Chiusano, David (DEC)

From: Stelmack, Mark J. <mark.stelmack@woodplc.com>
Sent: Thursday, June 14, 2018 4:51 PM
To: Chiusano, David (DEC)
Subject: Transmittal: Final Pre-Design Field Activities Plan for Batavia Iron & Metal Site #819018
Attachments: workplan.hw819018.2018-06-14.Batavia_Pre-Design Investigation_FAP_Final.pdf

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Dave

Attached is the final Field Activities Plan for Batavia Iron & Metal incorporating your review comments on the draft plan discussed by phone with MACTEC on June 13, 2008.

The field work is scheduled to begin the week of July 23 and continue for three weeks.

mark

Mark Stelmack
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MACTEC

engineering and constructing a better tomorrow

June 14, 2018

Mr. David Chiusano
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7017

Subject: **Field Activities Plan – Pre-Design Investigation**
Batavia Iron and Metal Co. (NYSDEC Site 819018)
MACTEC Engineering and Consulting, P.C., Project No. 3617137301

Dear Mr. Chiusano:

MACTEC Engineering and Consulting, P.C., (MACTEC), under contract to the New York State (NYS) Department of Environmental Conservation (NYSDEC) is submitting this Field Activities Plan (FAP) for the collection and analysis of surface and subsurface soil samples, and overburden groundwater samples to evaluate the extent of contamination at the Batavia Iron and Metal Company site (Site) (Site #819018) located in Batavia, New York. This FAP provides a description of the proposed sampling activities and is in accordance with the NYSDEC requirements in Work Assignment #D007619-25 under the Superfund Standby Contract between MACTEC and the NYSDEC.

Site Description

The Site (formerly Batavia Waste Material Co.) is located at 301 Bank Street in the City of Batavia, Genesee County, New York. The Site occupies an approximately 6.8 acres parcel; Figure 1 shows the Site boundary and bordering geographic features. The Site was formerly used to reclaim iron, metal, and wire materials for sale to recycling and manufacturing firms. In addition, the former site owners reportedly conducted demolition work.

Site topography generally slopes from north to south.

The Site is surrounded by:

- North and Northeast: Wetlands and Forest
- East: Residential Property
- South: Residential Property
- West: City of Batavia owned property (MacArthur Park)

The majority of the Site is unpaved and consists of either gravel areas or overgrown vegetation. Site features leftover from historic metals salvage and demolition activities include an approximate 8,000 square foot main building, remnants of former structures and surficial waste debris found throughout the Site (much of the surficial debris was either removed or stockpiled [i.e., rubber tires] during removal of on-site debris piles in 2018) (Figure 2). The main structure on the Site which housed furnaces for metal reclamation was destroyed in a fire in 1994 (GZA, 2012). Neighbors proximate to the site stated that the structure remnants and associated debris were pushed to the north end of the Site as fill. Neighbors also indicated that demolition debris, including brick, concrete, and asphalt, was accepted as fill at the Site to help raise the overall grade.

Historic fill consisting of asphalt, concrete pieces, coal fragments, and foundry sands has been observed at the southern end of the Site proximal to Bank Street (GZA, 2012). Fill consisting of brick, concrete, asphalt, and ash were also identified along the western property line during the 2017/2018 soil removal action at the adjacent City of Batavia owned property.

Previous sampling and remedial efforts associated with the Site include:

- 2012 Site Investigation Report (Environmental Restoration Program Investigation) (GZA, 2012)
  - Direct push boring and test pit soil sampling and groundwater sampling from 2006 to 2010;
  - Identified four areas of concern (AOCs):
    - AOC 1 – polychlorinated biphenyls (PCBs) and metals impacted fill in an area of a previous interim remedial measure (IRM) that addressed stained soils in the southeast corner of the Site
    - AOC 2 – PCBs, semi-volatile organic compounds (SVOCs), and metals impacted fill in the northern and western portions of the Site extending offsite along the northwestern property line
    - AOC 3- non-hazardous solid waste and debris present on the surface of the entire Site
    - AOC 4 – PCBs and metals impacted surface soil at offsite residential properties to the east.
  - Identified volatile organic compounds (VOCs), SVOCs, PCBs, and metals impacts to groundwater beneath the Site.

  - Identified potential soil vapor intrusion (SVI) pathways into residential structures from groundwater transport of VOC contaminants offsite.

- 2013-14 Offsite SVI Sampling Investigation (south and east from Site) (MACTEC, 2015)
  - Additional sampling of residential structures to assess potential for SVI from VOCs originating at the Site.
  - Installed three sub-slab depressurization systems at three residential properties as a mitigation effort based on the sub-slab VOC vapor concentrations

- 2014 Offsite residential soil sampling (south and east) (GeoLogic NY, Inc. [GeoLogic], 2014).
  - Additional direct push investigations on residential properties located south of the Site to evaluate the presence or absence of Site related contaminants on these properties.
  - Additional soil borings to refine the vertical and horizontal extent of contaminants exceeding NYS Residential Soil Cleanup Objectives (SCOs) on the residential properties to the east of the Site for the purpose of a Remedial Design (RD) for AOC 4.

- 2014 Offsite IRM – Residential PCB Removal (east) (MACTEC, 2015)
  - Completed removal of PCB and metals impacted surface soils on three residential properties to the east of the Site (AOC 4) (Figure 2).

- 2017-18 Offsite IRM – City of Batavia Property (west) (MACTEC, 2018)
  - Excavation and removal of soil and debris on the adjacent City of Batavia owned property west of the Site that was contaminated with PCBs and metals from Site activities (partial AOC 2) (Figure 2). Accessible areas were remediated to Residential SCOs.
  - Completed sampling, characterization, and removal of surface debris piles across the Site.

Specific source areas of contamination have not been identified for the contaminants of concern at the Site. Former operations, poor housekeeping, and dumping of oils and other fluids (battery acids, refrigerants, etc.) may have contributed to previously observed impacts in the fill material. Contaminants within the fill are not expected to significantly migrate horizontally from the Site into clean soils.

As part of field activities associated with the IRM conducted on the City of Batavia owned property (MACTEC, 2018), former structure remnants, an above ground storage tank, and the majority of the surficial waste debris was removed from the Site.

Remedial Design Investigation Objectives

Soil. Soil sampling conducted on the Site in 2006 (GZA, 2012) identified concentrations of PCBs above the NYS Residential SCO of 1 milligram per kilogram (mg/kg) identified in Table 375-6.8(b): Restricted

Use SCO (NYSDEC, 2006). Several metals (cadmium, copper, lead, and mercury) also exceeded the Residential SCOs.

As these contaminants represent the remedial driver for the Site, the purpose of the field sampling program outlined in this FAP is to further characterize the areas of the Site having concentrations of:

- PCBs greater than the residential (1 mg/kg) and commercial (25 mg/Kg) SCOs
- PCBs greater than 50 mg/kg
- Metals at concentrations above residential and commercial SCOs.

Characterization of the horizontal and vertical extent of soil contamination across the Site will support the scope of work for the site RD. To this end, a subset of samples will be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) for preliminary waste characterization. Based on visual and photoionization detection (PID) readings, a subset of samples will also be analyzed for VOCs and SVOCs.

Groundwater. Several contaminants have been detected previously in groundwater at the Site. Groundwater samples will be collected to establish a sitewide baseline of current groundwater conditions to support the RD scope of work.

Scope of Work

The scope of work consists of soil and groundwater sampling to evaluate extent of contamination. Table 1 includes a description of and rationale for the proposed field activities. Table 2 presents the soil sampling identifications (IDs) and analytical program, and Table 3 presents the groundwater sampling IDs and analytical program. Figures 3 and 4 show approximate soil and groundwater sampling locations, respectively.

The sampling will be conducted in accordance with MACTEC's Field Activities Plan & Quality Assurance Program Plan (QAPP) (MACTEC, 2011a) and with the NYSDEC DER-10 guidance (NYSDEC, 2010). The site-specific Health and Safety Plan (HASP) provided as Attachment 1 is based on the NYSDEC Program HASP (MACTEC, 2011b).

Prior to conducting intrusive work at the Site, Dig Safely New York will be contacted to identify underground utilities entering the Site. MACTEC's direct push subcontractor will procure a utility

location subcontractor to complete a survey in the area of proposed borings to be advanced across the southern half of the Site.

Community Air Monitoring Plan. A Community Air Monitoring Plan (CAMP) will be implemented during test pitting activities. The purpose of the CAMP is to provide a measure of protection for the downwind community from potential airborne contaminant releases resulting from proposed investigation activities. Site-specific procedures described below for fugitive dust and VOC monitoring are consistent with the NYS Department of Health generic CAMP as outlined in DER-10 (NYSDEC, 2010).

Particulate Air Monitoring.

Particulate monitoring will be conducted continuously during ground intrusive activities (e.g., installation of soil borings and/or monitoring wells). Dust/particulate monitoring will be conducted near upwind and downwind perimeters of the work area or where dust generating operations are obvious. Dust monitoring may be suspended during periods of heavy precipitation and snow cover.

Particulate air monitoring will be conducted with a DataRAM-4 or similar device. This instrument is equipped with an audible alarm (indication of action level exceedance) and is capable of measuring particulate matter less than 10 micrometers in size (PM-10). It will continually record emissions (calculating 15-minute running average concentrations) generated during field activities. The upwind and downwind dust monitoring devices will be checked periodically throughout each day of intrusive activities to assess emissions and the need for corrective action.

Weather conditions, including prevailing wind direction, will be observed and recorded each day of site activities. As work and weather conditions change throughout the day, the locations of the dust monitoring devices may be adjusted accordingly.

Particulate monitoring response and action levels include:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area.

- If after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 µg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work can resume if dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/m^3 of the upwind level and in preventing visible dust migration.

VOC Air Monitoring.

VOC air monitoring will be conducted in conjunction with the dust monitoring program. VOC air monitoring will be conducted using a RAE Systems MiniRAE 2000 VOC instrument (or a similar PID device) which provides real-time recordable air monitoring data.

VOC monitoring will be conducted for ground intrusive (continuous monitoring) and non-intrusive activities (periodic monitoring).

VOCs will be continuously monitored and recorded at the downwind perimeter of the immediate work area. Upwind concentrations will be measured before field activities commence and periodically throughout the day to establish background conditions. The downwind VOC monitoring device will also be checked periodically throughout the day to assess emissions and the need for corrective action.

VOC monitoring response and action levels include:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. Work activities can resume provided the total organic vapor level 200 feet downwind of the work area 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.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be suspended.

As work and weather conditions change throughout the day, the locations where the VOC monitoring devices are set up may be adjusted accordingly.

Soil Contaminant Delineation. Soil sampling to determine PCB extent were collected in 2006 from primarily the northern half of the Site as part of the previous Site Investigation. Soil samples for metals were collected in 2006 primarily from the southern half of the Site. Several metals were reported at concentrations above Residential SCOs.

Composite soil samples were collected in 2017 and 2018 from the onsite debris piles. Reported concentrations of PCBs in composite samples collected from each of the debris piles and from the soil sample locations typically exceeded the Residential (1 mg/kg) SCO.

Field activities proposed for the soil investigation consist of the completion of test pits, hand auger borings, direct push soil borings, and collection of soil samples for laboratory analyses to delineate concentrations of PCBs and metals in soil exceeding the Residential and Commercial SCOs.

To better define the aerial and vertical extent of soil contamination, a grid has been established across the Site, with borings and test pits planned in the center of each grid. A Global Positioning System device will be used to locate the approximate center of each grid, unless pre-established by the surveyor, prior to sampling. Sample locations will be marked with a pin flag upon completion. Proposed sample locations are presented on Figure 2; sample locations will be field-determined based onsite conditions within the designated grid coordinates.

Direct Push Sampling

Direct push sampling will be conducted primarily on the southern end of the Site where asphalt, new gravel vehicle parking areas, and proximity to buildings make test pitting difficult. The direct push sampling will consist of collecting continuous soil samples for visual characterization to depths of 12 feet below ground surface (bgs) or refusal if the top of the boulder-containing till is shallower than 12 feet. Sample location and soil description (soil type, color, grain size and moisture) will be documented on a field data record (FDR) (Attachment 2) using the unified soil classification system. Soil samples will be screened for VOCs using a PID with a 10.6 electron volt lamp. Sample collection for laboratory analysis are discussed below.

Hand Auger Sampling

Hand auger sampling will be conducted primarily along the northern and northeastern property boundary where wet conditions inhibit direct push and test pit sampling. The hand auger sampling will consist of

completing five borings for visual characterization to depths of 2 feet below the ground surface. Sample location soil description (soil type, color, grain size and moisture) will be documented on a FDR (Attachment 2) using the unified soil classification system. Soil will be screened for VOCs using a PID. Sample collection for laboratory analysis are discussed below.

Test Pit Sampling

Test pit sampling will consist of excavation of soils for visual characterization to two feet below the top of native soils (i.e., below bottom of fill). Due to the variable thicknesses of the fill on the Site, test pits may extend up to 12 feet bgs. Material will be excavated from the test pit in 2-foot intervals and staged on plastic sheeting and screened using a PID. Sample location, soil description (soil type, color, grain size, and moisture) using the unified soil classification system, and test pit dimensions will be documented on a FDR (Attachment 2). Sample collection for laboratory analysis are discussed below.

Test pits at the northern end of the Site are expected to encounter groundwater in the fill material. Test pits will continue to be advanced below the water table to the top of native soil if significant indications of impacted water (heavy sheen and/or free product) are not observed. If free product is observed to be entering the test pit, the excavation will be stopped and additional test pits will be advanced 25-feet away in each of the four immediately adjacent grid squares to attempt to delineate the area of potential free product. Visible confirmation of free product will be provided to the NYSDEC Project Manager upon discovery.

In the event that Site fill material is observed in test pits along the eastern property boundary, hand auger borings will be advanced off-site to visually delineate the horizontal and vertical extent of fill materials, if any, on the residential property east of the Site. Sample collection for laboratory analysis are discussed below.

Soil Sample Analytical Program

Proposed soil sample locations for the direct push borings, hand auger borings, and the test pits are presented on Figure 3.

Analytical soil samples for total metals and PCB analysis for the direct push borings/test pits will be collected as follows:

- surface soil: top 0-2 inches below grade or below the bottom of asphalt/gravel fill
- 2 feet bgs or from zones of potentially stained material

- bottom of the fill
- bottom of the boring/test pit (native soil) (sample collected two feet below the bottom of fill, if possible).

One soil sample from each direct push boring/test pit will also be analyzed for VOCs and SVOCs from an area with noted staining or the area with the highest PID reading. If PID readings or staining are not observed, the sample will be collected from within observed fill.

Analytical soil samples for total metals and PCB analysis for the hand auger borings will be collected as follows:

- Northern property boundary borings:
    - surface soil: top 0-6 inches below grade.
    - composite sample from the 1-2 feet bgs interval. The second deeper sample will be submitted to the laboratory with a hold on analysis pending the results of the shallow samples. If total PCBs or individual metals exceed Residential SCOs in the first sample, the deeper sample at that location will then be analyzed.
    - collected samples will also be analyzed for total organic carbon for comparison to sediment SCOs.
- Eastern property boundary borings (if completed):
    - surface soil: top 0-2 inches below grade
    - 2 feet bgs or from the bottom of fill material, if encountered.

Soil sample location IDs start with DP for the direct push borings, HA for the hand auger borings, and TP for the test pits and are based on the grid cell number (e.g., A02). Individual sample IDs will begin with the Site # 819018, followed by the sample location ID, followed by the three-digit sample depth in feet (e.g., 002 for 2 feet bgs) (Table 2). Grid coordinates will be field determined for sample location IDs for hand auger borings along the eastern property boundary, if completed.

Soil samples will be submitted to TestAmerica Laboratories, Inc. (TestAmerica) of Buffalo, New York for analysis. Based on individual metals concentrations detected, selected samples will be re-analyzed for TCLP metals for preliminary waste disposal estimations. Sample methods are listed in Table 2.

Groundwater Evaluation. Groundwater samples for VOCs, SVOCs, metals, and PCB analysis were collected in 2006 and in 2010 during the initial site investigation. Select VOCs, SVOCs, PCBs and/or

metals were detected in samples from several wells at concentrations exceeding Class GA standards (NYS, 1999).

Monitoring Well Installation

Six direct push borings will be completed as microwells per Section 4.4.4 of the QAPP (MACTEC, 2011a) to replace historical groundwater sampling locations that cannot be located, and to expand the existing monitoring well network. The proposed microwell locations are presented on Figure 4. The wells will be advanced to 12 feet bgs or refusal and constructed using 1-inch inner diameter Schedule 40 polyvinyl chloride (PVC) piping with a 5-foot 0.010-inch machine slotted screen. Number 0 sand will be placed around the screen and three feet above the screen, with a two-foot bentonite seal above the sand, and native backfill placed to the ground surface. The well located within the asphalt area near Bank Street will be completed with a flush mount casing. Other wells will be left as PVC stickups with a sealing cap.

The purpose of the new microwells is to supplement the existing monitoring well network to establish a baseline for groundwater conditions on the Site prior to the RD. The newly installed microwells will be developed (no sooner than 24 hours after installation for wells installed with top of screens below the water table) by over pumping as described in the Section 4.4.4 of the QAPP (MACTEC, 2011a). Measurements collected during well development will be recorded on a FDR included in Attachment 2.

Groundwater Sampling

Prior to groundwater sampling, a round of water levels will be collected by measuring depth to water from the Site wells (Figure 4). Monitoring wells and microwells will be sampled using low-flow sampling procedures as described in Section 4.5.4.3.2 of the Program QAPP (MACTEC, 2011a), if possible. Due to the sampling for per- and polyfluoroalkyl substances (PFAS), the field protocols to avoid cross-contamination of PFAS included in Attachment 3 will also be followed (MACTEC, 2017).

Field measurements for pH, temperature, specific conductivity, oxidation reduction potential, and dissolved oxygen will be collected through a flow through cell from each well during pre-sample purging. Turbidity will be measured separately with a turbidity meter. Field measurements and monitoring well sampling activities will be documented using a Low Flow Groundwater Data Record (Attachment 2).

Groundwater Sample Analytical Program

The groundwater sampling program including sample IDs is presented in Table 3. Groundwater samples will be submitted to TestAmerica for analyses of VOCs, SVOCs, Target Analyte List (TAL) metals, and PCBs. A subset of wells will be analyzed for the potential presence of emerging contaminants PFAS and 1,4-dioxane. PFAS analysis includes the six compounds identified in the United States Environmental Protection Agency (USEPA) Safe Drinking Water Act Unregulated Contaminant Monitoring Rule. Analytical methods are listed in Table 3.

Survey. A licensed surveying firm will survey the vertical and horizontal locations of: 1) newly installed wells MW-102 to MW-107, 2) well MW-101 installed in 2018 during the offsite IRM, and 3) at historical groundwater sampling locations MW-9 and SP-15. Horizontal locations will be tied to the NYS Plane Coordinate System using North American Datum of 1983 with an accuracy of 0.1 foot. Vertical elevations will be tied to mean sea level, using North American Vertical Datum of 1988, and measured to an accuracy of 0.01 foot.

Quality Assurance/Quality Control. Quality control samples will be collected at a frequency of 5 percent of the locations including field duplicates and matrix spike/matrix spike duplicates. Equipment blanks for the soil samples will be collected at a frequency of 5 percent.

Decontamination. Non-disposable sampling equipment that comes in contact with the samples to be analyzed will be decontaminated prior to collecting each sample. Tools and equipment will be washed with Liquinox® and potable water, and then rinsed with deionized water near the sampling location. The excavator bucket used during test pit activities will be cleaned with a high-pressure steam cleaner prior to advancing to the next location. Decontamination will occur at each test pit location, with decontamination fluids infiltrating into the ground at the decontamination location.

Investigation Derived Waste. Soil cuttings will be returned to the direct push borings and test pits in the general order in which they were removed. Disposable sampling equipment (gloves) will be double bagged for disposal as municipal solid waste.

Subcontractors. Subcontractors chosen to support the field activities include:

- Location survey will be completed by McDonald Engineering of Webster, New York.
- Test pits will be completed by Nothnagle Drilling, Inc. of Scottsville, New York.

- Direct push borings and microwell installation will be completed by Nature's Way Environmental Consultants of Alden, New York.
- Soil and groundwater sample analysis will be provided by TestAmerica. Sample results will include a category B deliverable and electronic data deliverable.

Deliverable. MACTEC will provide a letter report summarizing the activities completed during the investigation. The report will present soil analytical sample results in comparison with Part 375 Residential SCOs, and groundwater analytical sample results in comparison with Class GA groundwater standards (New York State, 1999). New York State has not published standards or guidance values for 1,4-dioxane or PFAS. Results for 1,4-dioxane will be compared to the USEPA Regional Screening Levels (RSLs) from May 2016 for residential tap water of 0.46 micrograms per liter (µg/L) (USEPA, 2016). Combined results for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) will be compared to the May 2016 USEPA Drinking Water Health Advisories of 70 nanograms per liter.

Completed FDRs, analytical results, and a Data Usability Summary Report (DUSR) will be provided as attachments to the report. Quality Control (QC) limits found in USEPA Region 2 validation guidelines in combination with the referenced analytical methods will be used during the data validation. Raw data checks, calculation checks, and transcription verifications will be performed only if QC issues are noted during the review that require further evaluation. Upon completion of the DUSR, an EQuIS Electronic Data Deliverable will be submitted.

If you have any questions or concerns, please feel free to call us at 207-775-5401.

Sincerely,

MACTEC Engineering and Consulting, P.C.

Mark J. Stelmack, P.E.
Project Manager

Charles R. Staples
Technical Lead

Attachments

Attachment 1: Site-Specific Health and Safety Plan

Attachment 2: Field Data Records

Attachment 3: Field Sampling Protocols to Avoid Cross-Contamination of Per- and Polyfluoroalkyl Substances (PFAS)

REFERENCES

GeoLogic NY, Inc., 2014. Remedial Action Work Plan, Remediation of Area of Concern #4, Batavia Iron and Metal Company, Inc., 301 and 305 Bank Street, Batavia, New York (Genesee Co.), Site No. 819018. Prepared by GeoLogic New York, Inc. Prepared for the New York State Department of Environmental Conservation. Revision No. 2. July 2014.

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MACTEC, 2015. Construction Completion Report, Area of Concern (AOC) 4, Remedial Action, Batavia Iron and Metal, State Superfund Site Number: 819018. Prepared for the New York State Department of Environmental Conservation, Albany, New York. June 2015.

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

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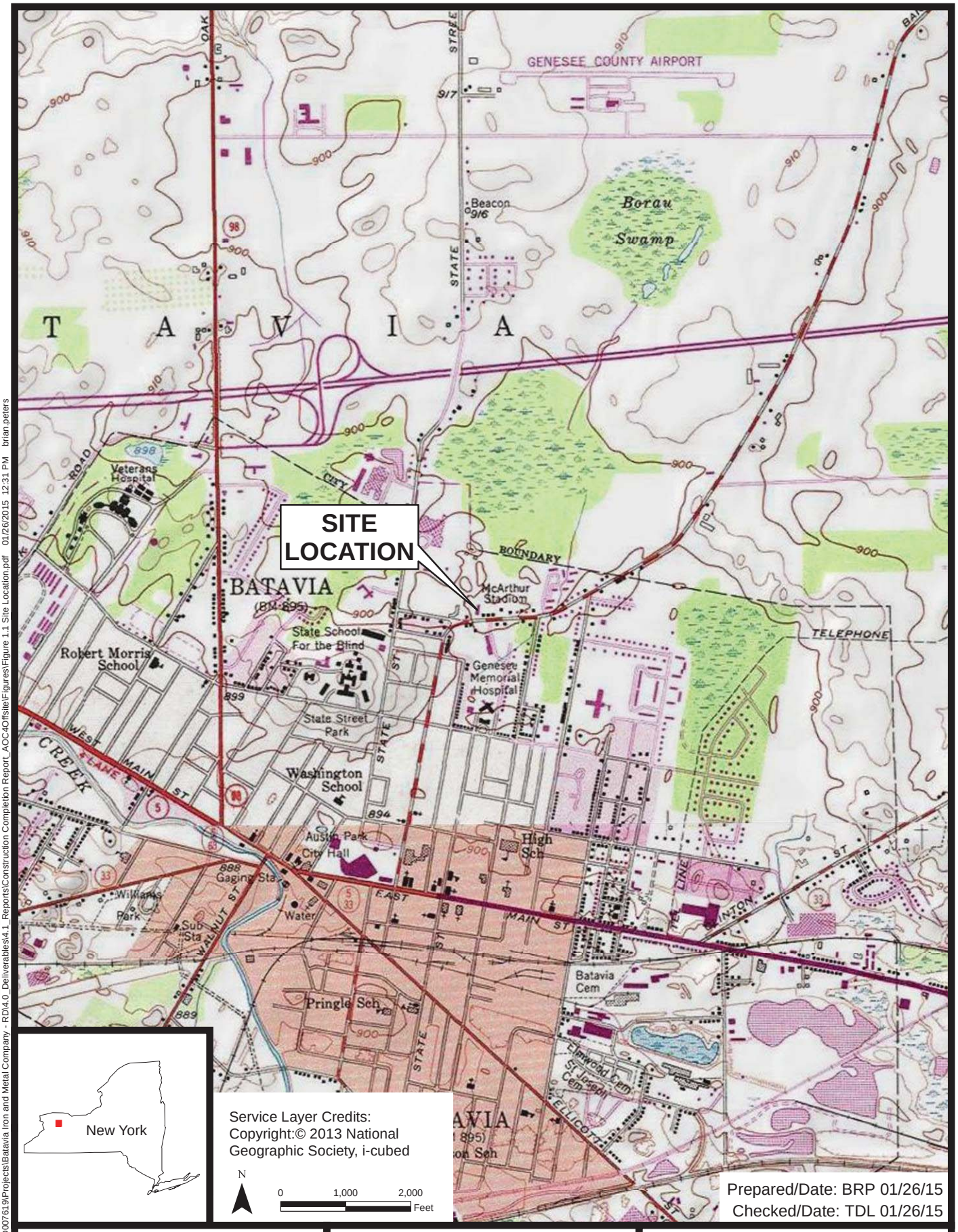
FIGURES



NYSDEC Site No. 819018
Batavia Iron and Metal Co.
Batavia, New York

MACTEC

Site Location

Project 3617137301 Figure 1

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ysdec1\Contract D007619\Projects\Batavia Iron and Metal Company - RD\4.0_Deliverables\4.5_Databases\GIS\MapDocuments\Batavia_Site_Loc_8x11P.mxd PDF: P:\Projects
ysdec1\Contract D007619\Projects\Batavia Iron and Metal Company - RD\4.0_Deliverables\4.1_Reports\Construction Completion Report_AOC4Offsite\Figures\Figure 1.1 Site Location.pdf 01/26/2015 12:31 PM brian.peters

Legend

- Site Property Boundary
- Approximate Limits of IRMs

N

0 50 100 Feet

Notes:

1. Genesee County color digital orthoimagery (2010) obtained from New York State GIS Clearinghouse at: gis.ny.gov

2. Site property boundary adapted from a plan entitled "Batavia Waste Material Corp., Inc.", provided by King Consulting Engineers, P. C. in AutoCAD format, dated June 2006.

Prepared/Date: BRP 01/26/15
Checked/Date: TDL 01/26/15

NYSDEC Site No. 819018
Batavia Iron and Metal Co.
Batavia, New York

MACTEC

Site Features

Project 3617137301 Figure 2

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Legend

Proposed Soil Sampling Locations:

- Direct Push
- Hand Auger
- Microwell/Direct Push
- Test Pit
- 25 Foot Grid
- Excavated as IRM
- Former Debris Piles
- Site Boundary

N

0 40 80 Feet

Genesee County color digital orthoimagery (2015) obtained from New York State GIS Clearinghouse at: gis.ny.gov

Prepared/Date: BRP 05/18/18
Checked/Date: CRS 05/18/18

NYSDEC Site No. 819018
Batavia Iron and Metal
Batavia, New York

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Proposed Soil Sampling Locations

Project 3617137301 Figure 3

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Legend

Groundwater Sampling Locations:

- Existing Monitoring Well/Microwell
- Proposed Microwell
- 25 Foot Grid
- Excavated as IRM
- Former Debris Piles
- Site Boundary

MW-1
MW-2
MW-3
MW-4
MW-5
MW-7
MW-8
MW-9
MW-101
MW-102
MW-103
MW-104
MW-105
MW-106
MW-107
SP-15

N

0 40 80 Feet

Genesee County color digital orthoimagery (2015) obtained from New York State GIS Clearinghouse at: gis.ny.gov

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NYSDEC Site No. 819018
Batavia Iron and Metal
Batavia, New York

MACTEC

Proposed Groundwater Sampling Locations

Project 3617137301 Figure 4

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TABLES

Table 1: Summary of Proposed Field Tasks, Methodology, Rationale, and Analytical Program

LOCATION TYPE	LOCATION ID	DESCRIPTION AND METHODOLOGY	RATIONALE	ANALYTICAL PROGRAM
Test Pit Soil Sampling[1]	TPI08 to TPY16 (ID based on grid ID)	Complete approximately 92 test pits up to two feet below fill material. Terminal depths will depend on fill thickness, but not expected to exceed 12 ft bgs. Up to 4 soil samples will be collected from each test pit.	Samples will be obtained to evaluate concentrations of PCBs, VOCs, SVOCs and Metals in surface and subsurface soils in unpaved Site areas.	368 soil samples plus QA/QC for PCBs, and metals plus a subset for VOCs and SVOCs.
Direct Push Soil Sampling[1]	DPK04 to DPT27 (ID based on grid ID)	Complete 16 direct push soil borings to approximately 12 feet bgs. Up to 4 soil samples will be collected from each boring.	Samples will be obtained to evaluate concentrations of PCBs, VOCs, SVOCs and Metals in surface and subsurface soils in paved site areas that are paved or were covered with new gravel in 2017 and 2018.	64 soil samples plus QA/QC for PCBs and metals plus a subset for VOCs and SVOCs.
Hand Auger Soil Sampling[1]	HAJ44 to HAQ41 (ID based on grid ID)	Complete 5 hand auger soil borings to approximately 2 feet bgs. Up to 2 soil samples will be collected from each boring.	Samples will be obtained to evaluate concentrations of PCBs and Metals in off-site surface and subsurface soils along the northern/northeastern site boundary.	10 soil samples plus QA/QC for PCBs, metals, and TOC.
Hand Auger Soil Sampling	Field Determined as Necessary (ID based on grid ID)	Complete hand auger soil borings, as necessary to delineate fill materials along and across the eastern property boundary based on observations in the nearby test pits. Up to 2 soil samples may be collected from each boring.	Samples will be obtained to evaluate concentrations of PCBs and Metals in surface and subsurface soils along the eastern site boundary.	Soil samples plus QA/QC for PCBs, metals
Monitoring Well Installation[2]	MW-102 to MW-107	Complete 6 direct push borings as groundwater monitoring wells.	Replace historical groundwater sampling locations and expand the existing monitoring well network to evaluate current overburden groundwater conditions on-Site.	NA
Groundwater Level Measurements	MW-1 to MW-5; MW-7 to MW-9; MW-101 to MW-107; SP-15	Water level measurements will be obtained at the existing and newly installed Site monitoring wells. Electronic water level meter will be used to collect readings to the nearest 0.01 feet.	Groundwater level measurements will be obtained to determine groundwater flow direction in the overburden aquifer.	NA
Baseline Monitoring Well Groundwater Sampling	MW-1 to MW-5; MW7 to MW-9; MW-101 to MW-107; SP-15	Collect low-flow groundwater samples from 10 existing on-site monitoring wells and 6 newly installed monitoring wells.	Groundwater samples will be obtained to evaluate groundwater quality across the Site.	16 groundwater samples plus QA/QC for PCBs, VOCs, SVOCs, and metals plus a subset for PFAS and 1,4-dioxane.
Surveying Services	MW-101 to MW-106; MW-9 and SP-15	MACTEC procured surveying firm will completed location survey of newly installed wells (MW-101 to MW-106) and at historical groundwater sampling locations MW-9 and SP-15.	The location survey of the groundwater wells will be used to evaluate groundwater flow conditions for the Site.	NA

Notes:
DP = direct push
MW/SP = monitoring well/microwell
TP = test pit
NA = not applicable
PCBs = polychlorinated biphenyls
PFAS = per- and polyfluoroalkyl substances
TOC = total organic carbon
VOCs = volatile organic compounds
SVOCs = semi-volatile organic compounds

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
DP/MW	J30	1257086.812	1097208.586	819018-DPJ30000	FS	*	*	X	X	
				819018-DPJ30___	FS	*	*	X	X	
				819018-DPJ30___	FS	*	*	X	X	
				819018-DPJ30___	FS	*	*	X	X	
DP/MW	L23	1257037.48	1097033.396	819018-DPL23000	FS	*	*	X	X	
				819018-DPL23___	FS	*	*	X	X	
				819018-DPL23___	FS	*	*	X	X	
				819018-DPL23___	FS	*	*	X	X	
DP/MW	M02	1256783.101	1096573.46	819018-DPM02000	FS	*	*	X	X	
				819018-DPM02___	FS	*	*	X	X	
				819018-DPM02___	FS	*	*	X	X	
				819018-DPM02___	FS	*	*	X	X	
DP/MW	N14	1256961.895	1096815.654	819018-DPN14000	FS	*	*	X	X	
				819018-DPN14___	FS	*	*	X	X	
				819018-DPN14___	FS	*	*	X	X	
				819018-DPN14___	FS	*	*	X	X	
DP/MW	T17	1257128.934	1096800.725	819018-DPT17000	FS	*	*	X	X	
				819018-DPT17___	FS	*	*	X	X	
				819018-DPT17___	FS	*	*	X	X	
				819018-DPT17___	FS	*	*	X	X	
				819018-DPT17___D	FD	*	*	X	X	
				819018-DPT17___MS	MS	*	*	X	X	
				819018-DPT17___MD	MD	*	*	X	X	
DP/MW	T27	1257260.199	1097013.491	819018-DPT27000	FS	*	*	X	X	
				819018-DPT27___	FS	*	*	X	X	
				819018-DPT27___	FS	*	*	X	X	
				819018-DPT27___	FS	*	*	X	X	
DP	K04	1256766.8	1096642.266	819018-DPK04000	FS	*	*	X	X	
				819018-DPK04___	FS	*	*	X	X	
				819018-DPK04___	FS	*	*	X	X	
				819018-DPK04___	FS	*	*	X	X	
DP	K06	1256793.053	1096684.82	819018-DPK06000	FS	*	*	X	X	
				819018-DPK06___	FS	*	*	X	X	
				819018-DPK06___	FS	*	*	X	X	
				819018-DPK06___	FS	*	*	X	X	
DP	M04	1256809.354	1096616.014	819018-DPM04000	FS	*	*	X	X	
				819018-DPM04___	FS	*	*	X	X	
				819018-DPM04___	FS	*	*	X	X	
				819018-DPM04___	FS	*	*	X	X	
DP	M06	1256835.607	1096658.567	819018-DPM06000	FS	*	*	X	X	
				819018-DPM06___	FS	*	*	X	X	
				819018-DPM06___	FS	*	*	X	X	
				819018-DPM06___	FS	*	*	X	X	
				819018-DPM06___D	FD	*	*	X	X	
				819018-DPM06___MS	MS	*	*	X	X	
				819018-DPM06___MD	MD	*	*	X	X	
DP	O02	1256825.654	1096547.207	819018-DPO02000	FS	*	*	X	X	
				819018-DPO02___	FS	*	*	X	X	
				819018-DPO02___	FS	*	*	X	X	
				819018-DPO02___	FS	*	*	X	X	
DP	O04	1256851.907	1096589.761	819018-DPO04000	FS	*	*	X	X	
				819018-DPO04___	FS	*	*	X	X	
				819018-DPO04___	FS	*	*	X	X	
				819018-DPO04___	FS	*	*	X	X	
DP	O06	1256878.16	1096632.314	819018-DPO06000	FS	*	*	X	X	
				819018-DPO06___	FS	*	*	X	X	
				819018-DPO06___	FS	*	*	X	X	
				819018-DPO06___	FS	*	*	X	X	
DP	O10	1256930.666	1096717.42	819018-DPO10000	FS	*	*	X	X	
				819018-DPO10___	FS	*	*	X	X	
				819018-DPO10___	FS	*	*	X	X	
				819018-DPO10___	FS	*	*	X	X	

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
DP	Q04	1256894.46	1096563.508	819018-DPQ04000	FS	*	*	X	X	
				819018-DPQ04___	FS	*	*	X	X	
				819018-DPQ04___	FS	*	*	X	X	
				819018-DPQ04___	FS	*	*	X	X	
				819018-DPQ04___D	FD	*	*	X	X	
				819018-DPQ04___MS	MS	*	*	X	X	
				819018-DPQ04___MD	MD	*	*	X	X	
DP	S08	1256989.52	1096622.361	819018-DPS08000	FS	*	*	X	X	
				819018-DPS08___	FS	*	*	X	X	
				819018-DPS08___	FS	*	*	X	X	
				819018-DPS08___	FS	*	*	X	X	
HA	J44	1257271.004	1097508.916	819018-HAJ44000	FS			X	X	X
				819018-HAJ44000D	FD			X	X	X
				819018-HAJ44000MS	MS			X	X	X
				819018-HAJ44000MD	MD			X	X	X
				819018-HAJ44___	FS			X	X	X
HA	L45	1257325.578	1097501.64	819018-HAL45000	FS			X	X	X
				819018-HAL45___	FS			X	X	X
HA	N46	1257382.336	1097492.18	819018-HAN46000	FS			X	X	X
				819018-HAN46___	FS			X	X	X
HA	P44	1257396.161	1097425.963	819018-HAP44000	FS			X	X	X
				819018-HAP44___	FS			X	X	X
HA	Q41	1257377.97	1097348.832	819018-HAQ418000	FS			X	X	X
				819018-HAQ418___	FS			X	X	X
TP	I08	1256782.072	1096750.344	819018-TPI08000	FS	*	*	X	X	
				819018-TPI08___	FS	*	*	X	X	
				819018-TPI08___	FS	*	*	X	X	
				819018-TPI08___	FS	*	*	X	X	
TP	I42	1257228.372	1097473.751	819018-TPI42000	FS	*	*	X	X	
				819018-TPI42___	FS	*	*	X	X	
				819018-TPI42___	FS	*	*	X	X	
				819018-TPI42___	FS	*	*	X	X	
TP	K08	1256819.306	1096727.373	819018-TPK08000	FS	*	*	X	X	
				819018-TPK08___	FS	*	*	X	X	
				819018-TPK08___	FS	*	*	X	X	
				819018-TPK08___	FS	*	*	X	X	
TP	K10	1256845.559	1096769.926	819018-TPK10000	FS	*	*	X	X	
				819018-TPK10___	FS	*	*	X	X	
				819018-TPK10___	FS	*	*	X	X	
				819018-TPK10___	FS	*	*	X	X	
				819018-TPK10___D	FD	*	*	X	X	
				819018-TPK10___MS	MS	*	*	X	X	
				819018-TPK10___MD	MD	*	*	X	X	
TP	K12	1256871.812	1096812.48	819018-TPK12000	FS	*	*	X	X	
				819018-TPK12___	FS	*	*	X	X	
				819018-TPK12___	FS	*	*	X	X	
				819018-TPK12___	FS	*	*	X	X	
TP	K14	1256898.065	1096855.033	819018-TPK14000	FS	*	*	X	X	
				819018-TPK14___	FS	*	*	X	X	
				819018-TPK14___	FS	*	*	X	X	
				819018-TPK14___	FS	*	*	X	X	
TP	K16	1256924.318	1096897.586	819018-TPK16000	FS	*	*	X	X	
				819018-TPK16___	FS	*	*	X	X	
				819018-TPK16___	FS	*	*	X	X	
				819018-TPK16___	FS	*	*	X	X	
TP	K18	1256950.571	1096940.139	819018-TPK18000	FS	*	*	X	X	
				819018-TPK18___	FS	*	*	X	X	
				819018-TPK18___	FS	*	*	X	X	
				819018-TPK20___	FS	*	*	X	X	

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
TP	K20	1256976.824	1096982.693	819018-TPK20000	FS	*	*	X	X	
				819018-TPK20___	FS	*	*	X	X	
				819018-TPK20___	FS	*	*	X	X	
				819018-TPK20___	FS	*	*	X	X	
				819018-TPK20___D	FD	*	*	X	X	
				819018-TPK20___MS	MS	*	*	X	X	
				819018-TPK22___MD	MD	*	*	X	X	
TP	K22	1257003.077	1097025.246	819018-TPK22000	FS	*	*	X	X	
				819018-TPK22___	FS	*	*	X	X	
				819018-TPK22___	FS	*	*	X	X	
				819018-TPK24___	FS	*	*	X	X	
TP	K24	1257029.33	1097067.799	819018-TPK24000	FS	*	*	X	X	
				819018-TPK24___	FS	*	*	X	X	
				819018-TPK24___	FS	*	*	X	X	
				819018-TPK26___	FS	*	*	X	X	
TP	K26	1257055.583	1097110.353	819018-TPK26000	FS	*	*	X	X	
				819018-TPK26___	FS	*	*	X	X	
				819018-TPK26___	FS	*	*	X	X	
				819018-TPK28___	FS	*	*	X	X	
TP	K28	1257081.836	1097152.906	819018-TPK28000	FS	*	*	X	X	
				819018-TPK28___	FS	*	*	X	X	
				819018-TPK28___	FS	*	*	X	X	
				819018-TPK30___	FS	*	*	X	X	
TP	K30	1257108.089	1097195.459	819018-TPK30000	FS	*	*	X	X	
				819018-TPK30___	FS	*	*	X	X	
				819018-TPK30___	FS	*	*	X	X	
				819018-TPK30___	FS	*	*	X	X	
				819018-TPK30___D	FD	*	*	X	X	
				819018-TPK30___MS	MS	*	*	X	X	
				819018-TPK32___MD	MD	*	*	X	X	
TP	K32	1257134.342	1097238.013	819018-TPK32000	FS	*	*	X	X	
				819018-TPK32___	FS	*	*	X	X	
				819018-TPK32___	FS	*	*	X	X	
				819018-TPK34___	FS	*	*	X	X	
TP	K34	1257160.595	1097280.566	819018-TPK34000	FS	*	*	X	X	
				819018-TPK34___	FS	*	*	X	X	
				819018-TPK34___	FS	*	*	X	X	
				819018-TPK36___	FS	*	*	X	X	
TP	K36	1257186.847	1097323.119	819018-TPK36000	FS	*	*	X	X	
				819018-TPK36___	FS	*	*	X	X	
				819018-TPK36___	FS	*	*	X	X	
				819018-TPK38___	FS	*	*	X	X	
TP	K38	1257213.101	1097365.672	819018-TPK38000	FS	*	*	X	X	
				819018-TPK38___	FS	*	*	X	X	
				819018-TPK38___	FS	*	*	X	X	
				819018-TPK38___	FS	*	*	X	X	
TP	K40	1257239.353	1097408.226	819018-TPK40000	FS	*	*	X	X	
				819018-TPK40___	FS	*	*	X	X	
				819018-TPK40___	FS	*	*	X	X	
				819018-TPK40___	FS	*	*	X	X	
				819018-TPK40___D	FD	*	*	X	X	
				819018-TPK40___MS	MS	*	*	X	X	
				819018-TPK40___MD	MD	*	*	X	X	
TP	K42	1257265.606	1097450.779	819018-TPK42000	FS	*	*	X	X	
				819018-TPK42___	FS	*	*	X	X	
				819018-TPK42___	FS	*	*	X	X	
				819018-TPK42___	FS	*	*	X	X	
TP	L44	1257313.136	1097480.206	819018-TPL44000	FS	*	*	X	X	
				819018-TPL44___	FS	*	*	X	X	
				819018-TPL44___	FS	*	*	X	X	
				819018-TPL44___	FS	*	*	X	X	

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
TP	M08	1256861.859	1096701.12	819018-TPM08000	FS	*	*	X	X	
				819018-TPM08___	FS	*	*	X	X	
				819018-TPM08___	FS	*	*	X	X	
				819018-TPM08___	FS	*	*	X	X	
TP	M10	1256888.113	1096743.673	819018-TPM10000	FS	*	*	X	X	
				819018-TPM10___	FS	*	*	X	X	
				819018-TPM10___	FS	*	*	X	X	
				819018-TPM10___	FS	*	*	X	X	
TP	M12	1256914.366	1096786.227	819018-TPM12000	FS	*	*	X	X	
				819018-TPM12___	FS	*	*	X	X	
				819018-TPM12___	FS	*	*	X	X	
				819018-TPM12___	FS	*	*	X	X	
				819018-TPM12___D	FD	*	*	X	X	
				819018-TPM12___MS	MS	*	*	X	X	
				819018-TPM12___MD	MD	*	*	X	X	
TP	M14	1256940.618	1096828.78	819018-TPM14000	FS	*	*	X	X	
				819018-TPM14___	FS	*	*	X	X	
				819018-TPM14___	FS	*	*	X	X	
				819018-TPM14___	FS	*	*	X	X	
TP	M16	1256966.871	1096871.333	819018-TPM16000	FS	*	*	X	X	
				819018-TPM16___	FS	*	*	X	X	
				819018-TPM16___	FS	*	*	X	X	
				819018-TPM16___	FS	*	*	X	X	
TP	M18	1256993.124	1096913.887	819018-TPM18000	FS	*	*	X	X	
				819018-TPM18___	FS	*	*	X	X	
				819018-TPM18___	FS	*	*	X	X	
				819018-TPM18___	FS	*	*	X	X	
TP	M20	1257019.377	1096956.44	819018-TPM20000	FS	*	*	X	X	
				819018-TPM20___	FS	*	*	X	X	
				819018-TPM20___	FS	*	*	X	X	
				819018-TPM20___	FS	*	*	X	X	
TP	M22	1257045.63	1096998.993	819018-TPM22000	FS	*	*	X	X	
				819018-TPM22___	FS	*	*	X	X	
				819018-TPM22___	FS	*	*	X	X	
				819018-TPM22___	FS	*	*	X	X	
				819018-TPM22___D	FD	*	*	X	X	
				819018-TPM22___MS	MS	*	*	X	X	
				819018-TPM22___MD	MD	*	*	X	X	
TP	M24	1257071.883	1097041.546	819018-TPM24000	FS	*	*	X	X	
				819018-TPM24___	FS	*	*	X	X	
				819018-TPM24___	FS	*	*	X	X	
				819018-TPM24___	FS	*	*	X	X	
TP	M26	1257098.136	1097084.1	819018-TPM26000	FS	*	*	X	X	
				819018-TPM26___	FS	*	*	X	X	
				819018-TPM26___	FS	*	*	X	X	
				819018-TPM26___	FS	*	*	X	X	
TP	M28	1257124.389	1097126.653	819018-TPM28000	FS	*	*	X	X	
				819018-TPM28___	FS	*	*	X	X	
				819018-TPM28___	FS	*	*	X	X	
				819018-TPM28___	FS	*	*	X	X	
TP	M30	1257150.642	1097169.206	819018-TPM30000	FS	*	*	X	X	
				819018-TPM30___	FS	*	*	X	X	
				819018-TPM30___	FS	*	*	X	X	
				819018-TPM30___	FS	*	*	X	X	
TP	M32	1257176.895	1097211.76	819018-TPM32000	FS	*	*	X	X	
				819018-TPM32___	FS	*	*	X	X	
				819018-TPM32___	FS	*	*	X	X	
				819018-TPM32___	FS	*	*	X	X	
				819018-TPM32___D	FD	*	*	X	X	
				819018-TPM32___MS	MS	*	*	X	X	
				819018-TPM32___MD	MD	*	*	X	X	

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
TP	M34	1257203.148	1097254.313	819018-TPM34000	FS	*	*	X	X	
				819018-TPM34___	FS	*	*	X	X	
				819018-TPM34___	FS	*	*	X	X	
				819018-TPM34___	FS	*	*	X	X	
TP	M36	1257229.401	1097296.866	819018-TPM36000	FS	*	*	X	X	
				819018-TPM36___	FS	*	*	X	X	
				819018-TPM36___	FS	*	*	X	X	
				819018-TPM36___	FS	*	*	X	X	
TP	M38	1257255.654	1097339.42	819018-TPM38000	FS	*	*	X	X	
				819018-TPM38___	FS	*	*	X	X	
				819018-TPM38___	FS	*	*	X	X	
				819018-TPM38___	FS	*	*	X	X	
TP	M40	1257281.907	1097381.973	819018-TPM40000	FS	*	*	X	X	
				819018-TPM40___	FS	*	*	X	X	
				819018-TPM40___	FS	*	*	X	X	
				819018-TPM40___	FS	*	*	X	X	
TP	M42	1257308.159	1097424.526	819018-TPM42000	FS	*	*	X	X	
				819018-TPM42___	FS	*	*	X	X	
				819018-TPM42___	FS	*	*	X	X	
				819018-TPM42___	FS	*	*	X	X	
				819018-TPM42___D	FD	*	*	X	X	
				819018-TPM42___MS	MS	*	*	X	X	
				819018-TPM42___MD	MD	*	*	X	X	
TP	N44	1257355.689	1097453.953	819018-TPN44000	FS	*	*	X	X	
				819018-TPN44___	FS	*	*	X	X	
				819018-TPN44___	FS	*	*	X	X	
				819018-TPN44___	FS	*	*	X	X	
TP	O08	1256904.413	1096674.867	819018-TPO08000	FS	*	*	X	X	
				819018-TPO08___	FS	*	*	X	X	
				819018-TPO08___	FS	*	*	X	X	
				819018-TPO08___	FS	*	*	X	X	
TP	O12	1256956.919	1096759.974	819018-TPO12000	FS	*	*	X	X	
				819018-TPO12___	FS	*	*	X	X	
				819018-TPO12___	FS	*	*	X	X	
				819018-TPO12___	FS	*	*	X	X	
TP	O14	1256983.172	1096802.527	819018-TPO14000	FS	*	*	X	X	
				819018-TPO14___	FS	*	*	X	X	
				819018-TPO14___	FS	*	*	X	X	
				819018-TPO14___	FS	*	*	X	X	
TP	O16	1257009.425	1096845.08	819018-TPO16000	FS	*	*	X	X	
				819018-TPO16___	FS	*	*	X	X	
				819018-TPO16___	FS	*	*	X	X	
				819018-TPO16___	FS	*	*	X	X	
				819018-TPO16___D	FD	*	*	X	X	
				819018-TPO16___MS	MS	*	*	X	X	
				819018-TPO16___MD	MD	*	*	X	X	
TP	O18	1257035.678	1096887.634	819018-TPO18000	FS	*	*	X	X	
				819018-TPO18___	FS	*	*	X	X	
				819018-TPO18___	FS	*	*	X	X	
				819018-TPO18___	FS	*	*	X	X	
TP	O20	1257061.931	1096930.187	819018-TPO20000	FS	*	*	X	X	
				819018-TPO20___	FS	*	*	X	X	
				819018-TPO20___	FS	*	*	X	X	
				819018-TPO20___	FS	*	*	X	X	
TP	O22	1257088.183	1096972.74	819018-TPO22000	FS	*	*	X	X	
				819018-TPO22___	FS	*	*	X	X	
				819018-TPO22___	FS	*	*	X	X	
				819018-TPO22___	FS	*	*	X	X	
TP	O24	1257114.437	1097015.293	819018-TPO24000	FS	*	*	X	X	
				819018-TPO24___	FS	*	*	X	X	
				819018-TPO24___	FS	*	*	X	X	
				819018-TPO24___	FS	*	*	X	X	

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
TP	O26	1257140.69	1097057.847	819018-TPO26000	FS	*	*	X	X	
				819018-TPO26___	FS	*	*	X	X	
				819018-TPO26___	FS	*	*	X	X	
				819018-TPO26___	FS	*	*	X	X	
				819018-TPO26___D	FD	*	*	X	X	
				819018-TPO26___MS	MS	*	*	X	X	
				819018-TPO26___MD	MD	*	*	X	X	
TP	O28	1257166.943	1097100.4	819018-TPO28000	FS	*	*	X	X	
				819018-TPO28___	FS	*	*	X	X	
				819018-TPO28___	FS	*	*	X	X	
				819018-TPO28___	FS	*	*	X	X	
TP	O30	1257193.195	1097142.953	819018-TPO30000	FS	*	*	X	X	
				819018-TPO30___	FS	*	*	X	X	
				819018-TPO30___	FS	*	*	X	X	
				819018-TPO30___	FS	*	*	X	X	
TP	O32	1257219.448	1097185.507	819018-TPO32000	FS	*	*	X	X	
				819018-TPO32___	FS	*	*	X	X	
				819018-TPO32___	FS	*	*	X	X	
				819018-TPO32___	FS	*	*	X	X	
TP	O34	1257245.702	1097228.06	819018-TPO34000	FS	*	*	X	X	
				819018-TPO34___	FS	*	*	X	X	
				819018-TPO34___	FS	*	*	X	X	
				819018-TPO34___	FS	*	*	X	X	
TP	O36	1257271.954	1097270.613	819018-TPO36000	FS	*	*	X	X	
				819018-TPO36___	FS	*	*	X	X	
				819018-TPO36___	FS	*	*	X	X	
				819018-TPO36___	FS	*	*	X	X	
				819018-TPO36___D	FD	*	*	X	X	
				819018-TPO36___MS	MS	*	*	X	X	
				819018-TPO36___MD	MD	*	*	X	X	
TP	O38	1257298.207	1097313.167	819018-TPO38000	FS	*	*	X	X	
				819018-TPO38___	FS	*	*	X	X	
				819018-TPO38___	FS	*	*	X	X	
				819018-TPO38___	FS	*	*	X	X	
TP	O40	1257324.46	1097355.72	819018-TPO40000	FS	*	*	X	X	
				819018-TPO40___	FS	*	*	X	X	
				819018-TPO40___	FS	*	*	X	X	
				819018-TPO40___	FS	*	*	X	X	
TP	O42	1257350.713	1097398.273	819018-TPO42000	FS	*	*	X	X	
				819018-TPO42___	FS	*	*	X	X	
				819018-TPO42___	FS	*	*	X	X	
				819018-TPO42___	FS	*	*	X	X	
TP	Q12	1256999.472	1096733.721	819018-TPQ12000	FS	*	*	X	X	
				819018-TPQ12___	FS	*	*	X	X	
				819018-TPQ12___	FS	*	*	X	X	
				819018-TPQ12___	FS	*	*	X	X	
TP	Q14	1257025.725	1096776.274	819018-TPQ14000	FS	*	*	X	X	
				819018-TPQ14___	FS	*	*	X	X	
				819018-TPQ14___	FS	*	*	X	X	
				819018-TPQ14___	FS	*	*	X	X	
				819018-TPQ14___D	FD	*	*	X	X	
				819018-TPQ14___MS	MS	*	*	X	X	
				819018-TPQ14___MD	MD	*	*	X	X	
TP	Q16	1257051.978	1096818.827	819018-TPQ16000	FS	*	*	X	X	
				819018-TPQ16___	FS	*	*	X	X	
				819018-TPQ16___	FS	*	*	X	X	
				819018-TPQ16___	FS	*	*	X	X	
TP	Q18	1257078.231	1096861.38	819018-TPQ18000	FS	*	*	X	X	
				819018-TPQ18___	FS	*	*	X	X	
				819018-TPQ18___	FS	*	*	X	X	
				819018-TPQ18___	FS	*	*	X	X	

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
TP	Q20	1257104.484	1096903.934	819018-TPQ20000	FS	*	*	X	X	
				819018-TPQ20___	FS	*	*	X	X	
				819018-TPQ20___	FS	*	*	X	X	
				819018-TPQ20___	FS	*	*	X	X	
TP	Q22	1257130.737	1096946.487	819018-TPQ22000	FS	*	*	X	X	
				819018-TPQ22___	FS	*	*	X	X	
				819018-TPQ22___	FS	*	*	X	X	
				819018-TPQ22___	FS	*	*	X	X	
TP	Q24	1257156.99	1096989.041	819018-TPQ24000	FS	*	*	X	X	
				819018-TPQ24___	FS	*	*	X	X	
				819018-TPQ24___	FS	*	*	X	X	
				819018-TPQ24___	FS	*	*	X	X	
				819018-TPQ24___D	FD	*	*	X	X	
				819018-TPQ24___MS	MS	*	*	X	X	
				819018-TPQ24___MD	MD	*	*	X	X	
TP	Q26	1257183.243	1097031.594	819018-TPQ26000	FS	*	*	X	X	
				819018-TPQ26___	FS	*	*	X	X	
				819018-TPQ26___	FS	*	*	X	X	
				819018-TPQ26___	FS	*	*	X	X	
TP	Q28	1257209.496	1097074.147	819018-TPQ28000	FS	*	*	X	X	
				819018-TPQ28___	FS	*	*	X	X	
				819018-TPQ28___	FS	*	*	X	X	
				819018-TPQ28___	FS	*	*	X	X	
TP	Q30	1257235.748	1097116.7	819018-TPQ30000	FS	*	*	X	X	
				819018-TPQ30___	FS	*	*	X	X	
				819018-TPQ30___	FS	*	*	X	X	
				819018-TPQ30___	FS	*	*	X	X	
TP	Q32	1257262.002	1097159.254	819018-TPQ32000	FS	*	*	X	X	
				819018-TPQ32___	FS	*	*	X	X	
				819018-TPQ32___	FS	*	*	X	X	
				819018-TPQ32___	FS	*	*	X	X	
TP	Q34	1257288.255	1097201.807	819018-TPQ34000	FS	*	*	X	X	
				819018-TPQ34___	FS	*	*	X	X	
				819018-TPQ34___	FS	*	*	X	X	
				819018-TPQ34___	FS	*	*	X	X	
				819018-TPQ34___D	FD	*	*	X	X	
				819018-TPQ34___MS	MS	*	*	X	X	
				819018-TPQ34___MD	MD	*	*	X	X	
TP	Q36	1257314.508	1097244.36	819018-TPQ36000	FS	*	*	X	X	
				819018-TPQ36___	FS	*	*	X	X	
				819018-TPQ36___	FS	*	*	X	X	
				819018-TPQ36___	FS	*	*	X	X	
TP	Q38	1257340.76	1097286.913	819018-TPQ38000	FS	*	*	X	X	
				819018-TPQ38___	FS	*	*	X	X	
				819018-TPQ38___	FS	*	*	X	X	
				819018-TPQ38___	FS	*	*	X	X	
TP	S10	1257015.773	1096664.915	819018-TPS10000	FS	*	*	X	X	
				819018-TPS10___	FS	*	*	X	X	
				819018-TPS10___	FS	*	*	X	X	
				819018-TPS10___	FS	*	*	X	X	
TP	S12	1257042.025	1096707.468	819018-TPS12000	FS	*	*	X	X	
				819018-TPS12___	FS	*	*	X	X	
				819018-TPS12___	FS	*	*	X	X	
				819018-TPS12___	FS	*	*	X	X	
TP	S14	1257068.278	1096750.021	819018-TPS14000	FS	*	*	X	X	
				819018-TPS14___	FS	*	*	X	X	
				819018-TPS14___	FS	*	*	X	X	
				819018-TPS14___	FS	*	*	X	X	
				819018-TPS14___D	FD	*	*	X	X	
				819018-TPS14___MS	MS	*	*	X	X	
				819018-TPS14___MD	MD	*	*	X	X	

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
TP	S16	1257094.532	1096792.574	819018-TPS16000	FS	*	*	X	X	
				819018-TPS16___	FS	*	*	X	X	
				819018-TPS16___	FS	*	*	X	X	
				819018-TPS16___	FS	*	*	X	X	
TP	S18	1257120.784	1096835.128	819018-TPS18000	FS	*	*	X	X	
				819018-TPS18___	FS	*	*	X	X	
				819018-TPS18___	FS	*	*	X	X	
				819018-TPS18___	FS	*	*	X	X	
TP	S20	1257147.037	1096877.681	819018-TPS20000	FS	*	*	X	X	
				819018-TPS20___	FS	*	*	X	X	
				819018-TPS20___	FS	*	*	X	X	
				819018-TPS20___	FS	*	*	X	X	
TP	S22	1257173.29	1096920.234	819018-TPS22000	FS	*	*	X	X	
				819018-TPS22___	FS	*	*	X	X	
				819018-TPS22___	FS	*	*	X	X	
				819018-TPS22___	FS	*	*	X	X	
TP	S24	1257199.543	1096962.787	819018-TPS24000	FS	*	*	X	X	
				819018-TPS24___	FS	*	*	X	X	
				819018-TPS24___	FS	*	*	X	X	
				819018-TPS24___	FS	*	*	X	X	
				819018-TPS24___D	FD	*	*	X	X	
				819018-TPS24___MS	MS	*	*	X	X	
				819018-TPS24___MD	MD	*	*	X	X	
TP	S26	1257225.796	1097005.341	819018-TPS26000	FS	*	*	X	X	
				819018-TPS26___	FS	*	*	X	X	
				819018-TPS26___	FS	*	*	X	X	
				819018-TPS26___	FS	*	*	X	X	
TP	S28	1257252.049	1097047.894	819018-TPS28000	FS	*	*	X	X	
				819018-TPS28___	FS	*	*	X	X	
				819018-TPS28___	FS	*	*	X	X	
				819018-TPS28___	FS	*	*	X	X	
TP	S30	1257278.302	1097090.448	819018-TPS30000	FS	*	*	X	X	
				819018-TPS30___	FS	*	*	X	X	
				819018-TPS30___	FS	*	*	X	X	
				819018-TPS30___	FS	*	*	X	X	
TP	S32	1257304.555	1097133.001	819018-TPS32000	FS	*	*	X	X	
				819018-TPS32___	FS	*	*	X	X	
				819018-TPS32___	FS	*	*	X	X	
				819018-TPS32___	FS	*	*	X	X	
TP	U14	1257110.832	1096723.768	819018-TPU14000	FS	*	*	X	X	
				819018-TPU14___	FS	*	*	X	X	
				819018-TPU14___	FS	*	*	X	X	
				819018-TPU14___	FS	*	*	X	X	
				819018-TPU14___D	FD	*	*	X	X	
				819018-TPU14___MS	MS	*	*	X	X	
				819018-TPU14___MD	MD	*	*	X	X	
TP	U16	1257137.085	1096766.321	819018-TPU16000	FS	*	*	X	X	
				819018-TPU16___	FS	*	*	X	X	
				819018-TPU16___	FS	*	*	X	X	
				819018-TPU16___	FS	*	*	X	X	
TP	U18	1257163.338	1096808.875	819018-TPU18000	FS	*	*	X	X	
				819018-TPU18___	FS	*	*	X	X	
				819018-TPU18___	FS	*	*	X	X	
				819018-TPU18___	FS	*	*	X	X	
TP	U20	1257189.591	1096851.428	819018-TPU20000	FS	*	*	X	X	
				819018-TPU20___	FS	*	*	X	X	
				819018-TPU20___	FS	*	*	X	X	
				819018-TPU20___	FS	*	*	X	X	
TP	U22	1257215.844	1096893.981	819018-TPU22000	FS	*	*	X	X	
				819018-TPU22___	FS	*	*	X	X	
				819018-TPU22___	FS	*	*	X	X	
				819018-TPU22___	FS	*	*	X	X	

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
TP	U24	1257242.097	1096936.535	819018-TPU24000	FS	*	*	X	X	
				819018-TPU24___	FS	*	*	X	X	
				819018-TPU24___	FS	*	*	X	X	
				819018-TPU24___	FS	*	*	X	X	
				819018-TPU24___D	FD	*	*	X	X	
				819018-TPU24___MS	MS	*	*	X	X	
				819018-TPU24___MD	MD	*	*	X	X	
TP	U26	1257268.349	1096979.088	819018-TPU26000	FS	*	*	X	X	
				819018-TPU26___	FS	*	*	X	X	
				819018-TPU26___	FS	*	*	X	X	
				819018-TPU26___	FS	*	*	X	X	
TP	U28	1257294.602	1097021.641	819018-TPU28000	FS	*	*	X	X	
				819018-TPU28___	FS	*	*	X	X	
				819018-TPU28___	FS	*	*	X	X	
				819018-TPU28___	FS	*	*	X	X	
TP	W16	1257179.638	1096740.069	819018-TPW16000	FS	*	*	X	X	
				819018-TPW16___	FS	*	*	X	X	
				819018-TPW16___	FS	*	*	X	X	
				819018-TPW16___	FS	*	*	X	X	
TP	W18	1257205.891	1096782.622	819018-TPW18000	FS	*	*	X	X	
				819018-TPW18___	FS	*	*	X	X	
				819018-TPW18___	FS	*	*	X	X	
				819018-TPW18___	FS	*	*	X	X	
TP	W20	1257232.144	1096825.175	819018-TPW20000	FS	*	*	X	X	
				819018-TPW20___	FS	*	*	X	X	
				819018-TPW20___	FS	*	*	X	X	
				819018-TPW20___	FS	*	*	X	X	
				819018-TPW20___D	FD	*	*	X	X	
				819018-TPW20___MS	MS	*	*	X	X	
				819018-TPW20___MD	MD	*	*	X	X	
TP	W22	1257258.396	1096867.729	819018-TPW22000	FS	*	*	X	X	
				819018-TPW22___	FS	*	*	X	X	
				819018-TPW22___	FS	*	*	X	X	
				819018-TPW22___	FS	*	*	X	X	
TP	Y16	1257222.191	1096713.816	819018-TPY16000	FS	*	*	X	X	
				819018-TPY16___	FS	*	*	X	X	
				819018-TPY16___	FS	*	*	X	X	
				819018-TPY16___	FS	*	*	X	X	
Equip. Blank	NA	NA	NA	819018EQ-01	EB	X	X	X	X	
Equip. Blank	NA	NA	NA	819018EQ-02	EB	X	X	X	X	
Equip. Blank	NA	NA	NA	819018EQ-03	EB			X	X	X
Equip. Blank	NA	NA	NA	819018EQ-04	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-05	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-06	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-07	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-08	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-09	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-10	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-11	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-12	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-13	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-14	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-15	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-16	EB			X	X	

Table 2: Soil Sampling and Analytical Schedule

	Sample Location					VOCs	SVOCs	PCBs	Metals	TOC
Site Type	Grid ID	X-coordinate	Y-coordinate	Sample ID	QC Code					
Equip. Blank	NA	NA	NA	819018EQ-17	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-18	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-19	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-20	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-21	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-22	EB			X	X	
Equip. Blank	NA	NA	NA	819018EQ-23	EB			X	X	

Sample collection criteria (Four samples ber boring/test pit):

1 - Surface soil 0-2 in.

2 - 2 ft below ground surface or from zones of stained material

3 - Bottom of fill

4 - Bottom of direct push/test pit (~2 ft below fill)

*Field determination = If elevated PID hit or odors encountered (VOC and SVOC sample collected; one per boring)

NOTES:

Location ID is based on Grid #

Sample Location = X/Y coordinates in NY State Plane West, feet

Samples IDs will be based on grid ID (see FAP text)

Last three digits represent sample depth in feet below ground surface (000=0.0 to 0.3 ft); depth may vary

DP = Direct push

DP/MW = Direct push / monitoring well

HA = Hand Auger

TP = Test pit

VOCs = Volatile organic compounds; to be analyzed by USEPA Method 8260B

SVOCs = Semi-volatile organic compounds, to be analyzed by USEPA Method 8270D

PCBs = Polychlorinated biphenyls; 9 Aroclors (NYSDEC ASP, 2005) to be analyzed by USEPA Method 8082A

Metals = Target Compound List (TCL) metals (NYSDEC ASP, 2005) to be analyzed by USEPA Methods 6010C/7471B/7470A

TOC = Total Organic Carbon to be analyzed by Llyod Kahn Method

Field duplicate samples will be collected at a frequency of 5%, field determined.

Matrix spike/matrix spike duplicate samples will be collected at a frequency of 5%, field determined

Equipment Blank will be collected at a frequency of 5%.

QC Code = FS = Field Sample, MS = Matrix Spike, MD = Matrix Spike Duplicate, EB = Equipment Blank

NA = Not applicable

Table 3: Groundwater Sampling and Analytical Program

Site Type	Media	Site Location ID	Field Sample Depth (feet bgs)	Sample ID	MS/MSD	DUP	VOCs 8260B	SVOCs 8270C	PCBs 8082A	TAL Metals 6010B 7470A	PFAS 537	1,4-Dioxane 8260 SIM
Monitoring Well	Groundwater	MW-1	22	819018-MW001022	X		1	1	1	1		
Monitoring Well	Groundwater	MW-2	20	819018-MW002020			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-3	21	819018-MW003021			1	1	1	1		
Monitoring Well	Groundwater	MW-4	11	819018-MW004011			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-5	8	819018-MW005008			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-7	9	819018-MW007009			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-8	15	819018-MW008015			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-9	12	819018-MW009012			1	1	1	1		
Monitoring Well	Groundwater	MW-101	TBD	819018-MW101___			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-102	TBD	819018-MW102___			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-103	TBD	819018-MW103___		X	1	1	1	1	1	1
Monitoring Well	Groundwater	MW-104	TBD	819018-MW104___			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-105	TBD	819018-MW105___			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-106	TBD	819018-MW106___			1	1	1	1	1	1
Monitoring Well	Groundwater	MW-107	TBD	819018-MW107___			1	1	1	1	1	1
Monitoring Well	Groundwater	SP-15	10	819018-SP015010			1	1	1	1	1	1
TOTAL SAMPLES							17	17	17	17	13	13

NOTES:
Sample ID = Site IDs begin with the NYSDEC Site # 819018 followed by well ID and sample depth (three digits; ___ represents depth not yet known).
bgs = below ground surface
DUP = Duplicate sample collected
MS/MSD = matrix spike and matrix spike duplicate sample collected
PFAS = per- and polyfluoroalkyl substances analyzed by Modified Method 537
VOCs = Target Compond List Volatile Organic Compounds analyzed by EPA Method 8260B.
SVOCs = Semi-Volatile Organic Compounds analyzed by EPA Method 8270D.
PCBS = Polychlorinated biphenyls analyzed by EPA Method 8082A.
TAL metals = Dissolved Target Analyte List metals analyzed by Method 6010B and 7470A.
1,4-Dioxane = analyzed by EPA Method 8260 Selective Ion Monitoring (SIM)
TBD = to be determined in the field (based on refusal; MW-101 installed during off-site RA, but depth not known).

Prepared By: NWV 06/13/18
Checked by:CRS 06/14/18

ATTACHMENT 1

SITE-SPECIFIC HEALTH AND SAFETY PLAN

MACTEC, Inc.

MACTEC Short Form HASP

Site: Batavia Iron and Metal Company, Inc. on-site (AOCs 1,2 and 3) Job/Task Number: 3617137301.03
Street Address: 301 Bank Street, Batavia, New York 14020
Proposed Date(s) of Investigation: June - August 2018
Prepared by: Nate Vogan Date: May 29, 2018
*Approved by: Kendra Bavor, CSP Date:
Site Description: **(attach map)** The New York State Department of Environmental Conservation (NYSDEC) classifies the Site as Class II Inactive Hazardous Waste Site where the disposal of contaminants has resulted in threats to public health and the environment that would be addressed by the remedy. The primary constituents of concern in soils have been identified as polychlorinated biphenyls (PCBs) and select metals, and PCBs and select chlorinated volatile organic compounds (VOCs) in groundwater. The presence of contaminants at this property has contaminated surficial and subsurface soils and groundwater.

General Scope: Site reconnaissance, soil sampling with direct push rig and advancement of test pits across the Site.

*Approval also serves as certification of a Hazard Assessment as required by 29 CFR 1910.132

Tasks:

MACTEC	Other Contractor/ Subcontractor	Task Description
☒	☐	Soil sampling
☐	☒	Direct Push sampling
☐	☒	Test Pit sampling

Dates of Required Training and Medical Surveillance (add additional training topics, as required**):**

Name	Nate Vogan	Rene Aube	
	Dates	**Dates**	**Dates**
Medical Surveillance	11/29/2017	9/1/2017	
40-Hour Initial	6/20/2008	1/1/1995	
8-Hour Supervisor [3]	6/4/2013	4/13/2006	
8-Hour Refresher	4/2/2018	2/2/2017	
First Aid	2/17/2017	6/5/2017	
CPR	2/17/2017	6/5/2017	
Hazard Communication	1/2/2018	1/26/2016	
Lead Standard	7/21/2016		
Cadmium Standard			
Asbestos Certification			

[2] At least one worker must be trained in First Aid/CPR and should received Bloodborne Pathogen Training
[3] Required for Field Lead and Site Health and Safety Officer

Known or Suspected Contaminants (include PELs/TLVs):

Contaminants of Concern (COC) (Attach Fact Sheets*)	**Maximum Concentrations**		**PEL/TLV**
	Soil (mg/kg)	**Water/ Groundwater (µg/l)**	
Benzo(a)anthracene	67	-	0.2mg/m3
Benzo(a)pyrene	46	-	0.2mg/m3
Benzo(b)fluoranthene	58	-	0.2mg/m3
Benzo(k)fluoranthene	29	-	0.2mg/m3

Contaminants of Concern (COC) (Attach Fact Sheets*)	Maximum Concentrations		PEL/TLV
	Soil (mg/kg)	Water/ Groundwater (µg/l)	
Dibenzo(a,h)anthracene	7.5	-	NA
Indeno(1,2,3-cd)Pyrene	20	-	0.2mg/m3
Phenol	0.71	-	5 ppm
Asbestos	-	-	0.1 f/cc
Arsenic	42.6	-	0.01mg/m3
Cadmium	50	-	0.005mg/m3
Chromium	32660	-	0.01 mg/m3
Copper	12400	-	1 mg/m3
Lead	5690	-	0.05 mg/m3
Mercury	21.5	-	0.025mg/m3
Nickel	318	-	1mg/m3
PCBs	480	4.4	0.5mg/m3

*Workers must be made aware of the signs, symptoms, and first aid for each COC. Information is located on the COC fact sheets. Note the Chromium listed here is not HexChromium.

Air Monitoring Action Levels:

PID/FID Reading[1]	Detector Tube[1]	Dust Meter[1]	LEL[2]/O_2[1]	Action
		Visual dust		Cease work, move up wind, and implement engineering controls to minimize dust. (respirable)
			>10% LEL	Stop work. Evacuate area. Consider return with ventilation system and spark proof/intrinsically safe equipment.
			<19.5% O_2	Stop work and evacuate area.

[1] Sustained readings measured in the breathing zone
[2] Readings at measured at the source (borehole, well, etc.)

AHAs: Check and attach all that apply (add applicable AHAs not already listed):

☒	Mobilization Demobilization and Site Preparation	☒	Insect Stings and Bites
☒	Field Work - General	☒	Working with Preservatives
☒	Field Work - Oversight	☒	Poisonous Plants
☒	Decontamination	☒	Site Reconnaissance
☒	Utility Clearance – for reference	☒	Geoprobe Investigation Oversight
☒	Soil Sample w Hand Auger, Hand Tools	☒	Perimeter Air Monitoring

HAZARD IDENTIFICATION SUMMARY

Complete the checklist for summarizing the hazards identified in the JHAs

Standard Hazards			
☐ Falling Objects	☒ Slips and trips	☒ Pinch points	☐ Rotating equipment
☒ Falls	☐ Power equipment/tools	☐ Elevated work surfaces	☐ _____
Eye Hazards			
☒ Particulates	☐ Liquid splashes	☐ Welding Arc	☐ _____
Hearing Hazards			
☒ None	☒ Impact noise	☐ High frequency noise	☐ High ambient noise

Respiratory Hazards						
☐ None	☒ Dust/aerosols/particulates	☐ Organic Vapors	☐ Acid Gases	☐ O_2 deficient	☒ Metals	☐ Asbestos

Chemical Hazards			
☐ None	☐ Organic solvents	☐ Reactive metals	☒ PCBs
☐ Acids / bases	☐ Oxidizers	☐ Volatiles/Semi-volatiles	☒ Lead, Cadmium (Note Chromium is not HEXCHROME)

Environmental Hazards				
☐ None	☒ Cold Stress	☒ Heat Stress	☒ Wet location	☒ Bio hazards (snakes, insects, spiders, poisonous plants, etc.)
☐ Explosive vapors	☐ Confined space	☐ Engulfment Hazard	☐ _____	

Electrical Hazards				
☒ None	☐ Energized equipment or circuits	☐ Overhead utilities	☐ Underground utilities	☐ Wet location

Fire Hazards			
☒ None	☐ Cutting, welding, or grinding generated sparks or heat sources	☐ Flammable materials present	☐ Oxygen enriched location

Ergonomic Hazards					
☒ Lifting	☐ Bending	☐ Twisting	☒ Pulling/tugging	☐ Repetitive motion	☒ Carrying
Computer Use in the: ☐ Office ☒ Field			☐ _____	☐ _____	

Radiological Hazards						
☒ None	☐ Alpha	☐ Beta	☐ Gamma/X-rays	☐ Neutron	☐ Radon	☐ Non-Ionizing

Other Hazards
☒ See attached supplemental information – Cadmium, Lead Standards

PPE and Monitoring Instruments

Initial Level of PPE *			
☒ Level D	☐ Modified Level D	☐ Level C	* Cannot use Short Form HASP for Level B or A work

Standard PPE					
☒ Hard Hat	☒ Safety boots	☒ Safety glasses	☐ Chem. Resistant Boots	☒ High visibility vest	☒ Other: Proper Working Gloves

Eye and Face Protection			
☐ Face shield	☐ Vented goggles	☐ Unvented goggles	☐ Indirect vented goggles

Hearing Protection			
☒ Ear plugs	☐ Ear Muffs	☐ Ear plugs and muffs	☐ Other _____

Respiratory Protection **Upgrade only**					
☒ None	☐ Dust mask	☐ Full Face APR	☐ Half Face APR	Cartridge Type: _____	Change Cartridges: __8_hr__

Protective Clothing			
☒ Work uniform	☐ White uncoated Tyvek®	☐ Poly-coated Tyvek®	☐ Saranex®
☐ Boot covers	☒ Reflective vest	☐ Chaps or Snake Legs	☐ Other ___

Hand Protection					
☐ None	☐ Cotton gloves	☐ Leather gloves	☐ Glove liners	☒ Cut-resistant gloves	☒ Other Nitrile and proper gloves for the task

					_____

☐ Outer Gloves: List Type:	☐ Inner Gloves: List Type_____

Monitoring Instruments Required*

One day of air monitoring for lead and cadmium will be conducted using a Galson personal air monitoring pump and sampling cassette.

Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:

- When work begins on a different portion of the site.
- When contaminants other than those previously identified are being handled.
- When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling.)
- When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon.)

☐ LEL/O2 Meter	☐ PID: ☐ 10.0-10.6 eV Lamp ☐ 11.7 eV Lamp	☐ FID	☐ Hydrogen Sulfide/Carbon Monoxide
☐ Dräger Pump (or equivalent) List Tubes_____	☐ Dust Meter: ☐ Respirable dust ☐ Total dust		☐ Other _Galson Pump_____

*Monitoring instruments will be calibrated daily in accordance with manufacturer's instructions. Results will be recorded in the field logbook.

PPE Selection Guidelines

When selecting the appropriate PPE for the job, consider the following:

- **Safety glasses** – general eye protection – source of hazard, typically coming from straight on, required at most sites
- **Tinted Safety Glasses** – same as above, but when working in direct sunlight. May need two both tinted and untinted if working in both sunlight and shade/overcast skies.
- **Safety goggles** – needed for splash hazard, more severe eye exposures coming from all directions. Non-vented or indirect venting for chemical splash, non-vented for hazardous gases or very fine dust, vented for larger particulates coming from all directions.
- **Face shield** – needed to protect face from cuts, burns, chemicals (corrosives or chemicals with skin notation), etc.
- **Safety boots** – needed if danger of items being dropped on foot that could injure foot
- **Hard hat** – danger from items falling on head – any overhead work, tools, equipment, etc that is above the head and could fall on head of item fails, or falls off work platform. Typically required at most sites as a general PPE
- **Thin, chemical protective inner gloves** (e.g., thin Nitrile, PVC – do not use latex – many people are allergic to latex) –needed to protect hands from incidental contact with low risk contamination at very low concentrations (ppb or low ppm concentrations in groundwater or soil) or used in combination with outer gloves as a last defense against contamination. Need to specify type
- **Outer gloves** – thicker gloves (e.g., Nitrile, Butyl, Viton, etc.) – used when potential for high concentrations of contaminants (e.g., floating product, percent ranges of contaminant, opening drums, handling pure undiluted chemicals, etc.). Need to specify type.
- **Leather gloves, leather palm, cotton** – good in protecting hands against cuts – no protection from chemicals. May be used in combination with chemical protective gloves.
- **Boot Covers –** when there is contamination in surface soils or waking surface in general. When safety boots need protection from contact with contaminants.
- **White (uncoated) Tyveks** – protect clothing from getting dirty, good for protection against solid, non-volatile chemicals (e.g., asbestos, metals) – no chemical protection.
- **Polycoated Tyveks** – least protective of chemical protective clothing. Used when some risk of contamination getting on skin or clothing. Usually, lower ppm ranges of contaminants.
- **Saranex** – Greater protection against contamination than Polycoated Tyveks. Used to protect against PCBs or higher concentrations of contaminants in the soil or groundwater.
- **Other Chemical protective clothing** – if significant risk of dermal exposure, contact H&S to determine best kind.

- **Long sleeved shirts, long pants** – if working in areas with poison ivy/oak/sumac, poisonous insects, etc. and no chemicals exposure. May want to use uncoated Tyveks for work in areas where poisonous plants are known to be to protect clothing.
- **Cartridge Respirator (Level C PPE)** – Need to calculate change schedule (contact Division EH&S Manager for this) to determine length of use. To be able to use cartridge respirators, need to know contaminants, estimate levels to be encountered in the breathing zone, need to ensure that cartridge will be effective against COCs, and need to be able to monitor for COCs using PID, FID, Dräger tubes, etc. If can't do any of these, then Level B PPE is probably going to be needed.
- **High Visibility Vest** – needed for any road work (within 15 feet of a road) or when working on a site with vehicular traffic or working around heavy equipment. Needed if work tasks would take employee concentration away from movement of vehicles and workers would have to rely on the other driver's ability to see the employee in order not to hit them. This includes heavy equipment as well as cars and trucks, on public roads or the jobsite. Not needed if wearing Polycoated Tyveks – as they are already high visibility.
- **Reflective Vest** – see above, but for use at night.
- **Hearing Protection** – needed if working at noise levels above 85 dBA on a time weighted average. If noise measurements are not available, use around noisy equipment, or in general, if you have to raise your voice to be heard when talking to someone standing two feet away.
- **Protective Chaps –** required when using a machete or chain saw or any other cut hazard to legs.

Note: It is important to realize that during Construction Oversight Activities MACTEC employees are typically on-site as individuals as opposed to teams. As a result it is particularly important to develop a Safety Relationship with the General Contractor to discuss daily activities and functions to review MACTEC safety concerns and procedures and the Contractors safety procedures. It is important to attend daily work briefings and safety meetings as a part of the project team.

Additionally, MACTEC should abide by the Contractors safety protocols in general for the project UNLESS they are counter to MACTEC Corporate protocols and directives or those of the MACTEC project HASP.

Of particular note:

1. Check in with the site supervisor or foreman upon arrival at the site each day. It is advisable to provide emergency contact information to the Contractor for yourself.

2. Maintain eye contact at all times with equipment operators and vehicle drivers. Broadcast your intentions at all times when moving about the site and your intentions to inspect the work and where you will be working.

3. Do not enter confined spaces, sheeted excavations, trenches or other isolated areas without assessing the safety requirements, without additional MACTEC support personnel review and without modifying this HASP.

4. MACTEC duties at the site are to evaluate, document, and inspect a cross-section of the work and not each and every physical element of the Contractor's activities. It is not necessary to place yourself in unsafe situations or locations where your project planning and safety evaluations have not been evaluated.

5. As previously indicated MACTEC is under no obligation to stay in exclusion zone areas in the event of any abnormal work excursions or occurrences and should pull back to safe limits as appropriate and if it is safe to do so offer support as a zone resource.

Chemicals Brought to the Site:

List all chemicals brought to the site (e.g., preservatives, decon solutions, calibration gases, gasoline, etc.).

Chemicals (Note: Name listed must match name on label and MSDS)	**SDS Attached?**
NITRIC ACID	☒
LIQUINOX	☒

Chemicals will be kept in their original containers. If transferred to another container, aside from days use by one individual, the new container will be labeled with the name of the chemical and the hazard warnings.

Work Zones:

It should be anticipated that any or all of the following will be employed by the subcontractor to delineate exclusion zone areas as appropriate. It is MACTECs responsibility to determine where these areas exist and respond accordingly and abide by requests and direction of the subcontractor site supervisors.

The work zones will be defined relative to the location of the work activity. The Exclusion Zone is considered the area within a 10-foot diameter of the sampling location. The Contamination Reduction Zone is considered to be the area within a 20-foot diameter of the sampling location. The decontamination zone is to be located upwind of the work area. Work zones will be maintained through the use of:

☒ Warning Tape
☒ Cones and Barriers
☒ Visual Observations

All zonation (see above) will be utilized by the subcontractor as well as other barricades, lights, and signage to control and alert facility personnel, control traffic, and barricade excavation.

Decontamination Procedures and Equipment:
Note: See Decontamination JHA for further information

Level D Decontamination Procedures

Decontamination Solution:	Detergent and Water
Station 1: Equipment Drop	Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc. on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.
Station 2: Outer Boots, and Gloves Wash and Rinse (if worn)	Scrub outer boots, and outer gloves decon solution or detergent water. Rinse off using copious amounts of water.
Station 3: Outer Boot and Glove Removal (if worn)	Remove outer boots and gloves. Deposit in plastic bag.
Station 4: Inner glove removal	Remove inner gloves and place in plastic bag.
Station 5: Field Wash	Hands and face are thoroughly washed. Shower as soon as possible.

Modified Level D and Level C PPE Decontamination Procedures

Decontamination Solution:	Detergent and Water
Station 1: Equipment Drop	Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc. on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.
Station 2: Outer Garment, Boots, and Gloves Wash and Rinse	Scrub outer boots, outer gloves, and splash suit with decon solution or detergent water. Rinse off using copious amounts of water.
Station 3: Outer Boot and Glove Removal	Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4: Canister or Mask (Level C only) Change	If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers are donned, joints are taped, and worker returns to duty.
Station 5: Boot, Gloves and Outer Garment	Boots, chemical resistant splash suit, and inner gloves are

	Removal	removed and deposited in separate containers lined with plastic.
Station 6:	Face Piece Removal (Level C only)	Facepiece is removed. Avoid touching face with fingers. Facepiece is deposited on plastic sheet.
Station 7:	Field Wash	Hands and face are thoroughly washed. Shower as soon as possible.

Site Communication: Again, specific protocols may be developed by the RAC which MACTEC personnel should be aware and abide by. MACTEC field personnel should be communicating with the MACTEC Project Manager and or their direct report on a daily basis.

Site Communication:

☒ Verbal
☒ Two-way radio
☒ Cellular telephone
☒ Hand signals

- Hand gripping throat ---------- Out of air, can't breathe
- Grip partner's wrist or both hands around waist ---------- Leave area immediately
- Hands on top of head ---------- Need assistance
- Thumbs up ---------- OK, I am all right, I understand
- Thumbs down ---------- No, negative

☐ Horn
☐ Siren
☐ Other:

EMERGENCY CONTACTS

NAME	TELEPHONE NUMBERS		DATE OF PRE-EMERGENCY NOTIFICATION (if applicable)
Fire Department:	911		
Hospital:	United Memorial Medical Center - (585) 343-6030 - Prim. The Jerome Center (Urgent Care) – 585-344-4800		
WorkCare	1-888-449-7787		
Police Department:	911		
Site Health and Safety Officer: Dena Gitto	Office: 732-302-9500	Cell: 732-325-8243	
Client Contact: David Chiusano	Office: 518-402-9814	Cell:	
Project Manager: Mark Stelmack	Office: 207-828-3592	Cell: 207-838-5928	
Regional HSE Manager: Cindy Sundquist	Office: 207-828-3309	Cell: 207-650-7593 Home: 207-892-4402	
Corporate VP of HSE – Vlad Ivensky	Office: 610-877-6144	Cell: 484-919-5175 Home: 215-947-0393	
EPA/DEP (if applicable):			
OTHER: Ambulance	911		

NAME	TELEPHONE NUMBERS		DATE OF PRE-EMERGENCY NOTIFICATION (if applicable)

Emergency Equipment:
The following emergency response equipment is required for this project and shall be readily available:

- ☒ Field First Aid Kit (including bloodborne pathogen kit/supplies)
- ☐ Fire Extinguisher (ABC type)
- ☐ Eyewash (Note: 15 minutes of free-flowing fresh water)
- ☐ Other: _____

EMERGENCY PROCEDURES

- The HSO (or alternate) should be immediately notified via the on-site communication system. The HSO assumes control of the emergency response.
- The HSO notifies the Project Manager and client contact of the emergency.
- If the emergency involves an injury to an AMEC employee, the HSE Coordinator or Field Lead are to implement the AMEC Early Injury Case Management program. See procedures and Flow Diagram below:
- If applicable, the HSO shall notify off-site emergency responders (e.g. fire department, hospital, police department, etc.) and shall inform the response team as to the nature and location of the emergency on-site.
- If applicable, the HSO evacuates the site. Site workers should move to the predetermined evacuation point (See Site Map).
- For small fires, flames should be extinguished using the fire extinguisher. Large fires should be handled by the local fire department.
- In an unknown situation or if responding to toxic gas emergencies, appropriate PPE, including SCBAs (if available), should be donned. If appropriate PPE is unavailable, site workers should evacuate and call in emergency personnel.
- For chemical spills, follow the job specific JHA for spill containment
- If chemicals are accidentally spilled or splashed into eyes or on skin, use eyewash and wash affected area. Site worker should shower as soon as possible after incident.
- If the emergency involves toxic gases, workers will back off and reassess. Prior to re-entering the work zone, the area must be determined to be safe. Entry will be using Level B PPE and utilize appropriate monitoring equipment to verify that the site is safe.
- An injured worker shall be decontaminated appropriately.
- Within 24 hours after any emergency response, the Incident Analysis Report (and Vehicle Incident Report if vehicle incident) shall be completed and returned to the Regional HSE Manager. Injuries requiring medical treatment beyond first aid (as well as work-related vehicle incidents) will require the employee to submit a post incident drug test.

Amec Foster Wheeler Early Injury Case Management Program

<table>
<tr><th>NON-EMERGENCY INCIDENT</th><th>EMERGENCY INCIDENT</th></tr>
<tr><td>Steps 1 & 2 must be completed before seeking medical attention other than local first aid.
1. Provide first-aid as necessary. Report the situation to your immediate supervisor AND HSE coordinator (all incidents with the apparent starting event should be reported within 1 hour of occurrence).
2. Injured employee:</td><td>1. Provide emergency first aid. Supervisor on duty must immediately call 911 or local emergency number; no employee may respond to outside queries without prior authorization. Any outside media calls concerning this incident must be referred immediately to Lauren Gallagher at 602-757-3211.
2. Once medical attention is sought and provided, the supervisor must:</td></tr>
<tr><td colspan="2">Call WorkCare 24/7 Hotline*
(888) II-XPRTS or (888) 449-7787</td></tr>
<tr><td>WorkCare will assess the situation and determine whether the incident requires further medical attention. During this process, WorkCare will perform the following:
• Explain the process to the caller.
• Determine the nature of the concern.
• Provide appropriate medical advice to the caller.
• Determine appropriate path forward with the caller.
• Maintain appropriate medical confidentiality.
• Help caller to execute path forward, including referral to the appropriate local medical facility.
• Send an email notification to the Corporate HSE Department.</td><td>WorkCare will be responsible for performing the following:
• Contact the treating physician.
• Request copies of all medical records from clinic.
• Send an email update to the Corporate HSE Department.</td></tr>
<tr><td colspan="2">3. IMMEDIATELY after contacting WorkCare send a brief email notification AND inform verbally (direct contact is required) ONE of HSE corporate representatives See Figure 11.3.
4. Make all other local notifications and client notifications.
5. Local Supervisor, HSE Coordinator, SSHO and any applicable safety committees to complete preliminary investigation, along with the initial Incident Report within 24 hours.
6. Corporate Loss Prevention Manager to complete Worker’s Compensation Insurance notifications as needed.
7. Corporate HSE to conduct further incident notifications, investigation, include in statistics, classify, and develop lessons learned materials.
* - NOTE: Step 2 is only applicable to the North-American operations and to incidents involving AMEC personnel. High potential near misses, subcontractors’ incidents, regulatory inspections, spills and property damages above $1,000 should be reported immediately, following directions from Step 3.</td></tr>
</table>

Site Specific Procedures are as follows:

INCIDENT FLOW CHART

Incident flow chart

Call immediately

amec foster wheeler

E&I Corporate HSE department contact list

Name/email	Office location	Contact information
Bruce Voss bruce.voss@amecfw.com	Cathedral City, CA	760.202.3737 (office) 951.897.6381 (cell)
Chad Barnes chad.barnes@amecfw.com	Phoenix, AZ	602.733.6000 (office) 480.495.9846 (cell)
Cindy Sundquist cynthia.sundquist@amecfw.com	Portland, ME	207.828.3309 (office) 207.650.7593 (cell) 207.892.4402 (home)
Gabe Sandholm gabe.sandholm@amec.com	Minneapolis, MN	612.252.3785 (office) 206.683.9190 (cell)
John Mazur john.mazur@amec.com	Wilmington, NC	910.444.2978 (office) 910.431.2330 (cell) 910.681.0538 (home)
Lori Dowling lori.dowling@amec.com	Prince George, BC	250.564.3243 (office)
Philip Neville philip.neville@amec.com	Thorold, ON	905.687.6616 (office) 905.380.4465 (cell)
Tim Kihn tim.kihn@amec.com	Edmonton, AB	780.944.6363 (office) 780.717.5058 (cell)
Vladimir Ivensky (can call 24/7) vladimir.ivensky@amec.com	Plymouth Meeting, PA	610.877.6144 (office) 484.919.5175 (cell) 215.947.0393 (home)
Kirby Lastinger kirby.lastinger@amec.com	Lakeland, FL	836-667-2345 x207 (office) 863-272-4775 (cell)

*High potential near misses, subcontractor incidents, regulatory inspections, spills, and property damage should be reported within 60 minutes to one of the above HSE Representatives.
WITHIN 24 HOURS - Local Supervisor, HSE Coordinator, Project HSE Officer, and any applicable safety committees must complete preliminary investigation, along with the initial Incident Analysis Report Form and forward it to the Corporate HSE Department

Rev. Feb15-Hb

FIELD TEAM REVIEW: I acknowledge that I understand the requirements of this HASP, and agree to abide by the procedures and limitations specified herein. I also acknowledge that I have been given an opportunity to have my questions regarding the HASP and its requirements answered prior to performing field activities. Health and safety training and medical surveillance requirements applicable to my field activities at this site are current and will not expire during on-site activities.

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

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MACTEC

Routes to Emergency Medical Facilities

PRIMARY HOSPITAL (for immediate emergency treatment):

Facility Name: United Memorial Medical Center

Address: 127 North Street, Batavia, NY 14020

Telephone Number: (585) 343-6030

DIRECTIONS TO PRIMARY HOSPITAL (see attached map):

ALTERNATE HOSPITAL:

Facility Name: The Jerome Center - Urgent Care

Address: 16 Bank Street, Batavia, NY 14020

Telephone Number: (585) 344-4800

DIRECTIONS TO ALTERNATE HOSPITAL (see attached map):

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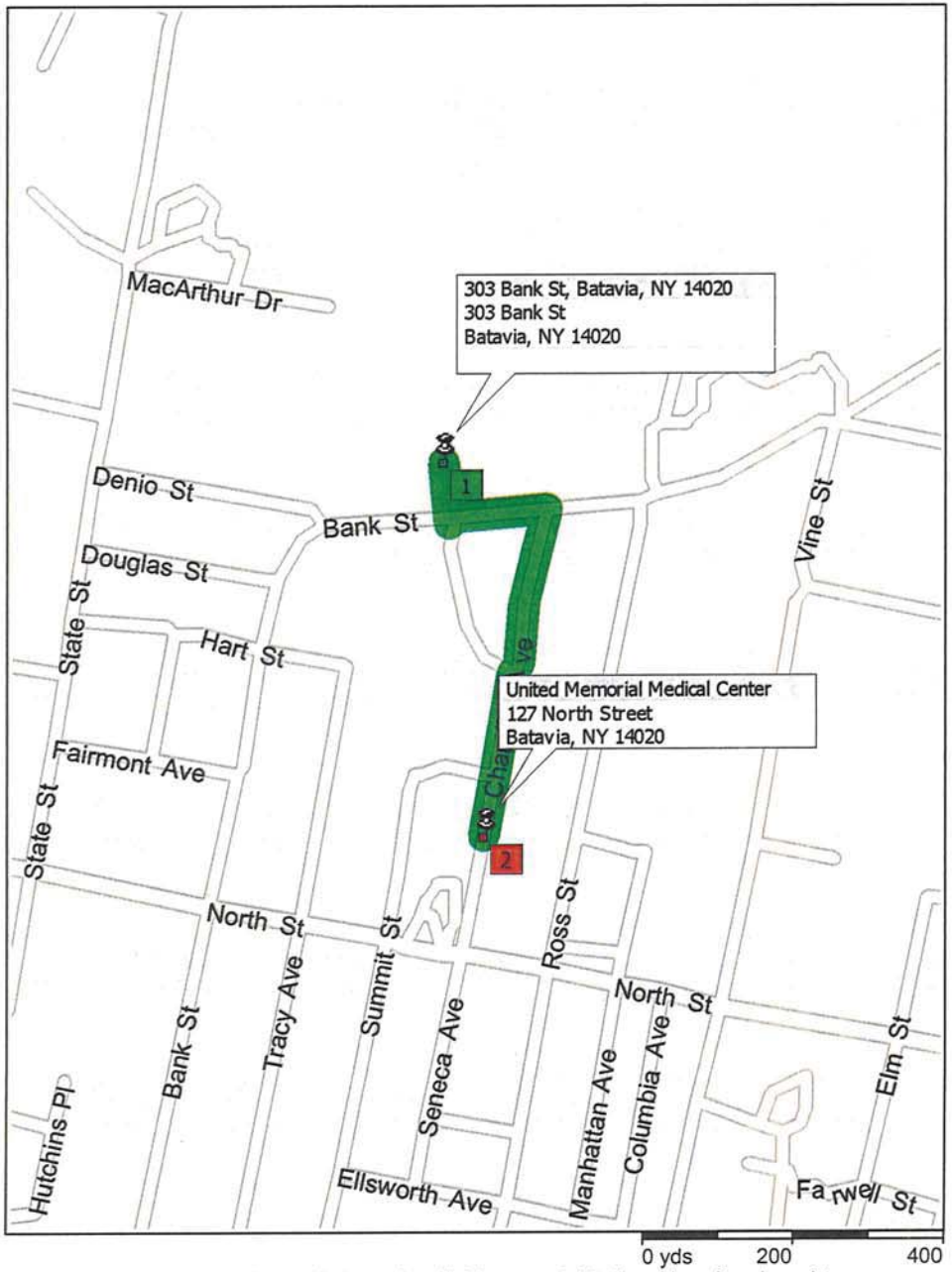
303 Bank St, Batavia, NY 14020 to United Memorial Medical Center

667 yards; 2 minutes



9:00 AM	0.0 mi	1 Depart 303 Bank St, Batavia, NY 14020 [303 Bank St, Batavia, NY 14020] on Local road(s) (South) for 76 yds
9:00 AM	0.1 mi	Turn LEFT (East) onto Bank St for 131 yds
9:01 AM	0.1 mi	Turn RIGHT (South) onto Chandler Ave for 0.3 mi
9:02 AM	0.4 mi	2 Arrive United Memorial Medical Center

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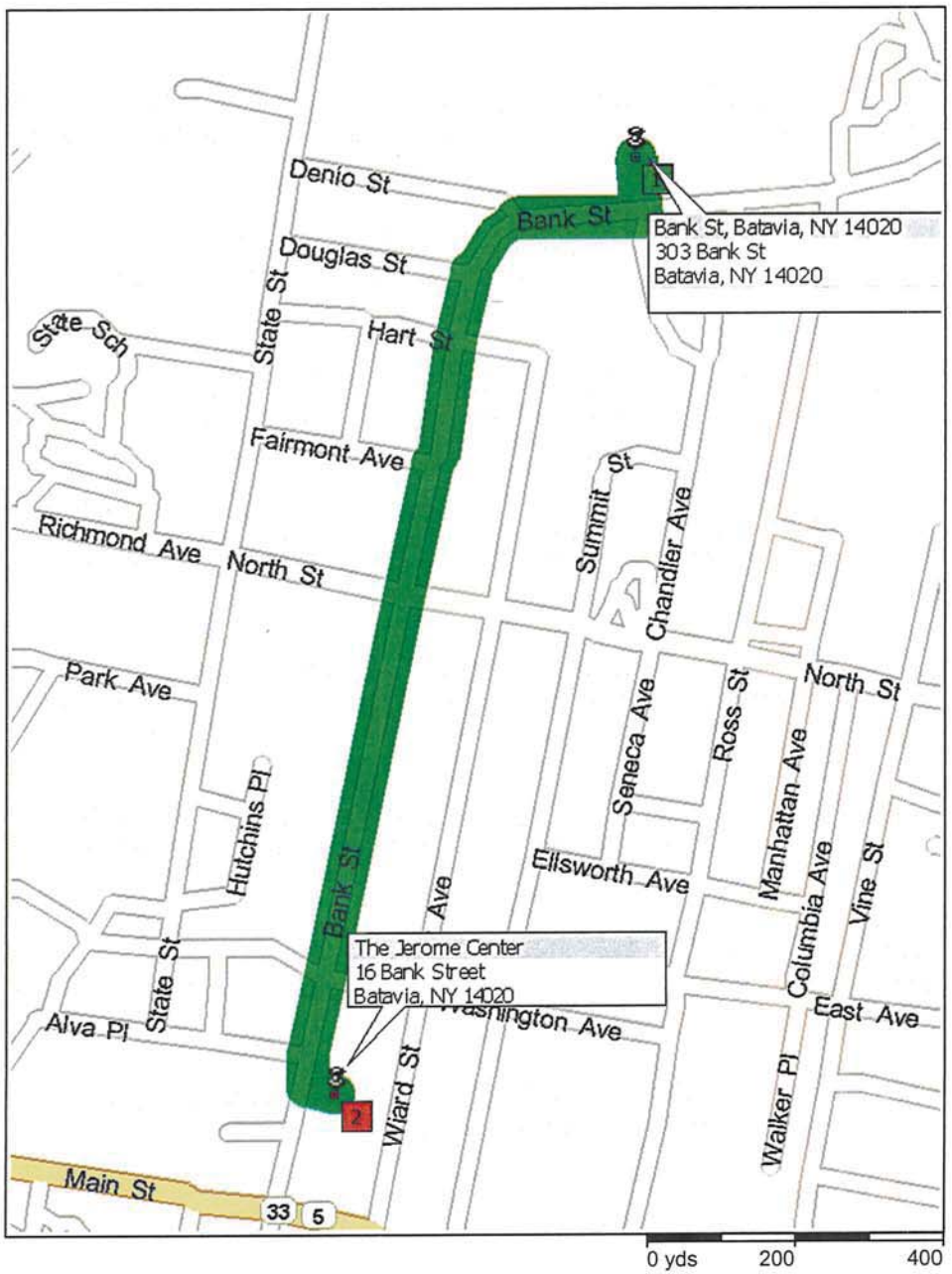
303 Bank St, Batavia, NY 14020 to The Jerome Center

0.9 miles; 2 minutes



9:00 AM	0.0 mi	1 Depart Bank St, Batavia, NY 14020 [303 Bank St, Batavia, NY 14020] on Local road(s) (South) for 76 yds
9:00 AM	0.1 mi	Turn RIGHT (West) onto Bank St for 0.8 mi
9:02 AM	0.8 mi	Turn LEFT (East) onto Local road(s) for 54 yds
9:02 AM	0.9 mi	2 Arrive The Jerome Center

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TAILGATE SAFETY MEETING REPORT

Check One:

☐ Initial Kickoff Safety Meeting ☐ Regular/Daily Tailgate Safety Meeting ☐ Unscheduled Tailgate Safety Meeting

Date: _____ Site: _____

Site Manager: _____ Site Health and Safety Officer: _____
Print *Print*

Order of Business

Topics Discussed (Check all that apply)

- ☐ Scope of Work
- ☐ Site History/Site Layout
- ☐ Personnel Responsibilities
- ☐ Training Requirements
- ☐ Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazard effects)
- ☐ Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- ☐ Safe Work Practices
- ☐ Engineering Controls
- ☐ Chemical Hazards and Controls
- ☐ Signs and symptoms of over exposure to site chemicals
- ☐ Medical Surveillance Requirements
- ☐ Action Levels
- ☐ Monitoring Instruments and Personal Monitoring
- ☐ Perimeter Monitoring, Type and Frequency
- ☐ PPE Required/PPE Used
- ☐ Define PPE Levels, Donning, Doffing Procedures
- ☐ Decontamination Procedures for Personnel and Equipment
- ☐ Physical Hazards and Controls (e.g., overhead utility lines)
- ☐ Anticipated Weather (snow, high winds, rain)
- ☐ Temperature Extremes (heat or cold stress symptoms and controls)
- ☐ Biological Hazards and Controls (e.g., poison ivy, spiders)
- ☐ Site Control (visitor access, buddy system, work zones, security, communications)
- ☐ Sanitation and Illumination
- ☐ Logs, Reports, Recordkeeping
- ☐ Incident Reporting Procedures
- ☐ Near Misses/Hazard ID including worker suggestions to correct and work practices to avoid similar occurrences
- ☐ General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- ☐ General Emergency Response Procedures (e.g., earthquake response, typhoon response, etc.)
- ☐ Medical Emergency Procedures (e.g., exposure control precautions, location of first aid kits, etc.)
- ☐ Route to Hospital and Medical Care Provider Visit Guidelines
- ☐ Site/Regional Emergency Response Procedures (e.g., exposure control precautions, location of first aid kits, etc.)
- ☐ Hazardous Materials Spill Procedures

Safety Suggestions by Site Workers: _____

Action Taken on Previous Suggestions: _____

Injuries/Incidents/Personnel Changes since last meeting: _____

Observations of unsafe work practices/conditions that have developed since previous meeting: _____

Location of (or changes in the locations of) evacuation routes/safe refuge areas: _____

Additional Comments: _____

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting

Name (Print)	Company	Signature

Meeting Conducted by: _____ Title: _____
Print

Signature: _____ Time: _____
Print

Incident Report Forms

1. Incident Analysis Report (IAR)
2. Vehicle Incident Report (VIR)
3. Ground Disturbance Incident Report(GDR)

Check one
Initial Report: ☐
Update: ☐
Final Report: ☐ ____

INCIDENT ANALYSIS REPORT

AMEC Environment & Infrastructure
Confidential - Privileged

Incident Potential
Letter: Select One
Number: Select One
Investigation Level: Select One

Group: Select One Group HSE Manager: ____ Incident Review Panel Team (if applicable): ____

Incident Date: _____ Report Date: _____

Section 1 – General Information

Employee Name: ____ Sex: ☐ M ☐ F Date of Birth: ____ Age Range: Select One

Job Position: Select One Hire Date: ____ Time employee began work: _____ Time of incident: ____ ☐ am | ☐ pm

Business Line: Select One Department Number: ____ Project Manager: ____

Project Name: ____ Project Number: ____ Client: ____

Office where employee works from: ____ Immediate Supervisor: ____ Hours employee worked during last 7 days: ____ hrs

Location: Select One Is this a Company controlled work site: ☐ Yes ☐ No Incident Assigned to: Select One

Location description: ____

Section 2 – Incident Type - Process (**mark at least ONE BOLD TYPE** and all that apply)

☐ **Fatality** ☐ **Environmental** ☐ **Injury/Illness Incident** If Injury/illness: Select One
☐ **Security** ☐ **Near Miss / Hazard ID** ☐ **Property Damage** If Damage: Select One ☐ 3rd Party?
☐ Hospitalization ☐ Regulatory Inspection ☐ Notice of Violation or Citation ☐ Agency Reportable?
☐ Motor Vehicle Incident Involving Injury ☐ Other (describe): ____

Outcome/Result: Select One Source of Hazard: Select One If "other", specify: ____ Immediate Cause: Select One

A. If **injury/illness**: Indicate the part of the body: Select One If "other", specify: ____
   Indicate body part location: Select One If "other", specify: ____
   Injury Type: Select One If "other", specify: ____ Illness Type: Select One If "other", specify: ____
B. If **property damage**: describe what happened and estimate ($) of damage to all objects involved? ____
C. If **environmental**: Type of Environmental incident?: Select One Name, CAS#, physical state and quantity? ____
   Receiving Environment?: Select One Mechanism of Incident?: Select One If "other", specify: ____
   Nature of Breach?: Select One Duration of Breach?: Select One
D. If **security**: Security Incident Type: Select One If Physical: Select One If Criminal: Select One If Intellectual: Select One
E. If an **inspection by a regulatory agency**, what agency, who were the inspectors, inspector contact information? ____

Section 3 – Incident Description

Attach and number additional pages, as needed, to ensure all details related to the incident are captured.

A. List the names of all persons involved in the incident, and employer information: ____
B. List the names of any witnesses, their employer, and a local/company telephone number or address: ____
C. Name of Employee's supervisor: ____ Contact phone number for supervisor: ____
D. What specific job/task or action was the employee(s) doing just prior to the incident: ____
E. Was a tool or equipment involved? ☐ Yes ☐ No What was it: ____ Last Inspection Date: ____Defects: ____
F. Explain in **detail** what happened: ____
G. Explain in **detail** what object or substance directly harmed the employee: ____

H. What were the weather conditions at time of incident?: ___

I. What was the lighting like at time of incident? Bright ☐ Shadows ☐ Dark ☐ Other: ___

J. List any damaged equipment or property (other than motor vehicles). Provide model and serial number **and** estimated costs to repair/replace damaged equipment or property, if applicable: ___

Section 4 - Incident Analysis

A. Was a Health and Safety Plan (HASP) or Activity Hazard Analysis (AHA) completed for the work being performed? ☐ Yes ☐ No
If "yes", Who prepared the document?: ___

B. Who and when was the last manager (Project, Unit, etc.) at the site of the incident?: ___

C. When and what safety training **directly related** to the incident has the person(s) involved had?: ___

D. List attached documentation (HASP acknowledgement forms, kickoff/daily/weekly meetings, inspections, photographs): ___

Section 5 - Incident Investigation Results and Corrective Actions

This section to be completed by the Group HSE Manager/IRP with support from location where incident occurred, in accordance with AMEC A-Z List of Accident Causes.

Causal Factors (Acts or Omissions / Conditions)

(Attach and number any additional pages as needed to completely address this section)

	IMMEDIATE CAUSE	IMMEDIATE CAUSE SUB-TYPE	DESCRIPTION
1	Select One	____	____
2	Select One	____	____
3	Select One	____	____
4	Select One	____	____

Root Cause(s) Analysis - The below items represents major root cause categories which have been determined to be Less Than Adequate (LTA). A more detailed determination of the root cause will be facilitated, if needed, by the applicable Group HSE Manager / IRP.

	ROOT CAUSE TYPE	ROOT CAUSE SUB-TYPE	DESCRIPTION
1	Select One	____	____
2	Select One	____	____
3	Select One	____	____
4	Select One	____	____

Corrective Actions					
Root Cause #	**Corrective Actions Taken** (Attach additional pages as needed to completely address this section)	**Responsible Person**	**Proposed Completion Date**	**Closed on Date**	**Verified by and Date Verified**
____	___	___	___	___	___
____	___	___	___	___	___
____	___	___	___	___	___
____	___	___	___	___	___
____	___	___	___	___	___

Section 6 - Notifications, Certification & Approvals

Check the appropriate boxes indicating the applicable reports have been made to the following applicable organizations:

Auto Insurance Carrier was called ☐ **Group HSE Manager Notified** ☐

WorkCare was called ☐ **Post-incident Drug/Alcohol Testing Performed** ☐

Incident Report prepared by: ___

Employee (s): ___	Date: ___	Employee's Supervisor: ___	Date: ___
HSE Coordinator/Project/Unit Manager: ___	Date: ___	Group HSE Manager: ___	Date: ___

ATTACHMENT 2

VEHICLE INCIDENT REPORT

Confidential - Privileged

Section 1 - General Information

Date of Incident: _____

Time incident occurred: _____ ☐ am | ☐ pm | Illumination: ☐ Dark ☐ Dusk ☐ Light | Road Condition: ☐ Dry ☐ Wet ☐ Icy/snow

Were police summoned to scene? ☐ Yes ☐ No Police Department and Location: _____

Report #; _____ Officer's Name: _____ Officer's Badge Number: _____

Section 2 - Company Driver and Vehicle

Driver's name: _____ D/L #: _____ State: _____

Driver's home office address: _____ Driver's Phone #: _____

Company Vehicle #: _____ Year: _____ Model: _____ License #: _____ State: _____

Company car?: ☐ Yes ☐ No Personal Vehicle?: ☐ Yes ☐ No Rental Vehicle?: ☐ Yes ☐ No

If rental, rented from: _____

Passenger/Witness Name(s): _____ Address: _____ Telephone: _____

Passenger/Witness Name(s): _____ Address: _____ Telephone: _____

Damage to vehicle: _____

Was an employee injured?: ☐ Yes ☐ No If yes, please describe: _____

Injuries to others?: ☐ Yes ☐ No If yes, please describe: _____

Vehicle was being used for: Company business ☐ Yes ☐ No Personal business ☐ Yes ☐ No

Towed?: ☐ Yes ☐ No If yes, by whom?: _____ To Where?: _____

Section 3 - Other Driver and Vehicle Information

Driver's Name: _____ D/L # : _____ State: _____

Current address: _____ City: _____ State: _____

Telephone: _____ Work: _____ Cell: _____

Registered Owner's Name: _____ Address: _____ City: _____ State: _____

(verify registration document)

The Other Vehicle: Make: _____ Model: _____ Year: _____ License #: _____ State: _____

Insurance company name: _____ Address: _____ Phone #: _____

Policy No.: _____ Contact Person: _____ Phone #: _____

Passenger/Witness Name(s): _____ Address: _____ Telephone: _____

Passenger/Witness Name(s): _____ Address: _____ Telephone: _____

Damage: (*Make note of pre-existing damage and take pictures if possible – you may attach additional pages if necessary):* _____

Injuries to other driver/passengers: _____

Section 4 – Approvals (signatures required)

Form completed by (please print): _____ Date: _____

Signature: _____

Office/Project Manager (please print): _____ Date: _____

Signature: _____

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Things to Do First In The Event Of a Motor Vehicle Incident

GENERAL INFORMATION

1. Do not decide on your own whether a particular incident is "covered" by insurance. Should there be any doubt, it is always preferable to report an occurrence, as this allows underwriters, the Risk Management Department and insurance adjusters to determine if a covered loss has taken place.

2. Policy Conditions do require that all losses and occurrences, which may result in a claim be promptly reported.

3. Do not admit liability or offer your opinion of liability to anyone.

4. Complete this IAR/VIR form promptly and forward with all applicable supporting documentation. It is essential both division and location information be provided.

5. For automobile collisions within the **United States**, please indicate on the IAR form that you have contacted Zurich at:

Zurich Insurance Company
1-800-987-3373 or
1-877-928-4531
24 hours a day, 7 days a week

6. For automobile collisions within **Canada**, please indicate on the IAR form that you have contacted Zurich at:

Crawford Adjusters Canada
Claims Alert
1-888-218-2346
24 hours a day, 7 days a week

The more details you have the better but, don't delay reporting if you don't have all of the information - that may be obtained later. A Zurich trained operator will answer your call and ask for all relevant information regarding the incident. The initial information required includes:

- Your division,
- Office location and division contact name – advise that you are an AMEC Company
- Name, drivers license and phone number of the driver involved in the loss
- Description of the vehicle which he/she was driving (i.e., year, make, model, license plate number, serial number)
- Date, time and location of incident
- Passenger information (if applicable)
- Third party information (i.e., name, phone number, address, vehicle information, insurance information)
- If any injuries occurred (if applicable)
- Police information
- Witness information (if applicable)

Call 911 if there are serious injuries!

If you are injured or think you were injured, **contact your supervisor and call WorkCare at 888-449-7787**. Your supervisor will notify your HSE Coordinator and your Group HSE Manager. For additional instructions on what to do, go to AMEC's HSE website at:

http://ee.amecnet.com/she/sheweb/incident_reporting.htm

1. Call for an officer if the incident occurred on public property (streets, highways or roads). Disputes often arise between the parties involved as to who was at fault; therefore, a police report is important. If an officer is unable to attend the scene of the collision, a counter police report may be filed at most stations. Insurance companies rely on police reports to determine liability.
2. Complete the Incident Investigation Report and the Vehicle Incident Report forms. It is important that both these forms are completed in detail. Include a diagram of the incident on the provided sheet. Incomplete information may lead to delays in processing associated claims and in helping to prevent this type of incident from occurring again.
3. Give only information that is required by the authorities or as directed by AMEC contractual requirements.
4. Sign only those statements required by the authorities or as directed by AMEC contractual requirements. Do not sign away your or the company's rights.

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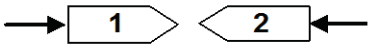
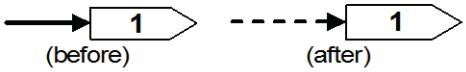
Vehicle Incident Diagram

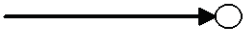
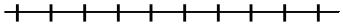
This or a similar diagram must be completed with all VIRs

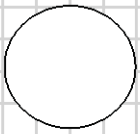
Instructions:

1. Number each vehicle and show directions 

2. Use a solid line to show path before incident and use a dotted line to show path after incient



3. Show pedestrian/non-motorist by: 
4. Show railroad by: 
5. Indicate north by arrow as: 
6. Show street or highway names or numbers
7. Show signs, signals, warning and traffic controls.



Indicate North by Arrow

Prepared by: _____ **Date:** _____

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GROUND DISTURBANCE INCIDENT REPORT

AMEC Environment & Infrastructure

Section 1 – General Information

Employee Name: _____ Time of incident: _____ ☐ am | ☐ pm Time Reported:_____ ☐ am | ☐ pm Report Date: _____

Project Name: _____ Project Number: _____ Client: _____

List of All Parties Present

Name	Company	Telephone No.	Role
____	____	____	____
____	____	____	____
____	____	____	____
____	____	____	____
____	____	____	____

Describe the chronological description of Incident and response:____

Section 2 – Date and Location of Event

A. *Date of Event: (MM/DD/YYYY)

B. ***Country** ***State** ***County** **City**

C. **Street address** **Nearest Intersection**

D. *Right of Way where event occurred

E. Public: ☐ City Street ☐ State Highway ☐ County Road ☐ Interstate Highway ☐ Public-Other

F. Private: ☐ Private Business ☐ Private Land Owner ☐ Private Easement

G. ☐ Pipeline ☐ Power /Transmission Line ☐ Dedicated Public Utility Easement

☐ Federal Land ☐ Railroad ☐ Data not collected ☐ Unknown/Other

List attached documentation (Public Utility Locates, Private Utility Locates, Copy of notifications submitted to Owner or other utility Owners, photographs): ____

Section 3 – Affected Facility Information

***What type of facility operation was affected?**

☐ Cable Television ☐ Electric ☐ Natural Gas ☐ Liquid Pipeline ☐ Sewer (Sanitary Sewer)

☐ Steam ☐ Telecommunications ☐ Water ☐ Unknown/Other

***What type of facility was affected?**

☐ Distribution ☐ Gathering ☐ Service/Drop ☐ Transmission ☐ Unknown/Other

Was the facility part of a joint trench?

☐ Unknown ☐ Yes ☐ No

Was the facility owner a member of One-Call Center?

☐ Unknown ☐ Yes ☐ No

Section 4 – Excavation Information

***Type of Excavator**

☐ Contractor ☐ County ☐ Developer ☐ Farmer ☐ Municipality ☐ Occupant
☐ Railroad ☐ State ☐ Utility ☐ Data not collected ☐ Unknown/Other

***Type of Excavation Equipment**

☐ Auger ☐ Backhoe/Trackhoe ☐ Boring ☐ Drilling ☐ Directional Drilling
☐ Explosives ☐ Farm Equipment ☐ Grader/Scraper ☐ Hand Tools ☐ Milling Equipment
☐ Probing Device ☐ Trencher ☐ Vacuum Equipment ☐ Data Not Collected ☐ Unknown/Other

***Type of Work Performed**

☐ Agriculture ☐ Cable Television ☐ Curb/Sidewalk ☐ Bldg. Construction ☐ Bldg. Demolition
☐ Drainage ☐ Driveway ☐ Electric ☐ Engineering/Survey ☐ Fencing
☐ Grading ☐ Irrigation ☐ Landscaping ☐ Liquid Pipeline ☐ Milling
☐ Natural Gas ☐ Pole ☐ Public Transit Auth. ☐ Railroad Maint. ☐ Road Work
☐ Sewer (San/Storm) ☐ Site Development ☐ Steam ☐ Storm Drain/Culvert ☐ Street Light
☐ Telecommunication ☐ Traffic Signal ☐ Traffic Sign ☐ Water ☐ Waterway Improvement
☐ Data Not Collected ☐ Unknown/Other

Section 5 – Pre-Excavation Notification

***Was the One-Call Center notified?**

☐ Yes ☐ No If Yes, which One-Call Center? Ticket number:

Was Private Contract Locator used?

☐ Yes ☐ No

Section 6 – Locating and Marking

***Type of Locator**

☐ Utility Owner ☐ Contract Locator ☐ Data Not Collected

***Were facility marks visible in the area of excavation?**

☐ Yes ☐ No ☐ Data Not Collected

***Were facilities marked correctly?**

☐ Yes ☐ No ☐ Data Not Collected

What technology was used to locate utilities?

☐ Maps ☐ Active(transmitter+receiver) ☐ Passive (receiver only) ☐ GPR
☐ Acoustic ☐ Magnetic ☐ Infrared ☐ Unknown/Other

What Factors affected the ability to locate services?

☐ Soil Type:_____ ☐ Non-Grounded ☐ Common Bonded ☐ Depth
☐ Electromagnetic interference ☐ Parallel facilities ☐ Congested facilities ☐ Unknown/Other

Section 7 – Excavator Downtime

Did Excavator incur down time?

☐ Yes ☐ No

If yes, how much time?

☐ Unknown ☐ Less than 1 hour ☐ 1 hour ☐ 2 hours ☐ 3 or more hours Exact Value _____If

Estimated cost of down time?

☐ Unknown ☐ $0 ☐ $1 to 500 ☐ $501 to 1,000 ☐ $1,001 to 2,500 ☐ $2,501 to 5,000
☐ $5,001 to 25,000 ☐ $25,001 to 50,000 ☐ $50,001 and over Exact Value _____

Section 8 – Description of Damage

***Was there damage to a facility?**
☐ Yes ☐ No (i.e. near miss)
***Did the damage cause an interruption in service?**
☐ Yes ☐ No ☐ Data Not Collected ☐ Unknown/Other
If yes, duration of interruption
☐ Unknown ☐ Less than 1 hour ☐ 1 to 2 hrs ☐ 2 to 4 hrs ☐ 4 to 8 hrs ☐ 8 to 12 hrs ☐ 12 to 24 hrs
☐ 1 to 2 days ☐ 2 to 3 days ☐ 3 or more days ☐ Data Not Collected Exact Value _____
Approximately how many customers were affected?
☐ Unknown ☐ 0 ☐ 1 ☐ 2 to 10 ☐ 11 to 50 ☐ 51 or more Exact Value _____
Estimated cost of damage / repair/restoration
☐ Unknown ☐ $0 ☐ $1 to 500 ☐ $501 to 1,000 ☐ $1,001 to 2,500 ☐ $2,501 to 5,000
☐ $5,001 to 25,000 ☐ $25,001 to 50,000 ☐ $50,001 and over Exact Value _____
Number of people injured
☐ Unknown ☐ 0 ☐ 1 ☐ 2 to 9 ☐ 10 to 19 ☐ 20 to 49 ☐ 50 to 99
☐ 100 or more Exact Value _____
Number of fatalities
☐ Unknown ☐ 0 ☐ 1 ☐ 2 to 9 ☐ 10 to 19 ☐ 20 to 49 ☐ 50 to 99
☐ 100 or more Exact Value _____

Was there a Product Release?
Product Release: ☐ No ☐ Yes ☐ N/A Type: ____ **If Yes, Incident Type is Environmental Report.**
Volume: ____ Spill Controls: ____
Repair Process: ____

Section 9 – Description of the Root Cause

Please choose one

One-Call Notification Practices Not Sufficient
☐ No notification made to the One-Call Center
☐ Notification to one-call center made, but not sufficient
☐ Wrong information provided to One Call Center

Locating Practices Not Sufficient
☐ Facility could not be found or located
☐ Facility marking or location not sufficient
☐ Facility was not located or marked
☐ Incorrect facility records/maps

Excavation Practices Not Sufficient
☐ Failure to maintain marks
☐ Failure to support exposed facilities
☐ Failure to use hand tools where required
☐ Failure to test-hole (pot-hole)
☐ Improper backfilling practices
☐ Failure to maintain clearance
☐ Other insufficient excavation practices

Miscellaneous Root Causes
☐ One-Call Center error
☐ Abandoned facility
☐ Deteriorated facility
☐ Previous damage
☐ Data Not Collected
☐ Other

Section 10 - Notifications, Certification & Approvals

Check the appropriate boxes indicating the applicable reports have been made to the following applicable organizations:

One Call was called ☐ **Spills Reporting Agency Notified** ☐

Emergency Responders (Fire) was called ☐ **Post-incident Drug/Alcohol Testing Performed**

List of All Agencies Contacted

Name/Agency	Phone #	Date	Time

Incident Report prepared by: ____

Employee (s): ____	Date: ____	Employee's Supervisor: ____	Date: ____
HSE Coordinator/Project/Unit Manager: ____	Date: ____	Group HSE Manager:____	Date: ____

Activity Hazard Analysis (AHAs)

Mobilization Demobilization and Site Preparation
Field Work - General
Field Work - Oversight
Decontamination
Utility Clearance – for reference
Soil Sample w Hand Auger, Hand Tools
Insect Stings and Bites
Working with Preservatives
Poisonous Plants
Site Reconnaissance
Geoprobe Investigation Oversight
Perimeter Air Monitoring

AHA - Mobilization/Demobilization and Site Preparation

Activity/Work Task:	**Mobilization/Demobilization and Site Preparation**	Overall Risk Assessment Code (RAC) (Use highest code)	**L**
Project Location:	**Batavia Iron & Metals**		
Project Number:	**3617137301**		
Date Prepared:	**02/08/16** **Date Accepted:**		
Prepared by (Name/Title):	Lucas Benedict		
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
When initially entering the site the following PPE must be available: • Work Uniform or Work Clothes • Hard Hat • Safety Glasses • Steel Toe Boots • Reflective Vests	**Competent / Qualified Personnel:** All AMEC drivers who have completed the AMEC driving program. **Training requirements:** AMEC Driving Program	Daily inspection of motor vehicles documented with daily inspection form.

AHA - Mobilization/Demobilization and Site Preparation

Job Steps	Hazards	Controls	RAC
1. Prepare For Site Visit	1A) N/A	Prior to leaving for site: ▪ Obtain and review HASP prior to site visit, if possible. ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots). ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current. ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment). ▪ If respiratory protection is required/potentially required, ensure that training and fit-testing has occurred within the past year. ▪ Familiarize yourself with route to the site.	**NA**
	1B) Vehicle Defects	1B) Vehicle defects Inspect company owned/leased vehicle for defects such as: ▪ Flat tires. ▪ Windshield wipers worn or torn. ▪ Oil puddles under vehicle. ▪ Headlights, brake lights, turn signals not working.	**L**
	1C) Insufficient Emergency Equipment, Unsecured Loads	1C) Insufficient emergency equipment, unsecured loads ▪ Ensure vehicle has first aid kit and that all medications are current (if first aid kits are not provided at the site). ▪ Ensure vehicle is equpped with warning flashers and/or flares and that the warning flashers work. ▪ Cell phones are recommended to call for help in the event of an emergency. ▪ Vehicles carrying tools must have a safety cage in place. All tools must be properly secured. ▪ Vehicles must be equipped with chocks if the vehicle is to be left running, unattended. ▪ Ensure sufficient gasoline is in the tank.	**L**

AHA - Mobilization/Demobilization and Site Preparation

Job Steps	Hazards	Controls	RAC
2. Operating Vehicles	2A) Collisions, Unsafe Driving Conditions	2A) Collisions, unsafe driving conditions ▪ Drive Defensively! ▪ Seat belts must be used at all times when operating any vehicle on company business. ▪ Drive at safe speed for road conditions. ▪ Maintain adequate following distance. ▪ Pull over and stop if you have to look at a map. ▪ Try to park so that you don't have to back up to leave. ▪ If backing in required, walk around vehicle to identify any hazards (especially low level hazards that may be difficult to see when in the vehicle) that might be present. Use a spotter if necessary.	L
3. Driving To The Jobsite (Mobilization)	3A) Dusty, Winding, Narrow Roads	3A) Dusty, Winding, Narrow Roads ▪ Drive confidently and defensively at all times. ▪ Go slow around corners, occasionally clearing the windshield.	L
	3B) Rocky Or One-Lane Roads	3B) Rocky Or One-Lane Roads ▪ Stay clear of gullies and trenches, drive slowly over rocks. ▪ Yield right-of-way to oncoming vehicles---find a safe place to pull over.	L
	3C) Stormy Weather, Near Confused Tourists	3C) Stormy Weather, Near Confused Tourists ▪ Inquire about conditions before leaving the office. ▪ Be aware of oncoming storms. ▪ Drive to avoid accident situations created by the mistakes of others.	L
	3D) When Angry Or Irritated	3D) When Angry Or Irritated ▪ Attitude adjustment; change the subject or work out the problem before driving the vehicle. Let someone else drive.	L
	3E) Turning Around On Narrow Roads	3E) Turning Around On Narrow Roads ▪ Safely turn out with as much room as possible. ▪ Know what is ahead and behind the vehicle. ▪ Use a spotter if available.	L
	3F) Sick Or Medicated	3F) Sick Or Medicated ▪ Let others on the crew know you do not feel well. ▪ Let someone else drive.	L

AHA - Mobilization/Demobilization and Site Preparation

Job Steps	Hazards	Controls	RAC
	3G) On Wet Or Slimy Roads	3G) On Wet Or Slimy Roads ▪ Drive slow and safe, wear seatbelts.	L
	3H) Animals On Road	3H) Animals On Road ▪ Drive slowly, watch for other animals nearby. ▪ Be alert for animals darting out of wooded areas	L
4. Gain Permission To Enter Site	4A) Hostile Landowner, Livestock, Pets	4A) Hostile Landowner, Livestock, Pets ▪ Talk to land owner, be courteous and diplomatic. ▪ Ensure all animals have been secured away from work area.	L
5. Mobilization/ Demobilization Of Equipment And Supplies	5A) Struck By Heavy Equipment/ Vehicles	5A) Struck By Heavy Equipment/ Vehicles ▪ Be aware of heavy equipment operations. ▪ Keep out of the swing radius of heavy equipment. ▪ Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times. ▪ Employees shall wear a high visibility vest or T-shirt (reflective vest required if working at night). ▪ Ground personnel will be aware of the counterweight swing and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation.	L
	5B) Struck by Equipment/ Supplies	5B) Struck by Equipment/ Supplies ▪ Workers will maintain proper space around their work area, if someone enters it, stop work. ▪ When entering another worker's work space, give a verbal warning so they know you are there.	L
	5C) Overexertion Unloading/ Loading Supplies	5C) Overexertion Unloading/ Loading Supplies ▪ Train workers on proper body mechanics, do not bend or twist at the waist while exerting force or lifting. ▪ Tightly secure all loads to the truck bed to avoid load shifting while in transit.	L
	5D) Overexertion Unloading/ Loading Supplies - Caught in/ on/ between:	5D) Overexertion Unloading/Loading Supplies - Caught in/on/between: ▪ Do not place yourself between two vehicles or between a vehicle and a fixed object.	L

AHA - Mobilization/Demobilization and Site Preparation

Job Steps	Hazards	Controls	RAC
	5E) Slip/Trip/Fall	5E) Slip/Trip/Fall ▪ Mark all holes and low spots in area with banner tape. Instruct personnel to avoid these areas. ▪ Drivers will maintain 3 point contact when mounting/dismounting vehicles/equipment. ▪ Drivers will check surface before stepping, not jumping down.	L
	5F) Vehicle Accident	5F) Vehicle Accident ▪ Employees should follow AMEC vehicle operation policy and be aware of all stationary and mobile vehicles.	L
6. Site Preparation	6A) Slip/Trip/Fall	6A) Slip/Trip/Fall ▪ Mark all holes and low spots in area with banner tape. Instruct personnel to avoid these areas.	L
7. Installation of soil erosion and sediment controls	7A) Overexertion	7A) Overexertion ▪ Workers will be trained in the proper method of placing erosion controls. ▪ Do not bend and twist at the waist while lifting or exerting force.	L
	7B) Struck by Equipment/ Supplies	7B) Struck by Equipment/ Supplies ▪ Workers will maintain proper space around their work area, if someone enters it, stop work. ▪ When entering another worker's work space, give a verbal warning so they know you are there.	L
8. Driving back from the jobsite	7C) See hazards listed under item #3	See safe work practices under item #3	L

AHA - Field Work - General

Activity/Work Task:	**Field Work - General**		
Project Location:	**Batavia Iron & Metals**		
Project Number:	**3617137301**		
Date Prepared:	**02/08/16**	**Date Accepted:**	
Prepared by (Name/Title):	Lucas Benedict		
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Overall Risk Assessment Code (RAC) (Use highest code) **L**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures for general field work.

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** See HASP **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag defective tools and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA - Field Work - General

Job Steps	Hazards	Controls	RAC
1. Prepare For Site Visit	N/A	▪ Obtain and review HASP prior to site visit. ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots). ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current. ▪ Complete site specific/ client required training. ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment). ▪ First aid kits shall be available at the work site and on each transport vehicle. ▪ Familiarize yourself with route to the site. ▪ Check weather forecast. Pack appropriate clothing and other items (e.g., sunscreen) for anticipated weather conditions. ▪ Verify that subsurface utilities have been identified.	L
2. Traveling To The Site By Vehicle		See AHA - Mobilization, Demobilization and Site Preparation	L
3. Initial Site Condition Assessment And Walking Around The Site	3A) Poor Communication – General Safety	3A) Poor Communication – General Safety ▪ Develop communication methods (agree on hand signals, warning alarms) with subcontractor and other site personnel. ▪ Log all workers and visitor on and off the site. ▪ Let other crewmembers know when you see a hazard. ▪ Avoid working near known hazards. ▪ Always know the whereabouts of fellow crewmembers. ▪ Carry a radio and spare batteries or cell phone at all times. ▪ Hold and document Safety Tailgate Meetings. ▪ Establish and communicate work zones, evacuation routes and rally locations.	L
	3B) Insect, Scorpion And Animal Bites And Stings	3B) Insect, Scorpion And Animal Bites And Stings ▪ See - AHA Noxious Insects and Animals	L
	3C) Poisonous Plants	3C) Poisonous Plants ▪ Wear long sleeves, long pants and boots. ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with high visibility spray paint if working at a fixed location. ▪ Look for signs of poisonous plants and demark area to aid in avoiding plant. ▪ Do not touch any plant part to any part of your body/clothing. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.	L

AHA - Field Work - General

Job Steps	Hazards	Controls	RAC
			
	3D) Chemical Hazards	3D) Chemical Hazards ▪ See HASP for appropriate level of PPE. ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone. ▪ Read MSDSs for all chemicals brought to the site. ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labelled. ▪ Decon thoroughly prior to consumption of food, beverage or tobacco.	**L**
	3E) High Crime Areas	3E) High Crime Areas ▪ Do not enter areas where threats are present. ▪ Contract security where applicable. Use the buddy system. ▪ Maintain contact with support such as radio or cell phone. ▪ Do not work after dark.	**L**
	3F) Operations Conducted At An Active Facility	3F) Operations Conducted At An Active Facility ▪ Stay well clear of operations being conducted at the facility. ▪ Keep alert for moving materials, equipment or vehicles. ▪ Determine client specific PPE needs prior to arriving at the site. ▪ Determine client specific emergency response procedures and follow as appropriate. ▪ Participate in client required safety training. ▪ Get copies of Clients MSDSs for any client chemicals that workers may be exposed to. ▪ Provide MSDSs to client for all chemicals brought to the site.	**L**
	3G) Remote Locations	3G) Remote Locations ▪ Carry a two-way radio or cell phone with clear signal and know how to use it. ▪ Work in teams. Account for all at the end of the work day. ▪ Make sure someone on crew is certified in first aid. ▪ Carry a first aid kit.	**L**
	3H) Personnel Decontamination	3H) Personnel Decontamination ▪ See AHA - Decontamination.	**L**

AHA - Field Work - General

Job Steps	Hazards	Controls	RAC
	3I) Slips / Trips / Falls	3I) Slips / Trips / Falls ▪ Site SHSO will inspect the entire work area to identify and mark hazards. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved. ▪ Horseplay is strictly prohibited. ▪ Wear slip resistant footwear preferably laced boots with a minimum 8" high upper and non-skid soles for ankle support and traction. ▪ Pay attention to where you place your feet. Be aware of surroundings. Avoid muddy areas if possible. ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Stay back at least 5 feet from excavated areas. Use caution when walking on or around loose soil.	L
	3J) Head Injury	3J) Head Injury ▪ Identify all overhead hazards prior to commencing work operations. ▪ Personnel are required to wear hard hats that meet ANSI Standard Z89.1. ▪ All ground personnel will stay clear of suspended loads. ▪ All equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects. ▪ Do not walk or work under scaffolding or other elevated work unless there are guardrails and toe boards in place. ▪ Flag or mark protruding objects at head level. ▪ Inspect rigging prior to each use. ▪ Do not walk under trees in high winds.	L
	3K) Eye Injury	3K) Eye Injury ▪ Wear appropriate safety glasses (tinted for sun and UV protection). ▪ Watch where you walk, especially around trees and brush with protruding limbs.	L
	3L) Foot Injury	3L) Foot Injury ▪ Employees must wear steel toe boots meeting ANSI Standard Z41-1999: Personal Protection - Protective Footwear, or ASTM F2412-2005: Standard Test Methods for Foot Protection, or ASTM F2413-2005. ▪ Wear extra socks or insulated steel toed boots during winter when cold. ▪ Ensure shoes/boots have good traction.	L

AHA - Field Work - General

Job Steps	Hazards	Controls	RAC
4. Oversight During Drilling, Or Construction Operations	4A) Caught In /On / Between Moving Equipment	4A) Caught In /On / Between Moving Equipment ▪ Clear area of obstructions and communicate with all workers involved that drilling is beginning. ▪ Wear appropriate PPE including leather gloves and steel-toed boots (See HASP). ▪ Workers will not position themselves between equipment and a stationary object. ▪ Workers will not wear long hair down (place in pony-tail and tuck into shirt), jewelry or loose clothing if working with tools/machinery.	L
	4B) Eye Injury	4B) Eye Injury ▪ See Section 3K above	L
	4C) Foot Injury	4C) Foot Injury ▪ See Section 3L above	L
	4D) Head Injury	4D) Head Injury ▪ See Section 3J above	L
	4E) Chemical Hazards	4E) Chemical Hazards ▪ See Section 3D above	L
	4F) Dust - Particulates (Respiratory)	4F) Dust - Particulates (Respiratory) ▪ Use dust suppression methods. ▪ Stand upwind of point of dust generation.	L
	4G) Slips / Trips / Falls, Twisted Ankles And Knees	4G) Slips / Trips / Falls, Twisted Ankles And Knees ▪ See Section 3I above	L
	4H) Operations Conducted At An Active Facility	4H) Operations Conducted At An Active Facility ▪ See Section 3F above	L
	4I) Injury from Heavy Equipment or Vehicles	4I) Injury from Heavy Equipment or Vehicles ▪ Ground personnel will wear high visibility vests. ▪ All equipment will be equipped with backup alarms. Spotters will be used when backing up trucks and heavy equipment and when moving equipment. ▪ Ground personnel in the vicinity of vehicles or heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will make eye contact with operators before approaching equipment. Operator will acknowledge eye contact by removing his hands from the controls. ▪ Equipment will not be approached on blind sides. Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Ground personnel will be aware of the swing radius and maintain an adequate buffer zone. ▪ Ground personnel will stay clear of all suspended loads. ▪ Personnel are prohibited from riding on the buckets, or elsewhere on the	L

AHA - Field Work - General

Job Steps	Hazards	Controls	RAC
		equipment except for designated seats with proper seat belts or lifts specifically designed to carry workers. ▪ Try to park so that you don't have to back up to leave. If backing in required, walk around vehicle to identify any hazards (especially low level hazards that may be difficult to see when in the vehicle) that might be present. Use a spotter if necessary. ▪ Place cones in the front and rear of the vehicle if near moving equipment or vehicles. Set up "Workers in the Road" or similar warning signs and cones to alert traffic. ▪ Prior to driving off, walk around vehicle to collect cones and identify any hazards - especially low level hazards that may be difficult to see when in the vehicle. ▪ Use emergency flashers and roof top flashing light (recommended) to alert oncoming vehicular traffic. ▪ Remain alert at all times as to the traffic outside the vehicle. Step to the side of the road when distracted by by-standers. Keep unofficial personnel out of the work area. Exit vehicle with caution.	
	4J) Underground Utilities	4J) Underground Utilities ▪ All utilities will be marked prior to excavation activities. ▪ For areas where utility locations cannot be verified, workers must hand dig for the first 3 feet. ▪ Use lineman's gloves when locating underground power lines. ▪ Work at adequate offsets from utility locations. ▪ Immediately cease work if unknown utility markings are discovered.	**L**
	4K) Back Injuries	4K) Back Injuries - Lifting ▪ Good lifting techniques (lift with legs not back). ▪ Mechanical devices (e.g., hand truck, cart, forklift, etc.) should be used to reduce manual handling of materials and drums. ▪ Team lifting should be utilized if mechanical devices are not available (mandatory for items over 50 lbs). ▪ Split heavy loads in to smaller loads. ▪ Make sure that path is clear prior to lift. ▪ Redesign work area to avoid low lifts. ▪ Stretch prior to lifting. ▪ Maintain a healthy life style and level of physical fitness.	**L**
		4K) Back Injuries - Shoveling ▪ Select the proper shovel for the task. A long handled, flat bladed shovel is recommend for loose material. ▪ Inspect the handle for splinters and/or cracks. ▪ Ensure that the blade is securely attached to the handle.	**L**

Job Steps	Hazards	Controls	RAC
		▪ Stand with your feet about hip width for balance and keep the shovel close to your body. ▪ Bend from the knees (not the back) and tighten your stomach muscles as you lift. ▪ Avoid twisting movements. If you need to move the snow to one side reposition your feet to face the direction the snow will be going. ▪ Avoid lifting large shoveling too much at once. When lifting heavy material, pick up less to reduce the weight lifted. ▪ Pace yourself to avoid getting out of breath and becoming fatigued too soon. ▪ Be alert for signs of stress such as pain, numbness, burning and tingling. Stop immediately if you feel any of these symptoms.	
		4K) Back Injuries - Standing/Static Posture ▪ Change posture on a frequent basis. ▪ Stretch prior to any physical activity.	L
	4L) Overhead Power Lines	4L) Overhead Power Lines ▪ Identify the location of all overhead power lines at the site. ▪ Maintain clearances depending on voltage - All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV or less). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.) ▪ Re-locate work so it is not close to power lines. ▪ Avoid storing materials under overhead power lines.	L
	4M) Noise	4M) Noise ▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs). ▪ All equipment will be equipped with manufacturer's required mufflers. ▪ Hearing protection shall be worn by all personnel working in or near heavy equipment. ▪ Hearing protection will be worn when workers need to shout when standing two feet away from each other. ▪ Segregate noisy equipment from the operators. ▪ Use sound dampening around noisy equipment.	L
5. Sampling and Sampling Oversight	5A) Chemical Hazards	5A) Chemical Hazards ▪ See Section 3D above ▪ Calibrate meters in a clean, well ventilated area. ▪ Store calibration gases in well vented area. Ensure chemical labels and warnings are legible.	L
	5B) Decontamination	5B) Decontamination ▪ See AHA - Decontamination	L

AHA - Field Work - General

Job Steps	Hazards	Controls	RAC
	5C) Back Injury - Lifting	5C) Back Injury - Lifting ▪ See Section 4K above	L
	5D) Hand Injury from Use of Hand Tools	5D) Hand Injury from Use of Hand Tools ▪ Cut resistant work gloves will be worn when dealing with sharp objects. ▪ All hand and power tools will be maintained in safe condition. ▪ Do not drop or throw tools. Tools shall be placed on the ground or work surface or handed to another employee in a safe manner. ▪ Ensure guards are in place and are in good condition. ▪ Daily inspections will be performed. ▪ Remove broken or damaged tools from service and tag out as defective. ▪ No tampering with electrical equipment is allowed (e.g., splicing cords, cutting the grounding prong off plug, etc.). ▪ Do not use excessive force or impact. ▪ Use tool in accordance with manufacturers instructions and for its intended purpose. Ensure all workers are trained. ▪ No tampering with electrical equipment is allowed (e.g., splicing cords, cutting the grounding prong off plug, etc.).	L
	5E) Slips/Trips/Falls	5E) Slips/Trips/Falls ▪ See Section 3I above.	L
	5F) Caught In / On / Between	5F) Caught In / On / Between ▪ See Section 4A above	L
	5G) Contact With Electricity	5G) Contact With Electricity ▪ All electrical tools and equipment will be equipped with GFCI. ▪ Electrical extension cords will be of the “Hard” or “Extra Hard” service type. ▪ All extension cords shall have a three-blade grounding plug. ▪ Personnel shall not use extension cords with damaged outer covers, exposed inner wires, or splices. ▪ Electrical cords shall not be laid across roads where vehicular traffic may damage the cord without appropriate guarding. ▪ All electrical work will be conducted by a licensed electrician. ▪ All equipment will be locked out and tagged out and rendered in a zero energy state prior to commencing any operation that may exposed workers to electrical, mechanical, hydraulic, etc. hazards. ▪ All utilities will be marked prior to excavation activities. ▪ All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead	L

AHA - Field Work - General

Job Steps	Hazards	Controls	RAC
		powerlines known to be 50 kV or less and a minimum of 35 feet from all others.)	
	5H) Equipment Failure	5H) Equipment Failure ▪ All equipment will be inspected before use. If any safety problems are noted, the equipment should be tagged and removed from service until repaired or replaced.	L
	5I) Fire Protection	5I) Fire Protection ▪ Ensure that adequate number and type of fire extinguishers are present at the site. ▪ Inspect fire extinguishers on a monthly basis – document tag on each extinguisher. ▪ All employees who are expected to use fire exinguishers will have received training on an annual basis. ▪ Obey no-smoking policy. ▪ Open fires are prohibited. ▪ Maintain good housekeeping. Keep rubbish and combustibles to a minimum. ▪ Keep flammable liquids in small containers with lids closed or a safety can. ▪ When dispensing flammable liquids, do in well vented area and bond and ground containers.	L
	5J) Confined Space Entry	5J) Confined Space Entry ▪ Confined Space Entry is not incluided in this project. Contact Chad Barnes before entering any confined space.	L
6. IDW pickup oversight	6A) Foot Injury	6A) Foot Injury See Section 3L above.	L
	6B) Chemical Hazards	6B) Chemical Hazards ▪ See Section 3D above.	L
	6C) Back Injury - Lifting	6C) Back Injury - Lifting ▪ See Section 4K above.	L
	6D) Slips/Trips/Falls	6D) Slips/Trips/Falls ▪ See Section 3I above	L
7. Environmental Health Considerations	7A) Severe Weather	7A) Severe Weather ▪ Watch for clouds and incoming weather. ▪ Monitor weather forecasts. ▪ Train workers about weather and appropriate precautions. ▪ Identify a shelter and a safe place in event of tornado etc.	L

AHA - Field Work - General

Job Steps	Hazards	Controls	RAC
	7B) Sun	7B) Sun ▪ Keep body protected ▪ Wear sunscreen, wide brimmed hat or hardhat. ▪ Schedule work for cool part of day. ▪ Take breaks in the shade.	L
	7C) Lightning and Thunder	7C) Lightning and Thunder ▪ Monitor weather channels to determine if electrical storms are forecasted. ▪ Plan ahead and identify safe locations to be in the event of a storm. (e.g., sturdy building, vehicle, etc.). ▪ The SHSO shall halt outdoor site operations whenever lightning is visible, outdoor work will not resume until 30 minutes after the last sighting of lightning.	L
	7D) Wind	7D) Wind ▪ Wind chill greatly affects heat loss (see attached Wind Chill Index). ▪ Avoid marking in old, defective timber, especially hardwoods, during periods of high winds due to snag hazards.	L
	7E) Cold Extremes	7E) Cold Extremes Take precautions to prevent cold stress injuries ▪ Cover all exposed skin and be aware of frostbite. While cold air will not freeze the tissues of the lungs, slow down and use a mask or scarf to minimize the effect of cold air on air passages. ▪ Dress in layers with wicking garments (those that carry moisture away from the body – e.g., cotton) and a weatherproof slicker. A wool outer garment is recommended. ▪ Take layers off as you heat up; put them on as you cool down. ▪ Wear head protection that provides adequate insulation and protects the ears. ▪ Maintain your energy level. Avoid exhaustion and over-exertion which causes sweating, dampens clothing, and accelerates loss of body heat and increases the potential for hypothermia. ▪ Acclimate to the cold climate to minimize discomfort. ▪ Maintain adequate water/fluid intake to avoid dehydration.	L
	7F) Heat Stress	7F) Heat Stress Take precautions to prevent heat stress ▪ Remain constantly aware of the four basic factors that determine the degree of heat stress (air temperature, humidity, air movement, and heat radiation) relative to the surrounding work environmental heat load.	L

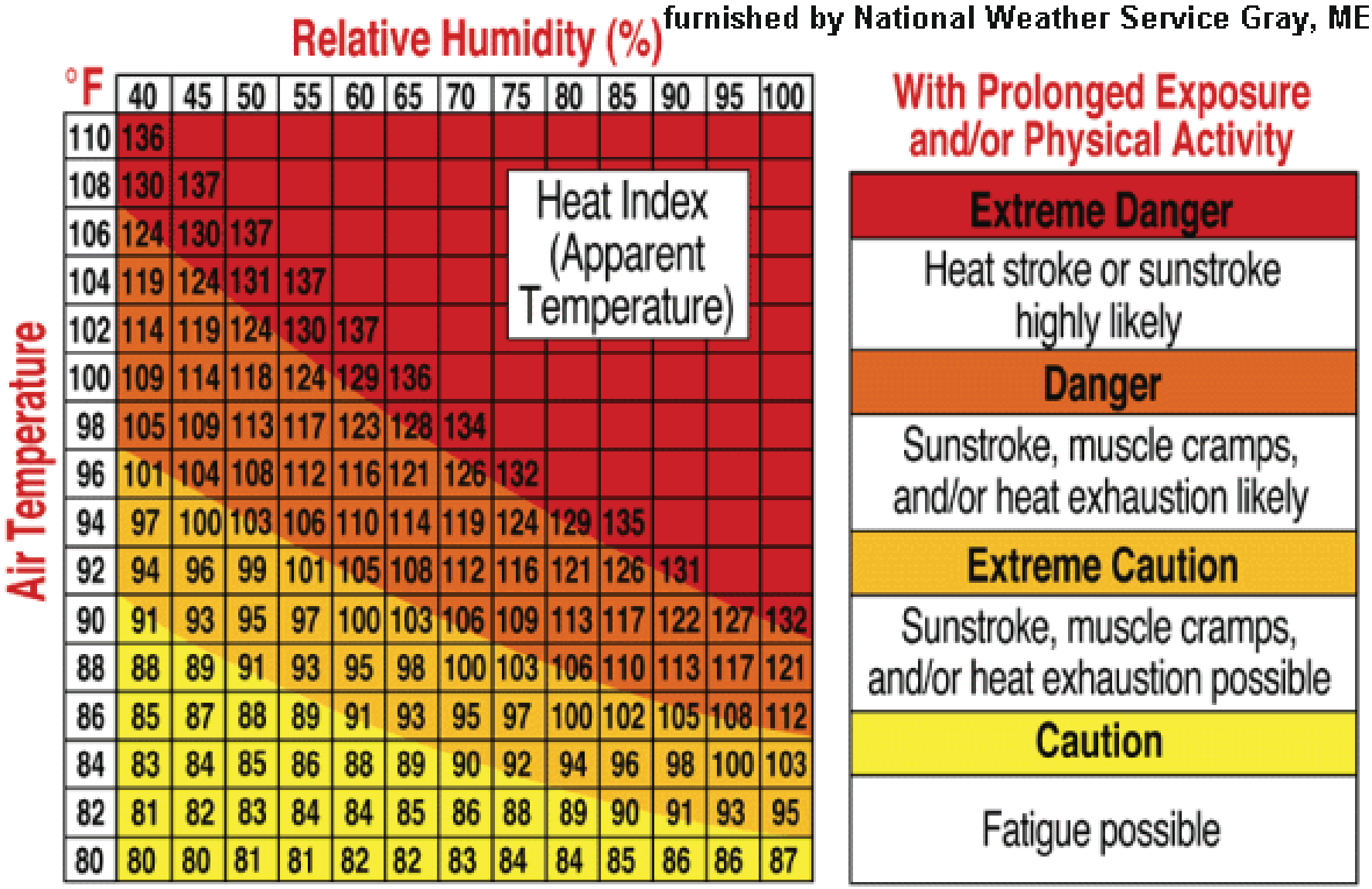
AHA - Field Work - General

Job Steps	Hazards	Controls	RAC
		▪ Know the signs and symptoms of heat exhaustion, heat cramps, and heat stroke. Heat stroke is a true medical emergency requiring immediate emergency response action. **NOTE: The severity of the effects of a given environmental heat stress is decreased by reducing the work load, increasing the frequency and/or duration of rest periods, and by introducing measures which will protect employees from hot environments.** ▪ Maintain adequate water intake by drinking water periodically in small amounts throughout the day (flavoring water with citrus flavors or extracts enhances palatability). ▪ Allow approximately 2 weeks with progressive degrees of heat exposure and physical exertion for substantial acclimatization. ▪ Acclimatization is necessary regardless of an employee's physical condition (the better one's physical condition, the quicker the acclimatization). Tailor the work schedule to fit the climate, the physical condition of employees, and mission requirements. ▪ A reduction of work load markedly decreases total heat stress. ▪ Lessen work load and/or duration of physical exertion the first days of heat exposure to allow gradual acclimatization. ▪ Alternate work and rest periods. More severe conditions may require longer rest periods and electrolyte fluid replacement.	
	7G) Wet Bulb Globe Temperature (WBGT) Index	7G) Wet Bulb Globe Temperature (WBGT) Index ▪ Curtail or suspend physical work when conditions are extremely severe (see attached Heat Stress Index). ▪ Compute a Wet Bulb Globe Temperature Index to determine the level of physical activity (take WBGT index measurements in a location that is similar or closely approximates the environment to which employees will be exposed).	**L**
		WBGT THRESHOLD VALUES FOR INSTITUTING PREVENTIVE MEASURES	
		80-90 degrees F — Fatigue possible with prolonged exposure and physical activity.	

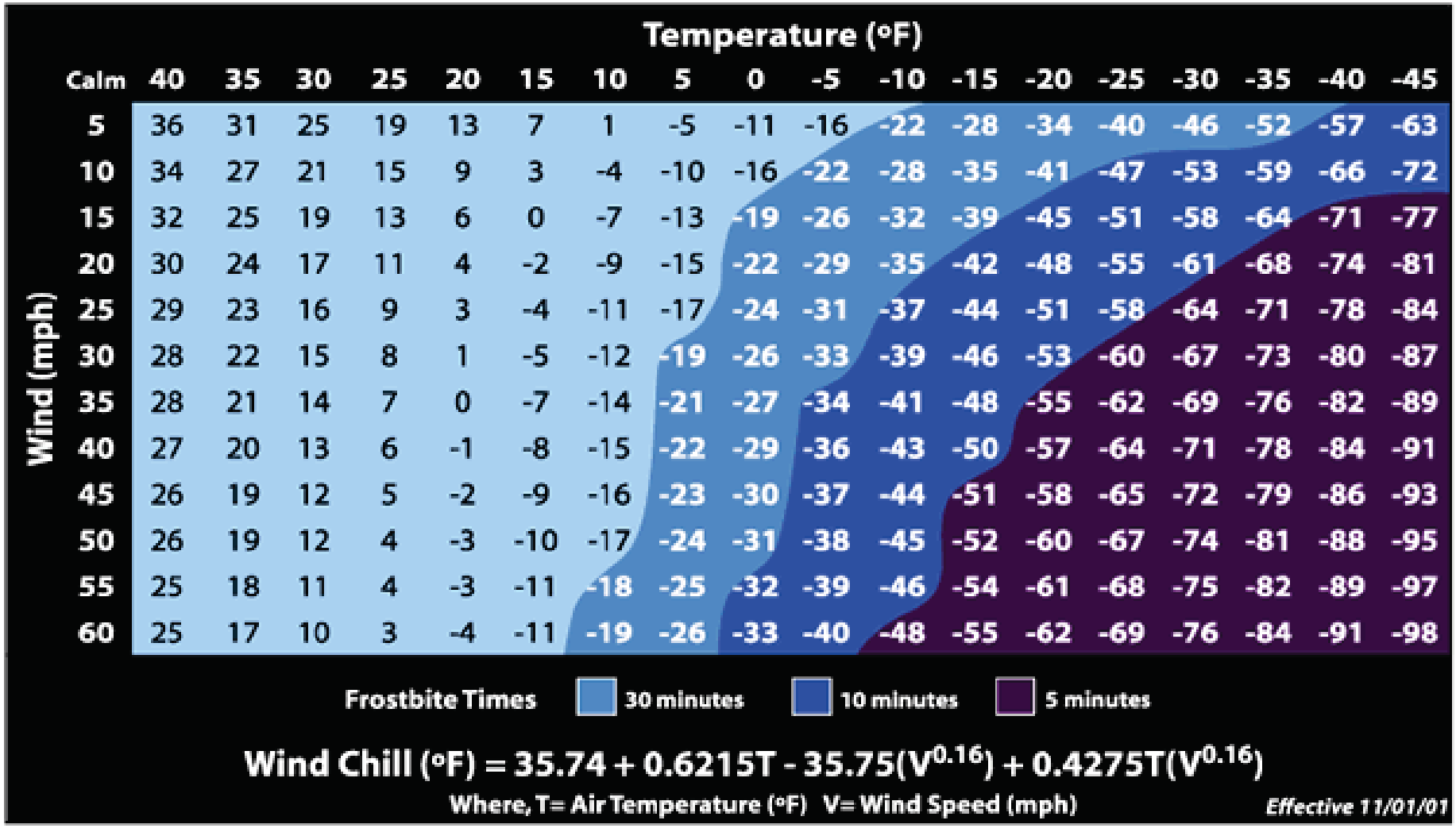
AHA - Field Work - General

Job Steps	Hazards	Controls		RAC
		90-105 degrees F	Heat exhaustion and heat stroke possible with prolonged exposure and physical activity.	
		105-130 degrees F	Heat exhaustion and heat stroke are likely with prolonged heat exposure and physical activity.	
8. Return to office/home		See AHA - Mobilization/ Demobilization and Site Preparation		L

furnished by National Weather Service Gray, ME



Wind Chill Chart



AHA – Field Work Oversight

Activity/Work Task:	**Field Work - Oversight**		
Project Location:	**Batavia Iron & Metals**		
Project Number:	**3617137301**		
Date Prepared:	**02/08/16**	**Date Accepted:**	
Prepared by (Name/Title):	Lucas Benedict		
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Overall Risk Assessment Code (RAC) (Use highest code) **M**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Prepare for site visit	1A) N/A	▪ Obtain and review HASP prior to site visit, if possible ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots) ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment) ▪ First aid kits shall be available at the work site and on each transport vehicle. ▪ Familiarize yourself with route to the site ▪ Check weather forecast. Pack appropriate clothing and other items (e.g., sunscreen) for anticipated weather conditions ▪ Verify that subsurface utilities have been identified.	L
2. Traveling to the site by vehicle 3. Initial Arrival - Assess Site Conditions	2A) See JHA for Mobilization, Demobilization and Site Preparation	7A) See JHA for Mobilization, Demobilization and Site Preparation	M

	Communication	▪ Talk to each other. Develop communication methods (agree on hand signals, warning alarms) ▪ Log all workers and visitor on and off the site. ▪ Let other crewmembers know when you see a hazard. ▪ Avoid working near known hazards. ▪ Always know the whereabouts of fellow crewmembers. ▪ Carry a radio and spare batteries or cell phone Hold tailgate meetings	**L**
	3A) Insect Bites and Stings	▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects. ▪ Inform crew members if allergic to insects and what to do if you need assistance. ▪ Avoid wearing heavy fragrances. ▪ Carry first-aid and sting relief kits. ▪ Carry identification of known allergies and necessary emergency medication. ▪ Spray clothing with insect repellant as a barrier. ▪ Wear light colored clothing that fits tightly at the wrists, ankles, and waist. ▪ Cover trouser legs with high socks or boots. ▪ Tuck in shirt tails.	**L**
	3B) Poisonous plants	▪ Wear long sleeves, long pants and boots ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with high visibility spray paint if working at a fixed location. ▪ Look for signs of poisonous plants and demark area to aid in avoiding plant. ▪ Do not touch any plant part to any part of your body/clothing. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.	**M**
	3C) Vermin, leaches, animal borne disease	▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Wear long sleeve shirt and full length pants	**L**
	3D) Chemical Hazards	▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read MSDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled	**M**

	3E) Overhead Power Lines	▪ Identify the location of all overhead power lines at the site. ▪ Maintain clearances depending on voltage - All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV or less). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.) ▪ Re-locate work so it is not close to power lines ▪ Avoid storing materials under overhead power lines	**M**
	3F) Underground Utilities	▪ All utilities will be marked prior to excavation activities ▪ For areas where utility locations cannot be verified, workers must hand dig for the first 3 feet ▪ Use lineman's gloves when locating underground power lines ▪ Work at adequate offsets from utility locations ▪ Immediately cease work if unknown utility markings are discovered.	**M**
	3G) Cold Stress	▪ Dress in layers with wicking garments (those that carry moisture away from the body – e.g., cotton) and a weatherproof slicker. A wool outer garment is recommended. ▪ Take layers off as you heat up; put them on as you cool down. ▪ Wear head protection that provides adequate insulation and protects the ears. ▪ Maintain your energy level. Avoid exhaustion and over-exertion which causes sweating, dampens clothing, and accelerates loss of body heat and increases the potential for hypothermia. ▪ Acclimate to the cold climate to minimize discomfort. ▪ Maintain adequate water/fluid intake to avoid dehydration. ▪ Be aware of signs of hypothermia, its prevention, detection and treatment. ▪ Have extra protection available, in case of an emergency such as blankets and heating devices. ▪ Don't work under extremely adverse weather conditions ▪ Stay in tune to current weather and extended forecasts.	**L**

	3H) Heat Stress	▪ Remain constantly aware of the four basic factors that determine the degree of heat stress (air temperature, humidity, air movement, and heat radiation) relative to the surrounding work environmental heat load. ▪ Know the signs and symptoms of heat exhaustion, heat cramps, and heat stroke. Heat stroke is a true medical emergency requiring immediate emergency response action. ▪ Maintain adequate water intake by drinking water periodically in small amounts throughout the day (flavoring water with citrus flavors or extracts enhances palatability). ▪ Lessen work load and/or duration of physical exertion the first days of heat exposure to allow gradual acclimatization. ▪ Alternate work and rest periods. More severe conditions may require longer rest periods and electrolyte fluid replacement.	**L**
	3I) Lightning and Thunder	▪ Monitor weather channels to determine if electrical storms are forecasted. ▪ Plan ahead and identify safe locations to be in the event of a storm. (e.g., sturdy building, vehicle, etc.) ▪ Suspend all field work at the first sound of thunder. You should be in a safe place when the time between the lightning and thunder is less than 30 seconds.	**L**
	3J) Severe Weather	▪ Watch for clouds and incoming weather. ▪ Monitor weather forecasts. ▪ Train workers about weather and appropriate precautions. ▪ Identify a shelter and a safe place in event of tornado etc	**L**
	3K) Sun	▪ Keep body protected ▪ Wear sunscreen, wide brimmed hat or hardhat. ▪ Schedule work for cool part of day. ▪ Take breaks in the shade.	**L**
	3L) High Crime Areas	▪ Do not enter areas where threats are present. ▪ Contract security where applicable. Use the buddy system. ▪ Maintain contact with support such as radio or cell phone ▪ Do not work after dark.	**L**
	3M) Operations conducted at an active facility	▪ Stay well clear of operations being conducted at the facility ▪ Keep alert for moving materials, equipment or vehicles ▪ Determine client specific PPE needs prior to arriving at the site ▪ Determine client specific emergency response procedures and follow as appropriate ▪ Participate in client required safety training ▪ Get copies of Clients MSDSs for any client chemicals that workers may be exposed to. ▪ Provide MSDSs to client for all chemicals brought to the site.	**M**

	3N) Remote Locations	▪ Carry a two-way radio and know how to use it. ▪ Work in teams. ▪ Make sure someone on crew is certified in first aid. ▪ Carry a first aid kit.	**M**
	3O) Set up Decon Station	▪ Refer to MSDS for specific hazards associated with decon solutions ▪ Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.), if appropriate (see HASP) ▪ Removal of PPE will be performed by the following tasks in the listed order: o Gross boot wash and rinse and removal o Outer glove removal o Suit removal o Respirator removal (if worn). o Inner glove removal ▪ Contaminated PPE is to be placed in the appropriate, provided receptacles. ▪ Employees will wash hands, face, and any other exposed areas with soap and water. ▪ Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials. ▪ Decon solutions will be disposed of according to the work plan.	**L**
4. Walk around the Site	4A) Poisonous plants	▪ Wear long sleeves, long pants and boots. ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with high visibility spray paint if working at a fixed location. ▪ Do not touch any plant part to any part of your body/clothing. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.	**M**
	4B) Vermin, leaches, animal borne disease	▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Be aware of your surroundings. ▪ Wear long sleeve shirt and full length pants ▪ Wear appropriate footwear (snake boots, etc.) ▪ Avoid high grass areas if possible ▪ Do not put hand/arm into/under an area that you cannot see into/under clearly ▪ Perform routine inspections for ticks, leaches, etc. of yourself and co-workers.	**L**
	4C) Chemical Hazards	▪ See HASP for appropriate level of PPE ▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read MSDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled	**L**

	4D) Slips/Trips/Falls	▪ Wear slip resistant footwear ▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Site SHSO will inspect the entire work area to identify and mark hazards. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved; ▪ Use caution when walking around excavated areas ▪ Use caution when walking on or around loose soil.	**M**
5. Oversight during drilling, or construction operations	5A) Heavy Equipment/ Vehicles	▪ Spotters will be used when backing up trucks and heavy equipment and when moving equipment. ▪ Ground personnel in the vicinity of vehicles or heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will be aware of the swing radius and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Personnel are prohibited from riding on the buckets, or elsewhere on the equipment except for designated seats with proper seat belts or lifts specifically designed to carry workers. Ground personnel will stay clear of all suspended loads. ▪ Ground personnel will wear high visibility vests ▪ Eye contact with operators will be made before approaching equipment.	**M**
	5B) Eye Injury	▪ Wear appropriate safety glasses (tinted for sun). ▪ Watch where you walk, especially around trees and brush with protruding limbs.	**L**
	5C) Foot Injury	▪ Wear steel toed boots ▪ Wear insulated steel toed boots during winter ▪ Ensure shoes/boots have good traction ▪ Pay attention to where you place your feet, especially when walking on uneven terrain	**L**
	5D) Head Injury	▪ Wear hardhat ▪ Do not walk or work under scaffolding or other elevated work unless there are guardrails and toeboards in place ▪ Flag or mark protruding objects at head level	**L**

	5E) Chemical Hazards	▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read MSDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled ▪ Wash hands and face prior to consumption of food, beverage or tobacco.	**M**
	5F) Dust - particulates (respiratory)	▪ Use dust suppression methods ▪ Stand upwind of point of dust generation	**L**
	5G) Overhead Power Lines	▪ Maintain clearances depending on voltage - All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV or less). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.)	**M**
	5H) Underground Utilities	▪ All utilities will be marked prior to excavation activities. ▪ Work at adequate offsets from utility locations ▪ Immediately cease work if unknown utility markings are discovered.	**M**
	5I) Standing/Static Posture	▪ Change posture on a frequent basis ▪ Stretch prior to any physical activity	
	5J) Slips/`Trips/Falls	▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Wear laced boots with a minimum 8" high upper and non-skid soles for ankle support and traction. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved. ▪ Use caution when walking around excavated areas ▪ Stay back at least 5 feet from excavated areas ▪ Use caution when walking on or around loose soil. ▪ Be aware of surroundings. Avoid muddy areas if possible.	**L**
6. Sampling Oversight	6A) Chemical Hazards	▪ See HASP for appropriate level of PPE ▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Be familiar with hazards associated with site contaminants. ▪ Wash hands and face prior to consumption of food, beverage or tobacco. ▪ Calibrate meters in a clean, well ventilated area ▪ Store calibration gases in well vented area. Ensure chemical labels and warnings are legible.	**M**

	6B) Decontamination	▪ Refer to MSDS for specific hazards associated with decon solutions ▪ Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.), if appropriate (see HASP) ▪ Removal of PPE will be performed by the following tasks in the listed order: o Gross boot wash and rinse and removal o Outer glove removal o Suit removal o Respirator removal (if worn). o Inner glove removal ▪ Contaminated PPE is to be placed in the appropriate, provided receptacles. ▪ Employees will wash hands, face, and any other exposed areas with soap and water. ▪ Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials. ▪ Decon solutions will be disposed of according to the work plan.	**M**
	6C) Lifting	▪ Good lifting techniques (lift with legs not back) ▪ Mechanical devices (e.g., hand truck, cart, forklift, etc.) should be used to reduce manual handling of materials. ▪ Team lifting should be utilized if mechanical devices are not available. (mandatory for items over 50 lbs) ▪ Split heavy loads in to smaller loads ▪ Make sure that path is clear prior to lift. ▪ Redesign work area to avoid low lifts ▪ Stretch prior to lifting ▪ Maintain a healthy life style and level of physical fitness.	**M**
	6D) Hand Tools	▪ Cut resistant work gloves will be worn when dealing with sharp objects. ▪ All hand and power tools will be maintained in safe condition. ▪ Do not drop or throw tools. Tools shall be placed on the ground or work surface or handed to another employee in a safe manner. ▪ Guards will be kept in place while using hand and power tools. ▪ Daily inspections will be performed. ▪ Remove broken or damaged tools from service and tag out as defective ▪ No tampering with electrical equipment is allowed (e.g., splicing cords, cutting the grounding prong off plug, etc.) ▪ Do not use excessive force or impact ▪ Do not use tool improperly. Ensure all workers are trained	**L**

	6E) Slips/Trips/ Falls	▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Wear laced boots with a minimum 8" high upper and non-skid soles for ankle support and traction. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved; ▪ Use caution when walking around excavated areas ▪ Stay back at least 5 feet from excavated areas ▪ Use caution when walking on or around loose soil. ▪ Be aware of surroundings. Avoid muddy areas if possible.	**L**
	6F) Struck by Vehicle	▪ Ground personnel in the vicinity of vehicles operations will be within the view of the operator at all times. ▪ Ground personnel will not stand directly behind vehicles when it is in operation ▪ Drivers will keep workers on foot in their vision at all times, if you lose sight of someone, Stop! ▪ High visibility vests will be worn when workers are exposed to vehicular traffic at the site or on public roads. ▪ Try to park so that you don't have to back up to leave. ▪ If backing in required, walk around vehicle to identify any hazards (especially low level hazards that may be difficult to see when in the vehicle) that might be present. Use a spotter if necessary ▪ Place cones in the font and rear of the vehicle ▪ Prior to driving off, walk around vehicle to collect cones and identify any hazards - especially low level hazards that may be difficult to see when in the vehicle. ▪ Set up "Workers in the Road" or similar warning signs and cones to alert traffic. ▪ Use emergency flashers and roof top flashing light (recommended) to alert oncoming vehicular traffic. ▪ Remain alert at all times as to the traffic outside the vehicle. Step to the side of the road when distracted by by-standers. Keep unofficial personnel out of the work area. ▪ Exit vehicle with caution. ▪ Wear High Visibility Vest when outside the vehicle. ▪ Utilize vehicle as a shield from oncoming traffic, as practical	**L**
7. IDW pickup oversight	7B) Foot Injury	▪ Wear steel toed boots ▪ Pay attention to where you place your feet, especially when walking on uneven terrain	

	7C) Chemical Hazards	▪ See HASP for appropriate level of PPE ▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Be familiar with hazards associated with site contaminants. ▪ Wash hands and face prior to consumption of food, beverage or tobacco.	**L**
	7D) Lifting	▪ Good lifting techniques (lift with legs not back) ▪ Use mechanical devices (e.g., hand truck, cart, forklift, etc.) to move drums. ▪ Team lifting should be utilized if mechanical devices are not available. (mandatory for items over 50 lbs)	**M**
	7E) Slips/Trips/ Falls	▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved; ▪ Use caution when walking around excavated areas ▪ Stay back at least 5 feet from excavated areas ▪ Use caution when walking on or around loose soil. ▪ Be aware of surroundings. Avoid muddy areas if possible.	**L**
8. Return to office/ home	8A) See Mobilization/ Demobilization and Site Preparation JHA	**See Mobilization/ Demobilization and Site Preparation JHA**	**L**

AHA – Field Work Oversight

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (1/2 face respirator with P-100 cartridge, Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** Name – Position/Employer – See HASP **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA - Decontamination

Activity/Work Task:	**Decontamination**	Overall Risk Assessment Code (RAC) (Use highest code)	**M**
Project Location:	**Batavia Iron & Metals**		
Project Number:	**3617137301**		
Date Prepared:	**02/08/16** **Date Accepted:**		
Prepared by (Name/Title):	Lucas Benedict		
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Establish Decontamination Station	1A) Materials Handling	1A) Materials Handling ▪ Use proper lifting techniques ▪ Use mechanical aids, if available, to move heavy items.	**L**
2. Decontamination / Steam cleaning.	2A) Struck by steam/hot water/pressure washing	2A) Struck by steam/hot water ▪ Workers not directly engaged in steam cleaning operations must stay clear. ▪ Workers using steam cleaning equipment must be trained on operation and safety devices/procedures using the owners/operators manual. ▪ Use face shield **and** safety glasses or goggles, if steam cleaning. ▪ Stay out of the splash/steam radius. ▪ Pressure washer must have dead man switch. ▪ Do not direct steam at anyone. ▪ Do not hold objects with your feet or hands. ▪ Ensure that direction of spray minimizes spread of contaminants of concern. ▪ Use shielding as necessary.	**M**

AHA - Decontamination

	2B) Exposure to contaminants	2B) Exposure to contaminants ▪ Conduct air monitoring (see HASP). ▪ Wear proper PPE (see HASP). ▪ See MSDSs for hazards associated with the decon solutions used (if other than water alone us used).	**L**
	2C) Slips/Trips/Falls	2C) Slips/Trips/Falls ▪ Be cautious as ground/plastic can become slippery ▪ Use boots or boot covers with good traction	**L**
3. Vehicle Decontamination	3A) Vehicle traffic in and out of the CRZ	3A) Large Vehicle Traffic ▪ Always wear a hard hat, steel toe boots, and a high visibility vest (unless Tyveks are used and are high visibility). ▪ Vehicle drivers are not to exit the vehicle in the CRZ. ▪ Identify an individual to communicate with vehicle drivers and maintain order ▪ Trucks will be lined with plastic and kept out of direct contact with any contaminated materials during loading. Wear PPE when removing plastic lining from truck beds. ▪ If not in the vehicle, obtain eye contact with the driver, so he is aware of your presence and location in the CRZ. ▪ If you are driving the vehicle, be aware of personnel in the CRZ and maintain communication with the identified personnel.	**L**
	3B) Exposure to contaminants	3B) Exposure to contaminants ▪ Use safety glasses or goggles, Polycoated Tyvek (if level of contamination poses dermal hazard or to keep work clothes dry), high visibility vest (if high visibility Tyveks are not used) hard hats, steel toe boots, and gloves while cleaning contaminated materials. ▪ Do not doff PPE until decontamination of the vehicle is complete and a decontamination certificate has been issued by the HSO. ▪ Conduct air monitoring (see HASP). ▪ See MSDSs for hazards associated with the decon solutions (if other than water alone is used).	**L**
	3C) Slips/Trips/Falls	3C) Slips/Trips/Falls ▪ Be cautious as ground/plastic can become slippery ▪ Use boots or boot covers with good traction	**L**
4. Equipment and Sample Decontamination	4A) Chemical exposure when handling contaminated sample jars and equipment	4A) Chemical exposure ▪ Wear PPE as outlined in the HASP. ▪ Refer to MSDS for specific hazards associated with decon solutions ▪ Monitor breathing zone for contaminants ▪ Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.) if appropriate (see HASP)	**M**
	4B) Materials Handling related injuries	4B) Materials Handling related injuries ▪ Use proper lifting techniques when lifting heavy equipment ▪ Use two person lift for heavy coolers	**L**

AHA - Decontamination

5. Personal Decontamination	4C) Exposure to contaminants	4C) Exposure to contaminants
		▪ Avoid bringing contaminated materials via shoes and clothing into the CRZ by examining such prior to exiting the EZ.
		▪ Removal of PPE will be performed by the following tasks in the listed order:
		  ▪ Gross boot wash and rinse and removal
		  ▪ Outer glove removal
		  ▪ Suit removal
		  ▪ Respirator removal (if worn).
		  ▪ Inner glove removal
		▪ Contaminated PPE is to be placed in the appropriate, provided receptacles.
		▪ Respirators will be removed and decontaminated at a specified location within the CRZ by a designated technician, then placed in storage bag.
		▪ Employees will wash hands, face, and any other exposed areas with soap and water.
		▪ Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials.
		▪ See MSDSs for hazards associated with the decontamination solutions used.
		▪ Decon solutions will be disposed of according to the work plan.
			M

AHA - Decontamination

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Safety glasses, gloves (HASP), steel toe work boots, high visibility safety vest, hearing protection.)	**Competent / Qualified Personnel:** See HASP - Name – Position/Employer **Training requirements:** Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA - Utility Clearance Activities

Activity/Work Task:	**Utility Clearance Activities**		
Project Location:	**Batavia Iron & Metals**		
Project Number:	**3617137301**		
Date Prepared:	**02/08/16**	**Date Accepted:**	
Prepared by (Name/Title):	Lucas Benedict		
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Overall Risk Assessment Code (RAC) (Use highest code) **H**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Pre-planning	1A) Property Access ▪ Animal bites ▪ Dangerous social areas/ violent neighborhoods ▪ Lost ▪ Electrocution	1A) Ensure communications with the property owner. Request pets and animals to be confined during the survey. ▪ Maintain communications via two way radios or cell phones. ▪ Learn animal posturing including how to identify rabid animals. ▪ Contract security as appropriate for safety and equipment theft. ▪ Be prepared with a map and compass as necessary. ▪ Be aware of overhead and underground utilities. Ensure Dig-Safe has been contacted. **1)** When working with electrical equipment avoid wet surfaces and exposed connections.	**L**
	1B) **Utilities Not Cleared (damage to utilities, worker injury)**	1B) Utilities Not Cleared. ▪ Provide sufficient time and budget to ensure that utilities have been adequately located, prior to the start of up of work. ▪ Contact One Call Utility identifier organization at least 6 days prior to the project start date. ▪ Cite or have subcontractor cite a start date of at least 3 working days prior to actual planned start date (provides window to inspect locations prior to job start-up. ▪ Verify via emails or phone that all utilities have visited the site and marked their respective utilities. ▪ If subcontractor calls One Call organization, require them to forward all e-mail responses from member utilities as they receive them. ▪ If verification cannot be done remotely, send worker to site to inspect ground for markings (cheaper	**H**

		to identify issues prior to mobilization to the site). ▪ Document all phone communications with driller about utility clearance issues and requests (e-mail the conversation highlights or document in a field notebook – it becomes part of the file record) ▪ Call any member utilities that have not responded indicating they have cleared or marked-out utilities. Place the call morning of ticket start date (e.g., 3 days prior to actual start date). Document the phone conversations in notes or e-mails to the file. ▪ If town services (e.g., sanitary sewer, storm sewer, water) aren't listed as a One Call member, contact the town office to schedule mark-out, obtain copies of utility networks, and identify the appropriate town contacts. ▪ If town maps have lateral connections to private lots marked and /or if we are drilling along road right-of way opposite developed properties, identify the locations of the lateral connections. This may mean contacting abutters and asking to look in basements for location of pipes. If possible do this during a site visit prior to field start. If not, it should occur during the first day of work so any issues can be identified and decisions made on the risk of proceeding. **Walk all planned locations with the subcontractor, prior to start of excavation/drilling to identify marked utilities and note any uncertainties. Field Lead should call PM and relay any issues. Document this inspection in the field book and note subcontractor's responses to any MACTEC concerns.**	
	1C) **Locating Utilties on Private Property**	1C) Locating Utilities on Private Property ▪ Hire private utility locater company ▪ Locate underground utilities by ground penetrating radar, electromagnetic, deep metal detector, pipe transmitter, vibracator, etc ▪ Review locations with property owner, member of operations and maintenance. ▪ Check as built drawings when available. Be aware possible drawing error or construction drawings may not be representative of actual locations. ▪ Use field clues such as manhole covers, repaved areas, depressions, disturbed areas, signs and postings, etc. as indications of access to utilities or recently installed/moved utilities.	**M**
	1D) Lack of Reliable Data on Utility Locations	1D) Lack of Reliable Data on Utility Locations ▪ If the surveys are not providing reliable data, plan to use non-destructive means to drill/excavate e.g., soil vacuum, water jet, air knife and/or hand tools. ▪ Use caution and proper PPE when using hand tools (hand augers, posthole diggers, shovels, steel rods, etc.). **2)** Involve the Project Manager, Technical Lead and/or Office Manager to make a decision to proceed or move the location	**L**
	1E) Working Near Live Utilities	1E) Working Near Live Utilities ▪ If live utilities are known to be present near drilling/excavation location, if possible, move drilling/excavation to another location. ▪ Lockout/Tagout utilities, if possible. Use non-destructive means to drill/excavate (see # 1D) until safe to proceed.	**H**
	1F) Slips/Trips/Falls	1F) Slips/Trips/Falls ▪ Keep work area free of excess material and debris ▪ Remove all trip hazards by keeping materials/objects organized and out of walkways ▪ Keep work surfaces dry when possible ▪ Wear appropriate PPE (see HASP) including non-slip rubber boots if working on wet or slick	**L**

AHA - Utility Clearance Activities

		surfaces ▪ Install rough work surface covers where possible ▪ Stay aware of footing and do not run	
	1G) Heat/Cold Stress	1G) Heat/Cold Stress ▪ Take breaks if feeling faint or overexerted ▪ Consume adequate food/beverages (water, sports drinks) ▪ If possible, adjust work schedule to avoid temperature extremes	**L**
2. Walking Around Site Identifying Utility Clearances.	2A) Biological Hazards: Insects, Snakes, Wildlife, Vegetation	2A) Biological Hazards: Insects, Snakes, Wildlife, Vegetation ▪ Inspect work areas when arrive at site to identify hazard(s) ▪ Use insect repellant if observe mosquitoes/gnats ▪ Survey site for presence of biological hazards and maintain safe distance ▪ Wear appropriate PPE including leather gloves, long sleeves and pants, and snake chaps as warranted by site conditions	**M**
	2B) Traffic (including pedestrian)	2B) Traffic (including pedestrian) ▪ Notify attendant or site owner/manager of work activities and location ▪ Use cones, signs, flags or other traffic control devices ▪ Wear appropriate PPE including high visibility clothing such as reflective vest ▪ Inspect area behind vehicle prior to backing and use spotter	**M**
	2C) Back strain due to lifting, pulling or tugging equipment	2C) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques	**M**

AHA - Utility Clearance Activities

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (1/2 face respirator with P-100 cartridge, Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** Name – Position/Employer See HASP **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA – Soil Sampling w/ Hand Auger/Hand Tools

Activity/Work Task:	**Soil Sampling w/ Hand Auger/Hand Tools**	Overall Risk Assessment Code (RAC) (Use highest code)	**M**
Project Location:	**Batavia Iron & Metals**		
Project Number:	**3617137301**		
Date Prepared:	**02/08/16** **Date Accepted:**		
Prepared by (Name/Title):	Lucas Benedict		
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures
-

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Going to site, work preparation	1A) Mobilization / Demobilization and Site Preparation	1A) See JHA for Mobilization Demobilization and Site Preparation	H
2. Working at the site	2A) General Field Work – Walking and working in the field, Environmental conditions, communication	2A) See JHA for General Field Work	L

	2B) Working Near Utilities	2B) Working Near Utilities • See JHA for Utility Clearance Activities • See JHA for Field Work - Oversight • On private property/active facility, walk all planned locations with a appropriate representative prior to start of exploration to identify the location of marked/unmarked utilities (underground/overhead) and note any uncertainties. Field Lead should call PM and relay any issues. Document this inspection in the field book and note subcontractor's responses to any MACTEC concerns. • Coordinate with facility representatives to gain access to restricted areas. • For areas where utility locations cannot be verified, workers must hand dig for the first 3 feet • Wear appropriate PPE • If working in close proximity to live utilities (i.e. transformers), do not tamper with the units in any way and maintain safe working distance based on voltage. • If working alone, always notify other crewmembers/project team members/facility personnel of your whereabouts. • Carry a radio and spare batteries or cell phone. • Let other crewmembers know when you see a hazard.	**M**
3. Preparing sample location	3A) Contact with poisonous plants or the oil from poisonous plants	3A) Contact with Poisonous plants or oil from poisonous plants ▪ Look for signs of poisonous plants and avoid. ▪ Wear PPE as described in the HASP. ▪ Do not touch anything part of your body/clothing. ▪ Always wash gloves before removing them ▪ Discard PPE in accordance with the HASP	**M**

	3B) Contact with biting insects (i.e., spiders, bees, etc.)	3B) Contact with biting insects ▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects in and around the well. ▪ Wear Level of PPE as described in the HASP. At a minimum, follow guidelines in the JHA "Insects Stings and Bites." ▪ If necessary, wear protective netting over your head/face. ▪ Avoid contact with the insects if possible. ▪ Inform your supervisor and the Site Health and Safety Supervisor if you have any allergies to insects and insect bites. Make sure you have identification of your allergies with you at all times and appropriate response kits if applicable. ▪ Get medical help immediately if you are bitten by a black widow or brown recluse, or if you have a severe reaction to any spider bite or bee sting.	**M**
	3C) Encounter wild/ dangerous animal	3C) Encounter wild/ dangerous animal • See JHA "Dog and Wildlife Safety"	**L**
	3D) Back strain due to lifting or moving equipment to sampling locations	3D) Back strain due to lifting or moving equipment to sampling locations ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques ▪ Split up heavy loads into smaller loads	**M**
	3E) Foot injuries	3E) Foot injuries ▪ Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. ▪ Do not carry more than you can handle safely ▪ Wear steel toed boots with high tops ▪ Be observant of surroundings. Be mindful of holes and uneven terrain. Surfaces may be wet and muddy. Avoid puddles.	**L**
4. Hand Auguring/ Shoveling Test Holes	4A) Back injury from lifting and twisting equipment	4A) Back injury from lifting and twisting equipment • Use proper lifting and bending techniques. • Us 2 persons for lifting of heavy, bulky items over 50 lbs. • Use Mechanical means if available (e.g. auger jacks etc.) • Wobble auger or shovel to break suction of wet soils.	**M**

	4B) Injuries from transporting equipment to site i.e. stumbling or falling	4B) Injuries from transporting equipment to site i.e. stumbling or falling • Ensure surround are is clear of personnel and obstacles as you approach the test site. • Transport equipment in sections, beginning with equipment nearest tailgate of truck. • Use 2 person lift for heavy items • Assure pathway is clear	**M**
	4C) Injuries while adding extensions	4C) Injuries while adding extensions • Ensure that PPE is used. • Lift and connect extension with care. • Use proper lifting procedures.	**L**
	4D) Hit utilities or geo-textile membrane and contamination	4D) Hit utilities or geo-textile membrane and contamination • Locate utilities and mark. Sample in cleared area. • Use of hand tools. Be observant. Do not use excessive force. • Follow sampling work plan for location and depth.	**L**
	4E) Injury to others as equipment is removed	4E) Injury to others as equipment is removed • Assure that other are standing at a safety distance before removing equipment	**L**
	4F) Fingers injuries	4F) Fingers injuries • Assure fingers are clear as equipment is extracted - Wear PPE (gloves, eye protection, etc). • Be aware of the type of material being removed from test hole and handle appropriately	**M**
	4G) Electrocution	4G) Electrocution • A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. • Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. • Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water • Do not stand in wet areas while operating power equipment • Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. • When unplugging a cord, pull on the plug rather than the cord. • Never do repairs on electrical equipment unless you are both authorized and qualified to do so.	**M**

AHA – Soil Sampling w/ Hand Auger/Hand Tools

5. Sample Collection	5A) Exposure to contaminants	5A) Exposure to Contaminants ▪ Stand up wind when sampling and do not breathe dust (if conditions are dusty) ▪ Monitor breathing zone with appropriate monitoring equipment (see HASP) ▪ Continually monitor soil samples for low level radiation. ▪ Wear chemical resistant PPE as identified in HASP / JHA ▪ Minimize sample contact ▪ Label sample in accordance with procedures	**H**
	5B) Exposure to preservatives	5B) Exposure to preservatives ▪ Work in a well ventilated area, upwind of samples ▪ Wear chemical resistant PPE as identified in HASP / JHA. ▪ Review MSDSs	**H**
	5C) Slips/trips/falls	5C) Slips/trips/falls ▪ Ground can become wet/muddy ▪ Wear good slip resistant footwear	**H**
	5D) Vapors and Airborne Particulates	5D) Vapors and Airborne Particulates ▪ Monitor air concentrations using direct-reading, real-time instruments (See HASP for required monitoring instruments and action limits) ▪ If hazardous conditions are identified, stop work until precautions are taken ▪ Wear appropriate PPE including safety glasses with side shields, dust masks and respirators (See HASP)	**M**
	5E) Lifting Injury	5E) Lifting injury ▪ Use proper lifting techniques when carrying quantities of samples ▪ Use proper ergonomics when hand digging for samples	**M**
	5F) Eye injury	5F) Eye Injury ▪ Wear eye protection during operation of Geoprobe or if misc. debris may harm your eyes.	**L**
	5G) Fire	5G) Have an A-B-C rated fire extinguisher on hand in case of small equipment fires. Only individuals trained in fire extinguisher use should use a fire extinguisher.	**L**

	5H) Sharp Sampling Tools	5H) Sharp Sampling Tools • Use correct tools for opening sleeves • When opening sleeve, cut away from body • Place soil core on sturdy surface prior to cutting	**L**
	5I) Sample Cross Contamination	5I) Sample Cross Contamination ▪ Decontaminate or dispose of sampling equipment between sampling locations ▪ Double-check sample labels to ensure accuracy and adhesion to containers	**M**
6. Disposal of leftover soil	6A) Contamination from impacted soil	6A) Properly dispose of any leftover soil sample ▪ Consult the Project Manager for proper disposal of soil. ▪ Don proper PPE when handling sample cores and disposing of soils. ▪ If soils are placed in a container (i.e. drum) properly label the drum.	**L**
7. Backfill Borehole.	7A) Contamination from impacted soil and/or groundwater	7A) Minimize contact with potentially impacted soil and/or groundwater ▪ Don proper PPE when backfilling the borehole. ▪ If the borehole is located in a paved area (i.e. asphalt/concrete), carefully patch the borehole using proper patching materials.	**L**
8. Solid/Liquid Waste Management/ Disposal	8A) Contaminated Materials and Container Pinch Points	8A) Contaminated Materials and Container Pinch Points ▪ Wear appropriate PPE including Nitrile and leather gloves (See HASP) ▪ Position hands/fingers to avoid pinching/smashing/crushing when closing drum rings	**L**
	8B) Heavy Materials and Containers Lifting/ Moving	8B) Contaminated Materials and Container Pinch Points ▪ Do not lift or move heavy containers without assistance ▪ Use proper bending/lifting techniques by lifting with arms and legs and not with back ▪ If possible, use powered lift truck, drum cart, or other mechanical means Take breaks if feeling faint or overexerted ▪ Spot drums in storage area prior to filling ▪ Wear appropriate PPE including leather gloves and steel-toed boots	**M**
9. Demobilize	9A) See Mobilization/ Demobilization and Site Preparation JHA	9A) See Mobilization/ Demobilization and Site Preparation JHA	**H**

AHA – Soil Sampling w/ Hand Auger/Hand Tools

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** Name – Position/Employer **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA - Insect Stings and Bites
Activity Description

Activity/Work Task:	**Insect Stings and Bites**		
Project Location:	**Batavia Iron & Metals**		
Project Number:	**3617137301**		
Date Prepared:	**02/08/16**	**Date Accepted:**	
Prepared by (Name/Title):	Lucas Benedict		
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Overall Risk Assessment Code (RAC) (Use highest code) **L**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Traveling/working in areas with potential Tick Bites –Example outdoor wooded areas or fields.	1. Lyme Disease, Rocky Mountain Spotted Fever, etc.	▪ Spray clothing with insect repellant as a barrier. ▪ Wear light colored clothing that fits tightly at the wrists, ankles, and waist. ▪ Each outer garment should overlap the one above it. ▪ Cover trouser legs with high socks or boots. ▪ Tuck in shirt tails. ▪ Search the body on a regular basis, especially hair and clothing; ticks generally do not attach for the first couple of hours. ▪ If a tick becomes attached, pull it by grasping it as close as possible to the point of attachment and pull straight out with gentle pressure. Wash skin with soap and water then cleanse with rubbing alcohol. Place the tick in an empty container for later identification, if the victim should have a reaction. Record dates of exposure and removal. ▪ Do not try to remove the tick by burning with a match or covering it with chemical agents. ▪ If you can not remove the tick, or the head detaches, seek propmt medical help. ▪ Watch for warning signs of illness: a large red spot on the bite area; fever, chills,	**L**

AHA - Insect Stings and Bites
Activity Description

		headache, joint and muscle ache, significant fatigue, and facial paralysis are reactions that may appear within two weeks of the attack. Symptoms specific to Lyme disease include: confusion, short-term memory loss, and disorientation.	
2. Working/traveling in areas with potential bee and wasp stings- Example wooded areas and fields	2. Allergic reactions, painful stings	▪ Be alert to hives in brush or in hollow logs. Watch for insects travelling in and out of one location. ▪ If you or anyone you are working with is known to have allergic reactions to bee stings, tell the rest of the crew and your supervisor. Make sure you carry emergency medication with you at all times. ▪ Wear long sleeve shirts and trousers; tuck in shirt.. Bright colors and metal objects may attract bees. ▪ If you are stung, cold compresses may bring relief. ▪ If a stinger is left behind, scrape it off the skin. Do not use a tweezers as this squeezes the venom sack, worsening the injury. ▪ If the victim develops hives, asthmatic breathing, tissue swelling, or a drop in blood pressure, seek medical help immediately. Give victim antihistime, (Benadryl, chlo-amine tabs).	**L**
3. Traveling/working in areas of potential Mosquito Bites- Example- Woods, fields, near bodies of water and etc.	3. Skin irritation, encephalitis	▪ Wear long sleeves and trousers. ▪ Avoid heavy scents. ▪ Use insect repellants. If using DEET, do not apply directly to skin, apply to clothing only. ▪ Carry after-bite medication to reduce skin irritation.	**L**

AHA - Insect Stings and Bites
Activity Description

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Safety glasses, gloves (HASP), steel toe work boots, high visibility safety vest, Long sleeved light colored shirt, and long light colored pants.)	**Competent / Qualified Personnel:** See HASP - Name – Position/Employer **Training requirements:** Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA - Working with Preservatives
Activity Description

Activity/Work Task:	**Working with Preservatives**		
Project Location:	**Batavia Iron & Metals**		
Project Number:	**3617137301**		
Date Prepared:	**02/08/16**	**Date Accepted:**	
Prepared by (Name/Title):	Lucas Benedict		
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Overall Risk Assessment Code (RAC) (Use highest code) **M**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures
-

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Opening the box of ampoules	1A) Cuts or punctures with a knife	1A) Cuts or punctures with a knife ▪ Use appropriate techniques when handling a knife. Always cut away from you.	M
	1B) Broken ampoules in the box. Cuts from the broken glass.	1B) Broken ampoules in the box. Cuts from the broken glass. ▪ Wear safety goggles and protective gloves. ▪ Dispose of the preservative and broken glass by approved methods.	L
	1C) Broken ampoules in the box. Breathing fumes.	1C) Broken ampoules in the box. Breathing fumes. ▪ Wear safety goggles and protective gloves. ▪ Always work in a well-ventilated area.	L
2. Breaking top of glass ampoule	2A) Cuts from the broken glass.	2A) Cuts from the broken glass ▪ Wear safety goggles and protective gloves. ▪ Use a paper towel to wrap ampoule in to snap the top or use an ampoule breaker. Always point the ampoule away from you when you snap off the top.	L

AHA - Working with Preservatives
Activity Description

	2B) Skin contact chemical burns.	2B) Skin contact chemical burns. ▪ Wear safety goggles and protective gloves. ▪ Fumes may come into contact with the perspiration on your skin and rehydrate to form an acid. ▪ If your skin itches, flush affected area for 15 minutes with water.	**M**
	2C) Eye contact	2C) Eye contact ▪ Wear safety goggles. ▪ If acid splashes in the eyes, flush eyes for 15 minutes with water. Seek medical advice.	**L**
	2D) Breathing fumes	2D) Breathing fumes ▪ HNO_3 and HCL have high vapor pressure. Always work in a well-ventilated area.	**L**
3. Adding acid to sample	3A) Chemical reaction	3A) Chemical reaction ▪ Wear safety goggles and protective gloves. Acid may react with high alkaline sample and fizz (releases CO_2).	**L**
	3B) Eye contact	3B) Eye contact ▪ Wear safety goggles. ▪ If acid splashes in the eyes, flush eyes for 15 minutes with water. Seek medical advice.	**L**
	3C) Skin contact chemical burns.	3C) Skin contact chemical burns. ▪ Wear safety goggles and protective gloves.	**M**
4. Ampoule disposal	4A) Cuts from the broken glass.	4A) Cuts from the broken glass. ▪ Wear safety goggles and protective gloves. ▪ Place used ampoules in an empty, non-reactive container in the field and bring it back to the office. Dispose of the preservative and broken glass by approved methods.	**L**

AHA - Working with Preservatives
Activity Description

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection (Site project specific HASP)	**Competent / Qualified Personnel:** See HASP (Name – Position/Employer) **Training requirements:** HAZCOM PPE Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA - Poisonous Plants

Activity/Work Task:	**Poisonous Plants**		
Project Location:	Batavia Iron & Metals		
Project Number:	3617137301		
Date Prepared:	02/08/16	Date Accepted:	
Prepared by (Name/Title):	Kendra Bavor		

	Frequent	Likely	Occasional	Seldom	Unlikely
		E	H	H	M
		H	H	M	L
		M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures for field work with potential for poisonous plants.

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Mobilization		See AHA - Mobilization, Demobilization and Site Preparation	L
2. Preparation	Training – Identifying Poisonous Plants	Provide training on identifying the specific poisonous plants that could be present at the site	L
		 POISON IVY (Rhus toxicondendron L.) POISON OAK (Rhus diversiloba) POISON SUMAC (Rhus toxicondendron vernix)	L

AHA - Poisonous Plants

	Poison Ivy 	2A) Poison Ivy: ▪ Grows everywhere in United States except Hawaii and Alaska. ▪ In the East, Midwest, and the South, it grows as a vine. ▪ In the Northern and Western United States, it grows as a shrub. ▪ Each leaf has three leaflets. ▪ Leaves are green in the summer and red in the fall. ▪ In the late summer and fall, white berries may grow from the stems.	L
	Poison Oak 	2B) Poison Oak: ▪ Oak-like fuzzy leaves in clusters of three. ▪ It has two distinct kinds: ▪ Eastern poison oak (New Jersey to Texas) grows as a low shrub. ▪ Western poison oak (Pacific Coast) grows to six-foot-tall clumps or vines up to 30 feet long. ▪ It may have clusters of yellow berries.	L
	Poison Sumac 	2C) Poison Sumac ▪ Grows in standing water in peat bogs in the Northeast and Midwest and in swampy areas in parts of the Southeast. ▪ Each leaf has clusters of seven to 13 smooth-edged leaflets. ▪ The plants can grow up to 15 feet tall. ▪ The leaves are orange in spring, green in summer and red, and orange or yellow in fall. ▪ There may be clumps of pale yellow or cream-colored berries.	L

AHA - Poisonous Plants

3. Contact with poisonous plants	3A) Hand Contact	3A) Hand Contact ▪ Apply IvyX (or similar product) to hands, forearms and other potentially exposed parts of the body, prior to starting work in the morning and again right after lunch. ▪ Leather Gloves must be worn at all times when digging, screening or carrying field equipment. ▪ Leather gloves should be of sufficient length to cover the entire wrist and cuff of the shirt. ▪ Carefully remove gloves, without touching the exterior surface, when taking notes and prior to lunch or restroom breaks. ▪ Gloves that become worn should be replaced immediately. ▪ Do not scratch or rub the face or other exposed skin while wearing gloves ▪ Workers will apply Tecnu (or similar product) to the hands and forearms immediately after removing their gloves, prior to lunch and again at the end of the day. Tecnu will help cleanse the urushiol oil from the skin before it can be absorbed. Sensitive individuals can also apply prior to showering in the evening.	**M**
	3B) Arm Contact	3B) Arm Contact ▪ Apply IvyX (or similar product) to hands, forearms and other potentially exposed parts of the body, prior to starting work in the morning and again right after lunch ▪ Wear light weight, long sleeved shirts as the sleeves will provide a physical barrier between the skin and any urushiol oil encountered. Disposable gauntlets may we worn over arms to keep oil from clothing as well. ▪ Have the sleeves pulled down to the base of the hand, covering the forearm and wrist (all exposed skin). ▪ Workers will apply Tecnu (or similar product) to the hands and forearms immediately after removing their gloves, prior to lunch and again at the end of the day. Tecnu will help cleanse the urushiol oil from the skin before it can be absorbed. Sensitive individuals can also apply prior to showering in the evening.	**M**
	3C) Leg Contact	3C) Leg Contact ▪ Wear long pants and boots. ▪ Assume boots are contaminated with the urushiol oil and only handle with gloved hands.	**M**

AHA - Poisonous Plants

4. Handling Contaminated Equipment and Clothing	4A) Exposure from Handling Contaminanted Equipment	4A) Exposure from Handling Contaminanted Equipment ▪ Do not handle any field equipment that may have come in contact with poison ivy/oak/sumac without gloves ▪ Decontaminate all equipment at the end of each workday with a solution of water and dish soap. ▪ Scrub all surfaces of the screens and shovels with a brush. ▪ Rinse with cool water using a portable garden sprayer.	**M**
	4B) Exposure from Handling Contaminated Clothing	4B) Exposure from Handling Contaminated Clothing ▪ Wash clothing potentially contaminated with urushiol oil prior to wearing again. ▪ Handle contaminated clothing with gloves as the oil can remain on environmental surfaces for up to 5 years.	**M**

AHA - Site Reconnaissance

Activity/Work Task:	**Site Reconnaissance**		
Project Location:	**Batavia Iron & Metals**		
Project Number:	**3617137301**		
Date Prepared:	**02/08/16**	**Date Accepted:**	
Prepared by (Name/Title):	Lucas Benedict		
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Overall Risk Assessment Code (RAC) (Use highest code): **M**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures
-

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Going to site, work preparation	1A) Mobilization / Demobilization and Site Preparation	• See JHA for Mobilization Demobilization and Site Preparation	
Working at the site	**General Field Work – Walking and working in the field, Environmental conditions, communication**	**See JHA for General Field Work**	
2. Interview present owner and/or operator	2A) Hostile landowner, livestock, pets	2A) Hostile landowner, livestock, pets ▪ Talk to land owner, be courteous and diplomatic ▪ Ensure all animals have been secured away from work area	**L**
3. Site Walkover	3A) Slips, Trips, and Falls	3A) Slips, Trips, and Falls ▪ Wear appropriate foot protection. ▪ Ensure proper footing. ▪ Be aware of uneven and slippery surfaces. ▪ Use care when climbing over and through brush, stumps, rocks, and logs. ▪ Ensure proper lighting is available when working after daylight hours.	**M**

AHA - Site Reconnaissance

	3B) Exposure to Chemicals	3B) Exposure to hazardous substances ▪ Wear PPE as identified in HASP. ▪ Review hazardous properties of site contaminants Monitor breathing zone air in accordance with HASP to determine levels of contaminants present.	**L**
	3C) Hostile landowner, livestock, pets	3C) Hostile landowner, livestock, pets ▪ Talk to land owner, be courteous and diplomatic ▪ Ensure all animals have been secured away from work area	**L**
	3D) Exposure to operations conducted at an active facility	3D) Exposure to operations conducted at an active facility ▪ Stay well clear of operations being conducted at the facility ▪ Keep alert for moving materials, equipment or vehicles	**L**
	3E) Contact with poisonous plants or the oil from poisonous plants	3E) Contact with poisonous plants or the oil from those plants: ▪ Look for signs of poisonous plants and avoid. ▪ Wear PPE as described in the HASP. ▪ Do not touch anything part of your body/clothing. ▪ Always wash gloves before removing them. ▪ Discard PPE in accordance with the HASP.	**M**
	3F) Contact with biting insects (i.e., spiders, bees, etc.)	3F) Contact with stinging/biting insects ▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects in and around the well. ▪ Wear Level of PPE as described in the HASP. At a minimum, follow guidelines in the JHA "Insects Stings and Bites." ▪ If necessary, wear protective netting over your head/face. ▪ Avoid contact with the insects if possible. ▪ Inform your supervisor and the Site Health and Safety Supervisor if you have any allergies to insects and insect bites. Make sure you have identification of your allergies with you at all times and appropriate response kits if applicable. ▪ Get medical help immediately if you are bitten by a black widow or brown recluse, or if you have a severe reaction to any spider bite or bee sting.	**M**
	3G) Falling from ladders/injury from dropped objects	3G) Falling from ladders/injury from dropped objects ▪ Use three point support system at all times when working on a ladder. ▪ Ensure ladder supports are firmly grounded before ascending a ladder. ▪ Avoid doing any work from ladders. ▪ Use personal fall protection system if working over 4 feet above ground what isn't adequately guarded (e.g., guardrails) ▪ Do not walk underneath ladders. Stay clear of areas where work is performed on ladders due to potential falling objects.	**L**

	3H) Electrical Hazards	3H) Electrical Hazards ▪ All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.) ▪ Ensure power lines are de-energized and grounded, or guarded if working near them. ▪ Use non-conducting wood or fiberglass ladders while working near power lines. ▪ Stay clear of any live unprotected wires or electrical equipment. ▪ All equipment will be locked out and tagged out and rendered in a zero energy state prior to commencing any operation that may expose workers to electrical, mechanical, hydraulic, etc. hazards. ▪ Do not touch bare wires, electrical components, etc. ▪ Electrical extension cords will be of the "Hard" or "Extra Hard" service type. ▪ All extension cords shall have a three-blade grounding plug. ▪ Personnel shall not use extension cords with damaged outer covers, exposed inner wires, or splices. ▪ Electrical cords shall not be laid across roads where vehicular traffic may damage the cord without appropriate guarding. ▪ All electrical work will be conducted by a licensed electrician. ▪ The SHSO shall halt outdoor site operations whenever lightning is visible, outdoor work will not resume until 30 minutes after the last sighting of lightning.	**L**
4. Records Review	4A) Materials handling/Repetitive Motion	4A) Materials handling/Repetitive Motion ▪ Don't carry more documents than you can handle – make two trips ▪ Use materials handling aid (e.g., cart) if appropriate	**L**
	4B) Slips, Trips and Falls	4B) Slips, Trips and Falls ▪ Be aware of your footing at all times ▪ Avoid carrying documents up and down the stairs. If available, use the elevator. ▪ When traveling up and down stairs, always have one hand free and hold on to the hand rail. ▪ Wear appropriate footwear with slip resistant soles.	**L**

AHA - Site Reconnaissance

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE safety glasses, gloves, steel toe work boots, high visibility safety vest, nitrile gloves, leather palm – cut resistant gloves)	**Competent / Qualified Personnel:** Name – Position/Employer **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA - Geoprobe Investigation – Oversight and Sample Collection ONLY

Activity/Work Task:	Geoprobe Investigation – Oversight and Sample Collection ONLY		
Project Location:			
Contract Number:			
Date Prepared:	8/29/2011	**Date Accepted:**	**5/3/2013**
Prepared by (Name/Title):			
Reviewed by (Name/Title):	Kendra Bavor, CSP		

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures
-

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Overall Risk Assessment Code (RAC) (Use highest code) **M**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Subcontractor Drive Geoprobe onto site	1A) Malfunction of vehicle/equipment	1A) Drivers shall perform a pre-operational check of equipment, read and be familiar with any operator's manual. ▪ Report all needed repairs promptly. ▪ Operators shall not use defective/unsafe equipment.	L

	1B) Wreck of Geoprobe while being driven	1B) Wreck of Geoprobe while being driven ▪ All drivers shall be properly licensed. ▪ Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be used unsupervised. ▪ Keep wind shields, windshield wipers, side mirrors and side windows clean ▪ Drivers shall conduct a pre-operation vehicle safety check ▪ Drivers shall plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. If an observer is not available, the driver shall walk around the vehicle to make sure rear is clear prior to backing. ▪ Seat belts shall be worn when driving by driver and passengers. ▪ Choose the safest location possible to park equipment. Avoid parking in blind spots of other equipment. ▪ Adjust vehicle speed for load and weather. Tire chains should be utilized as dictated by weather conditions. ▪ When operating a vehicle off the roadway, be aware of possible hidden objects in the grass and unstable terrain. ▪ Never allow anyone between truck and trailer when backing to hook trailer ▪ Perform periodic checks of equipment on long trips to assure the load is secure. ▪ Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.	**L**
2. Loading/unloading of equipment	2A) Crush and pinch points created when loading/unloading equipment 2B) Heavy lifting, twisting, bending 2C) Slip, trips and falls	2A) Crush and pinch points created when loading/unloading equipment ▪ Be aware of crushing and pinching hazards when loading, unloading and fastening down equipment. ▪ Make sure cargo is properly loaded and secured. ▪ Wear protective equipment consistent with the hazard (hard hats, safety glasses, leather gloves, safety shoes, etc.) 2B) Size up the load, utilize help for heavy items, split loads as necessary. Use proper body mechanics and ergonomic techniques. 2C) Keep walking area clear. Proper housekeeping.	**M**

3. Geoprobe operation by Subcontractor	3A) Vehicle movement/ unstable 3B) Crushing injuries, pinch points, entanglement and flying particles, 3C) Noise 3D) slip trips and falls, 3E) material under stress, equipment limitations, rope or cable blocks, hydraulic leaks 3F) utility lines, 3G) overhead loads, 3H) lifting 3I) Chemical exposure	Geoprobe operation by the Subcontractor. Read Owner's Manual. 3A) Always apply the parking brake and shut off engine before exiting the vehicle. • Ensure back up alarm is operational. • Complete a visual inspection of the equipment prior to operation. Replace or repair equipment if necessary. Complete a checklist to document inspections and corrective actions required. • Keep body parts clear of probe foot. • Be familiar with Emergency kill switch and controls. Test prior to probing. • When on sloped surface position the unit parallel to the slope with the control on the up hill side. • Use caution on soft or loose surface. Be aware of the weight of loaded vehicle. • Be aware of weather and windy conditions. Do not operate during lighting storm or high winds. 3B) Heed all Caution, Warning or Danger decals on machine. • Ensure everyone is clear of moving parts. • Designate only one experienced operator to avoid unexpected engagement. • Operate only from the control side. Do not reach across operating probe. • Avoid placing your hands on top of the tool string when raising/lowering the hammer or swinging/ folding probe assembly. • DO not wear loose clothing. Tie back hair when operating equipment. • PPE – safety shoes, hard hat, safety glasses, hearing protection, gloves. Optional Tyvek or coveralls. 3C) PPE – hearing protection. 3D) Maintain an orderly and clean site. • Housekeeping. • Barricade or establish work zones to minimize unauthorized entry. • Adequate lighting 3E) Know the capacities, equipment limitations and acceptable operating loads. Follow the equipment operator's manual and proper maintenance requirements. • Stand clear of potential release of energy. Keep body part clear of moving parts. • Use the correct tool for the job. • Limit the rate of the hammer lowering while advancing the tool string to avoid raising the probe foot more than 6 inches off the ground surface. • In the event problem or binding, the operator should release all control levers to neutral. • Inspect hydraulic lines. Repair or replace damaged hoses. 3F) Be aware of surroundings. Establish safe "dig" zones. Contact Dig Safe or "one call" system to mark underground utilities or tanks. • Before moving onto a site, evaluate height restrictions due to overhead utilities and vegetation. • Borings to be located a minimum of 10 feet from overhead lines. • Do not drive the machine with the mast extended.	**M**

		3G) Remain alert. Establish work zone to minimize workers under overhead loads. Avoid sudden jerks or overloading. Check load for balance and appropriate support prior to hoisting. 3H) Use mechanical means to lift heavy loads and removing rod. Don appropriate PPE for chemicals of concern. Work from upwind. Be aware or combustion fumes if equipment has auxiliary power. Practice good hygiene by washing hands, and no eating/smoking within the exclusion zone.	**L**
4. Operational area	4A) adverse weather conditions (temperature extremes), 4B) uneven terrain, 4C) poisonous plants/snakes/insects hazards	4A) Keep a weather eye. Monitor the weather forecast and actual conditions. • Wear appropriate clothing that does not restrict, cause over heat or is too loose. • Be aware of muddy conditions or puddles. 4B) Be aware of drop-offs, uneven ground and potential hidden objects which may cause loss of control when maneuvering rigs or create unstable drill set-ups. In heavily wooded area, scout to locate hidden objects. Use care when walking. 4C) Be aware of poisonous plants, insects, snakes, animals and animal waste products and carcasses. Wear long sleeve shirts, gloves, and high top boots when hazards cannot be avoided. Proper first aid supplies, insect repellents shall accompany field crews.	**M**
	4D) Contaminated soils, buried power or gas lines, landfills and containment of spills	4D) Contaminated soils, buried power or gas lines, landfills and containment of spills ▪ During drilling operations, always be aware of the possibility of encountering potentially hazardous materials, such as petroleum hydrocarbons, herbicides, pesticides, chemical manufacturing by-products or solid waste materials. ▪ In the event that any unknown or questionable materials are encountered, then the drilling operations are to be suspended immediately until further instructions are received from supervision. ▪ Do not handle any suspected contaminated materials unless trained to do so and proper protective methods are followed. ▪ During drilling operations, always be aware of the possibility of striking an un-located or improperly located gas or power line. ▪ In the event a buried utility line is struck, drilling operations are to be suspended **immediately**. - If the utility line is electric, keep personnel at least 10 feet from all metal surfaces connected with the drill rig. - If the utility is gas, then the area is to be evacuated and secured. Immediate notification to the utility company is MANDATORY. ▪ In the event of a gas or oil spill, the proper authorities are to be contacted immediately so that containment operations can be implemented.	**M**
5. Subcontractor Mixing grout on site and filling/placing in hole between the well pipe and bore hole wall	5A) Lifting 5B) Chemical exposure	5A) Size the load of materials to be moved and utilize appropriate help for lifting and moving. Use proper ergonomic and body mechanics to move materials (bags of grout, etc.). Use mechanical mixer for large quantities of grout. 5B) PPE – Safety glasses, safety shoes, gloves, optional tyvek/coveralls.	**M**
6. Subcontractor cutting soil acetate sleeve open to sample soil	6A) cutting of hand with a razor blade	6A) MACTEC personnel must let the subcontractor cut the sample liners as they have the appropriate tools to do so. 6B) Subcontractor must be aware of where hands are placed prior and during cutting with hand saw	**M**
7. Subcontractor driving drilling rig offsite.	7A) Reference item # 1	7A) Reference item #1.	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** Name – Position/Employer **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA – Perimeter Air Monitoring

Activity/Work Task:	Perimeter Air Monitoring		
Project Location:			
Contract Number:			
Date Prepared:	10/13/2017	**Date Accepted:**	10/13/2017
Prepared by (Name/Title):	Andrew Shust		
Reviewed by (Name/Title):	Vincent Whelan/ Kendra Bavor, CSP		

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Overall Risk Assessment Code (RAC) (Use highest code)	L

Risk Assessment Code (RAC) Matrix

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Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

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Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

AHA – Perimeter Air Monitoring

Job Steps	Hazards	Controls	RAC
1. Prepare for site visit	1a) N/A	▪ Obtain and review HASP prior to site visit, if possible ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots) ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current ▪ Complete site specific/ client required training ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment) ▪ First aid kits shall be available at the work site and on each transport vehicle. ▪ Familiarize yourself with route to the site ▪ Check weather forecast. Pack appropriate clothing and other items (e.g., sunscreen) for anticipated weather conditions ▪ Verify that subsurface utilities have been identified.	**L**
2. Traveling to the site by vehicle	2a) See JHA for Mobilization, Demobilization and Site Preparation	▪ See AHA for Mobilization, Demobilization and Site Preparation	**L**

AHA – Perimeter Air Monitoring

3. Set up/disassemble (daily): weather station near trailer, Lead/ Cr(VI)/ VOC air monitoring stations surrounding the Site, and dust (PM10) monitors. Perform routine/periodic checks of instrumentation	3a) Struck by heavy construction equipment or other vehicular collisions. Slips, trips, and falls caused by Site debris, uneven surfaces, vegetation, etc. Physical injuries or strain. Extreme weather conditions and stress (heat/cold/rain/storms). Biological hazards, such as feral cats, ticks and other insects, poison ivy, etc. Limited ingress/egress due to remote locations. Site security breach/unauthorized access	▪ Use buddy system for placing traffic guidance and control equipment. Use company vehicle, cones, and other safety/traffic equipment to make work area safe for team. Park vehicle to protect workers ▪ Move deliberately and be aware of surrounding environment. Establish a clear walking path to each location. Avoid puddles. ▪ Use flag-persons or spotters to maintain personnel clearance from active vehicles. ▪ Use proper lifting techniques; request help when lifting heavy/ awkward objects. ▪ Wear PPE for the task in accordance to the HASP and chemicals present (in addition to minimum PPE, which is required at all times). ▪ Have sufficient drinking water available for project team in accordance with HASP. Take breaks as necessary to cool down/warm up. ▪ Have access to hygiene facilities (rest room/ washing) to wash before eating, applying cosmetics, drinking, and leaving the site. ▪ Identify emergency shelters/evacuation routes for extreme weather condition circumstances. Monitor weather changes and predictions. ▪ Bring a charged, functioning cell phone, and implement the buddy system, or at a minimum, communicate locations and expected schedule with supervisor(s). Communicate with project manager or delegate before/upon arrival and after in safe place at end of day/ shift. ▪ If unauthorized personnel enter or attempt to access the Site, communicate hazards and call appropriate supervisor/9-1-1.	**L**
4. Place air monitoring equipment back in field trailer, download data and compare to applicable standards.	4a) Lifting strain. Vehicle travel/accident. Weather stress (heat/cold). Contamination off site	▪ Prepare for weather with proper seasonal clothing options. ▪ Use proper lifting techniques. ▪ Make sure all air monitoring equipment is decontaminated. Practice good hygiene and good housekeeping to keep equipment and personnel neat and clean. ▪ Check out at the end of each day and review planned movements of Site personnel for duration of remaining activities. Communicate with project team to notify them of safe closure of site daily.	**L**
5. Demobilize daily. Return to office/home	8a) See Mobilization/ Demobilization and Site Preparation AHA	Follow safe driving procedures, utilize defensive driving techniques. See Mobilization/ Demobilization and Site Preparation AHA	**L**

AHA – Perimeter Air Monitoring

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** Name – Position/Employer **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting Operation of Monitoring equipment Medical monitoring Baseline for chemical of concern (as needed)	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Site housekeeping Inspect all PPE prior to use Perimeter security

Chemicals of Concern

Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Dibenzo(a,h)anthracene
Indeno(1,2,3-cd)Pyrene
Phenol
Asbestos
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
PCBs

APPENDIX A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Benzo(a)anthracene

CAS Number: 56-55-3

Synonyms: Benz(a)anthracene; coal tar pitch volatile

HEALTH HAZARD DATA

Color: Colorless or yellow brown

Physical State: Solid Flakes or powder

Liquid

Gas

Odor: N/A

Odor Threshold N/A

Vapor Density: N/A

Ionization Potential (IP): N/A

IDLH: 80 mg/m^3 (as coal tar pitch volatile)

Carcinogen: OSHA X

IARC X

NTP X

ACGIH X

NIOSH

Skin absorbable: Yes

Skin corrosive: No

Signs/Symptoms of Acute Exposure:

Skin, eye and throat irritation; dermatitis, bronchitis

Source	TWA (units)	STEL (units)	C (units)
	Note: No specific TWA established for this chemical; use TWA for coal tar pitch volatiles		
OSHA PELs	0.2 mg/m^3		
ACGIH TLVs	0.2 mg/m^3		
NIOSH RELs	0.1mg/m^3		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Collection on a 37 mm glass fiber filter at a maximum flow rate of 2 liters/minute until a maximum collection volume of 960 liters is reached. Analysis by liquid chromatography	NA	NA	NA	NA
Dust meter **Action limit will be based on soil concentrations. Contact C. Sundquist for	Any		N/A	**

Checked by: Joanne Bacchus Date: 06/04/08

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits Tyvek

Gloves Nitrile or Neoprene

Boots Neoprene

Service Limit Concentration (ppm): NA

MUC 1/2 Mask APR = TWA x 10 = **2 mg/m^3

MUC Full-Face APR = TWA x *50 = **10 mg/m^3

*If quantitative fit testing is conducted, otherwise, use protection factor of 10

**Action limit will be based on soil concentrations. Contact C. Sundquist for action limits

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA

Fire Extinguishing Media:

Dry Chemical X Foam X

Water Spray CO_2 X

Incompatibilities:

Strong oxidizers; dust explosion possible if in powder or granular form, mixed with air

APPENDIX A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Benzo (a) pyrene
CAS Number: 50-32-8
Synonyms:

HEALTH HAZARD DATA

Color: Black of dark-brown

Physical State: Solid Residue
Liquid
Gas

Odor: NA

Odor Threshold NA

Vapor Density: NA

Ionization Potential (IP): NA

IDLH: 80 mg/m^3

Carcinogen: OSHA
IARC X
NTP X
ACGIH X
NIOSH X

Skin absorbable: NO

Skin corrosive: NO

Signs/Symptoms of Acute Exposure:
Dermatitis, bronchitis

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs	.2 mg/m^3		
ACGIH TLVs	.2 mg/m^3		
NIOSH RELs	.1mg/m^3		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Dust meter **Action limit will be based on soil concentrations. Contact C. Sundquist for action limits	Any		N/A	**

Checked by: Date:

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:
Suits Polycoated Tyvek

Gloves Neoprene, Nitrile rubber

Boots Neoprene

Service Limit Concentration (ppm): NA

MUC 1/2 Mask APR = TWA x 10 = **2mg/m^3

MUC Full-Face APR = TWA x *50 = **2mg/m^3
*If quantitative fit testing is conducted, otherwise, use protection factor of 10

**Action limit will be based on soil concentrations. Contact C. Sundquist for action limits

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA

Fire Extinguishing Media:

Dry Chemical X Foam X

Water Spray CO_2 X

Incompatibilities:
Strong oxidizers

APPENDIX A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Benzo(b)fluoranthene

CAS Number: 205-99-2

Synonyms:
Benz[e]acephenanthrylene; B(b)F; coal tar pitch volatile

HEALTH HAZARD DATA

Color: Colorless

Physical State: Solid X
Liquid
Gas

Odor: NA

Odor Threshold NA

Vapor Density: NA

Ionization Potential (IP): NA

IDLH: 80 mg/m^3 (as coal tar pitch volatile)

Carcinogen: OSHA X
IARC X
NTP
ACGIH X
NIOSH X

Skin absorbable: Yes

Skin corrosive: No

Signs/Symptoms of Acute Exposure:
Eye, nose, and skin irritation; dermatitis, bronchitis

Source	TWA (units)	STEL (units)	C (units)
	Note: No specific TWA established for this chemical; use TWA for coal tar pitch volatiles		
OSHA PELs	0.2 mg/m^3		
ACGIH TLVs	0.2 mg/m^3 (listed as A2)		
NIOSH RELs	0.1 mg/m^3		

AIR MONITORING

Type	Brand/ Model No.	Calibrations Method/ Media	Relative Response or Conversion Factor	Meter Specific Action Level
Collection on a filter + sorbent tube at a flow rate of 1.5 to 2 liters/minute until a maximum collection volume of 1000 liters is reached. Analysis by liquid chromatography	NA	NA	NA	NA
Dust meter **Action limit will be based on soil concentrations. Contact C. Sundquist for action limits	Any		N/A	**

Checked by: Joanne Bacchus Date: 06/04/08

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:
Suits Polycoated Tyvek

Gloves Neoprene, Nitrile rubber

Boots Neoprene

Service Limit Concentration (ppm): NA

MUC 1/2 Mask APR = TWA x 10 = **2 mg/m^3

MUC Full-Face APR = TWA x *50 = **10 mg/m^3

*If quantitative fit testing is conducted, otherwise, use protection factor of 10

**Action limit will be based on soil concentrations. Contact C. Sundquist for action limits

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL:

Fire Extinguishing Media:

Dry Chemical X Foam X

Water Spray X CO_2 X

Note: Emits toxic fumes under fire conditions

Incompatibilities:
Strong oxidizers

APPENDIX A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Benzo(k)fluoranthene
CAS Number: 207-08-9
Synonyms:
8,9-Benzfluoranthene;
11,12-Benzfluoranthene

HEALTH HAZARD DATA

Color: Pale yellow

Physical State: Solid X
Liquid
Gas

Odor: NA

Odor Threshold NA

Vapor Density: NA

Ionization Potential (IP): NA

IDLH: 80 mg/m^3 (as coal tar pitch volatile)

Carcinogen: OSHA X
IARC X
NTP
ACGIH X
NIOSH X

Skin absorbable: Yes

Skin corrosive: No

Signs/Symptoms of Acute Exposure:
Eye, nose, and skin irritation; dermatitis, bronchitis

Source	TWA (units)	STEL (units)	C (units)
	Note: No specific TWA established for this chemical; use TWA for coal tar pitch volatiles		
OSHA PELs	0.2 mg/m^3		
ACGIH TLVs	0.2 mg/m^3 (listed as B2)		
NIOSH RELs	0.1 mg/m^3		

AIR MONITORING

Type	Brand/ Model No.	Calibration Method/ Media	Relative Response or Conversion Factor	Meter Specific Action Level
Collection on a filter + sorbent tube at a flow rate of 1.5 to 2 liters/minute until a maximum collection volume of 1000 litersis reached. Analysis by liquid chromatography	NA	NA	NA	NA
Dust meter **Action limit will be based on soil concentrations. Contact C. Sundquist for action limits	Any		N/A	**

Checked by: Joanne Bacchus Date: 06/04/08

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:
Suits Polycoated Tyvek

Gloves Neoprene, Nitrile rubber

Boots Neoprene

Service Limit Concentration (ppm):

MUC 1/2 Mask APR = TWA x 10 = **2 mg/m^3

MUC Full-Face APR = TWA x *50 = **10 mg/m^3
*If quantitative fit testing is conducted, otherwise, use protection factor of 10

**Action limit will be based on soil concentrations. Contact C. Sundquist for action limits

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA

Fire Extinguishing Media:
Dry Chemical X Foam X
Water Spray CO_2 X
Note: Emits toxic fumes under fire conditions

Incompatibilities:
Strong oxidizers

APPENDIX A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name: Dibenz(a,h)anthracene

CAS Number: 53-70-3

Synonyms: DB(A,H)A; dibenzo(a,h)anthracene

HEALTH HAZARD DATA

Color: Colorless

Physical State: Solid Crystals

Liquid

Gas

Odor: N/A

Odor Threshold N/A

Vapor Density: N/A

Ionization Potential (IP): N/A

IDLH: N/A

Carcinogen: OSHA

IARC X

NTP X

ACGIH

NIOSH

Skin absorbable: Yes

Skin corrosive: No

Signs/Symptoms of Acute Exposure:

Skin irritation and photosensitization; eye redness

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs	N/A		
ACGIH TLVs	N/A		
NIOSH RELs	N/A		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Collection on a 37 mm glass fiber filter at a maximum flow rate of 2 liters/minute until a maximum collection volume of 960 liters is reached. Analysis by liquid	NA	NA	NA	NA
Dust meter **Action limit will be based on soil concentrations. Contact C. Sundquist for	Any		N/A	**

Checked by: Joanne Bacchus Date: 06/04/08

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits Recommended; material not specified

Gloves Recommended; material not specified

Boots Recommended; material not specified

Service Limit Concentration (ppm): N/A

MUC 1/2 Mask APR = TWA x 10 = **2 mg/m^3

MUC Full-Face APR = TWA x *50 = **10 mg/m^3

*If quantitative fit testing is conducted, otherwise, use protection factor of 10

**Action limit will be based on soil concentrations. Contact C. Sundquist for action limits

FIRE/REACTIVITY DATA

Flash Point:

LEL/UEL:

Fire Extinguishing Media:

Dry Chemical X Foam

Water Spray X CO_2

Incompatibilities:

N/A

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
ndeno[1,2,3-cd]pyrene
CAS Number: 000193-39-5
Synonyms:

HEALTH HAZARD DATA

Color: Crystaline

Physical State: Solid X / Liquid / Gas

Odor: N/A

Odor Threshold: N/A

Vapor Density: N/A
Vapor Pressure N/A
Ionization Potential (IP) N/A

IDLH: N/A

Carcinogen: OSHA
IARC X
NTP X
ACGIH
NIOSH

Skin absorbabl Yes X No
Skin corrosive: Yes No

Signs/Symptoms of Acute Exposure:
Information not available

Source	TWA (units) ppm	STEL (units) ppm	C (units) ppm
OSHA PELs	0.2 mg/m3 as coal tar pitch volatile		
ACGIH TLVs			
NIOSH RELs			

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Personal Sampling				
Dust Meter Contact C. Sundquist for Action Limit	Any			

Checked by: Date:

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:
Suits Polycoated Tyveks

Gloves Nitrile outer, vinyl inner

Boots Nitrile, latex

Service Limit Concentration (ppm):

MUC 1/2 Mask APR = TWA x 10 = *
MUC Full-Face APR = TWA x 10 = *

*Contact C. Sundquist for Action Limits

FIRE/REACTIVITY DATA

Flash Point: N/A

LEL/UEL: N/A

Fire Extinguishing Media:
Dry Chemical Foam
Water Spray CO_2

Incompatibilities:
N/A

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Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name: Phenol

CAS Number: 108-95-2

Synonyms: Carbolic acid; Hydroxybenzene; Monohydroxybenzene; Phenyl alcohol; Phenyl hydroxide

HEALTH HAZARD DATA

Color: Colorless to lt. pink

Physical State: Solid X; Liquid X; Gas

Odor: sweet, tarry

Odor Threshold: 0.05 ppm

Vapor Density: Not Pertinent

Ionization Potential (IP): 8.50 eV

IDLH: 250 ppm

Carcinogen: OSHA; IARC; NTP; ACGIH; NIOSH

Skin absorbable: yes X no

Skin corrosive: yes X no

Signs/Symptoms of Acute Exposure: Irritates eyes, nose, throat; anorexia, weakness, muscle ache; pain, dark urine; cyanosis, live kidney damage; skin burns; dermatitis, tremor; convulsions

Source	TWA (units)	STEL (units)	C (units)
OSHA PEL	5 ppm (skin)		
ACGIH TLVs	5 ppm (skin)		
NIOSH RELs	5 ppm (skin)		15.6 ppm

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Detector Tube	Dräeger 8101641	1 -20 ppm	0.85	4.25 ppm
PID	HNU 9.5 eV	Isobutylene 100 ppm	0.77	3.85 ppm

Checked by: Emmet F. Curtis Date: 2/15/00

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits: Butyl rubber, Neoprene

Gloves: Butyl rubber, Neoprene, Teflon, Viton, PE/EVAL

Boots: Butyl rubber, Neoprene

Service Limit Concentration (ppm) 1000

MUC 1/2 Mask APR=TWA x 10= 50 ppm

MUC Full-Face APR=TWA x 10= 50 ppm

FIRE/REACTIVITY DATA

Flash Point: 175°F

LEL/UEL: 1.8%/8.6%

Fire Extinguishing Media:

Dry Chemical	X	Foam	X
Water Spray	X	CO_2	X

Incompatibilities: Strong oxidizers, calcium, hypochlorite, aluminum chloride, acids

2000 by LAW Engineering & Environmental Services, Inc.

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Asbestos
CAS Number: 1332-21-4
Synonyms:
Actinolite, Amosite, Anthophyllite, Crysotile
Crocidolite, Tremolite

HEALTH HAZARD DATA

Color:	hite, greenish, blue, or gray-gre
	Fibrous
Physical State:	Solid x
	Liquid
	Gas
Odor:	Odorless
Odor Threshold:	N/A
Vapor Density:	N/A
Vapor Pressure	N/A
Ionization Potential (IP)	N/A
IDLH:	Ca - NE
Route of Entry:	Inh, Ing, Con

Carcinogen:	OSHA	X
	IARC	X
	NTP	X
	ACGIH	X
	NIOSH	X

Skin absorbabl Yes ____ No X
Skin corrosive: Yes ____ No X

Signs/Symptoms of Acute Exposure
Asbestosis (chronic exposure), dyspenea, intersitia
fibrosis, restricted pulmonary function, finger clubb
irritates eyes, carcinogen

Source	TWA (units) ppm	STEL (units) ppm	C (units) ppm
OSHA PELs	0.1 f/cc	1 f/cc (15 min)	
ACGIH TLVs	0.1 f/cc		
NIOSH RELs	0.1 f/cc fiber/cubic centimeter		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Personal Sampling		Calibrate pump to flow rate of 2 LPM	N/A	N/A

Checked by: Cindy Sundquist Date: 10/26/2011

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials
Suits: Uncoated Tyveks
Gloves
Boots

Service Limit Concentration (ppm)

MUC 1/2 Mask APR = TWA x 10 =
MUC Full-Face APR = TWA x 10 =

FIRE/REACTIVITY/FIRST AID DATA

Flash Point: N/A

LEL/UEL: N/A

Fire Extinguishing Media:
Dry Chemical ____ Foam ____
Water Spray ____ CO_2 ____

Incompatibilities: None reported

First Aid: Irrigate eyes immediately. If inhale
breath fresh air ASAP

2011 by AMEC Environment & Infrastructure

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

NE = None Established
NA = Not Applicable/Not Available
Abs = Skin Absorption
Ing = Ingestion
Inh = Inhalation
Con = Skin and/or Eye contact

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Arsenic

CAS Number: 7440-38-2

Synonyms:
Arsenia

HEALTH HAZARD DATA

Color: Silver-grey or tin-white

Physical State: Solid X; Liquid ___; Gas ___

Odor: odorless

Odor Threshold: NA

Vapor Density: NA

Ionization Potential (IP): NA

IDLH: 5 mg/m^3

Carcinogen: OSHA X; IARC X; NTP X; ACGIH X; NIOSH X

Skin absorbable: yes ___ no X

Skin corrosive: yes ___ no X

Signs/Symptoms of Acute Exposure:
Respiratory irritation, GI disturbances
Dermatitis

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs	0.01 mg/m^3		
ACGIH TLVs	0.01 mg/m^3		
NIOSH RELs			0.002 mg/m^3

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Not Applicable				

Checked by: Emmet F. Curtis Date: 12/5/03

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits: Any chemical-resistant

Gloves: Any chemical-resistant

Boots: Any chemical-resistant

Service Limit Concentration (ppm): NA

MUC 1/2 Mask APR = TWA x 10 = 0.05 mg/m^3

MUC Full-Face APR = TWA x 10 = 0.05 mg/m^3

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA / NA

Fire Extinguishing Media:

Dry Chemical X; Foam X; Water Spray X; CO_2 X

Incompatibilities:
Strong oxidizers, bromine azide
Hydrogen gas can react with arsenic to form the highly toxic gas arsine.

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Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminant exists. Professional judgement and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Cadmium
CAS Number: 7440-43-9
Synonyms:
Cd

HEALTH HAZARD DATA

Color: Silvery

Physical State: Solid X; Liquid ; Gas

Odor: Not available

Odor Threshold: NA

Vapor Density: Not available
Vapor Pressure Not applicable
Ionization Potential (IP) N/A

IDLH: N/A

Carcinogen: OSHA ; IARC ; NTP X; ACGIH X; NIOSH

Skin absorbabl Yes ; No X
Skin corrosive: Yes ; No X

Signs/Symptoms of Acute Exposure:
Irritates eyes, skin, respiratory tract.
Skin sensitizer. Toxic inhaled or
injested to kidneys, lungs, liver.

do not induce vomiting. Provide ventilation
Wash thoroughly with water

Source	TWA (units) ppm	STEL (units) ppm	C (units) ppm
OSHA PELs	0.005 mg/m^3		
ACGIH TLVs	0.01 mg/m^3		
NIOSH RELs	As low as feasible		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Respirable Dust Meter		Factory/ Manufacturer	NA	**
** Contact C. Sundquist or K. Bavor for action limit based on soil concentration.				

Checked by: Date:

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:
Suits Uncoated Tyvek or Polycoated Tyvek.

Gloves Any

Boots Any

Service Limit Concentration (ppm):

MUC 1/2 Mask APR = TWA x 10 = 0.05 mg/m^3
MUC Full-Face APR = TWA x 10 = 0.05 mg/m^3

FIRE/REACTIVITY DATA

Flash Point: N/A

LEL/UEL: NA

Fire Extinguishing Media:
Dry Chemical X; Foam X
Water Spray Fog; CO_2 X

Incompatibilities:
Keep dry and cool. Keep away from ignition source.
Keep away from oxidizing agents
Auto exition 570 deg. C.
In powder form can create a dust explosion

2003 by MACTEC Engineering & Consulting, Inc.

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Chromium
CAS Number:7440-47-3
Synonyms:
Chrome, Chromium metal

HEALTH HAZARD DATA

Color: Blue-white to steel-gray

Physical State: Solid X; Liquid ___; Gas ___

Odor: odorless

Odor Threshold: NA

Vapor Density: NA

Ionization Potential (IP): NA

IDLH: 25 mg/m^3 (CrIII)

Carcinogen: OSHA ___; IARC X; NTP X; ACGIH X; NIOSH X

Skin absorbable: yes ___ no X

Skin corrosive: yes ___ no X

Signs/Symptoms of Acute Exposure:
Irritates eyes and skin

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs	0.5 mg/m^3	Cr+6 = 0.005 mg/m3	
ACGIH TLVs	0.01 mg/m^3		
NIOSH RELs	0.001 mg/m^3 (Cr VI)		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Not Applicable (NA)				

Checked by: Emmet F. Curtis Date: 12/5/03

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits: Any chemical-resistant

Gloves: Any chemical-resistant

Boots: Any chemical-resistant

Service Limit Concentration (ppm): NA

MUC 1/2 Mask APR = TWA x 10 = 0.05 mg/m^3

MUC Full-Face APR = TWA x 10 = 0.05 mg/m^3

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA / NA

Fire Extinguishing Media:

Dry Chemical	X	Foam	X
Water Spray	X	CO_2	X

Incompatibilities:
Strong oxidizers, alkalis

2003 by MACTEC Engineering & Consulting, Inc.

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

APPENDIX A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Copper

CAS Number: 7440-50-8

Synonyms:
Cu, copper metal dusts

HEALTH HAZARD DATA

Color: Reddish gold metallic

Physical State: Solid X
Liquid
Gas

Odor: NA

Odor Threshold NA

Vapor Density: NA

Ionization Potential (IP): NA

IDLH: 100 mg/m^3

Carcinogen: OSHA
IARC
NTP
ACGIH
NIOSH

Skin absorbable: Yes

Skin corrosive: No

Signs/Symptoms of Acute Exposure:

Fumes/dust may cause eye/upper respiratory irritation; may induce allergic contact dermatitits in susceptible individuals. Ingestion causes nausea, vomiting, abdominal pain, metallic taste, and diarrhea. Ingestion of large doses may cause stomach and intestine ulceration, jaundice, and kidney and liver damage.

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs	1 mg/m^3		
ACGIH TLVs	1 mg/m^3		
NIOSH RELs	1 mg/m^3		

AIR MONITORING

Type	Brand/Model No.	Calibration Method/ Media	Relative Response or Conversion Factor	Meter Specific Action Level
Collection on a Mixed Cellulose Ester Filter (MCEF) 0.8 microns at a flow rate of 2 liters/minute until a maximum collection volume of 960 liters is reached. Analysis via AAS or ICP	NA	NA	NA	NA
Dust meter **Action limit will be based on soil concentrations. Contact C. Sundquist for action limits	Any		N/A	**

Checked by: Date:

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits Tyvek, Polycoated Tyvkes

Gloves Any chemical –resistant Gloves

Boots Any chemical –resistant boots

Service Limit Concentration (ppm):

MUC 1/2 Mask APR = TWA x 10 = **10 mg/m^3

MUC Full-Face APR = TWA x *50 = **50 mg/m^3

*If quantitative fit testing is conducted, otherwise, use protection factor of 10

**Action limit will be based on soil concentrations. Contact C. Sundquist for action limits

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA

Fire Extinguishing Media:

Dry Chemical X Foam X

Water Spray CO_2 X

Note: Do not allow molten copper to contact water

Incompatibilities:

Reacts violently with ammonium nitrate, bromates, chlorates, iodates, chloride, ethylene oxide, hydrazine mononitrate, hydrazoic acid, sodium azide, potassium oxide, acetylene gas and magnesium metal

APPENDIX A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Lead
CAS Number: 7439-92-1
Synonyms:
Lead Metal, Plumbum

HEALTH HAZARD DATA

Color: Gray

Physical State: Solid X
Liquid
Gas

Odor: NA

Odor Threshold NA

Vapor Density: NA

Ionization Potential (IP): NA

IDLH: 100 mg/m3

Carcinogen: OSHA
IARC X
NTP
ACGIH X
NIOSH

Skin absorbable: NO

Skin corrosive: NO

Signs/Symptoms of Acute Exposure:

Weak, insomnia, facial pallor, anorexia, low weight, constipation, abdominal pain, anemia, paralysis, (wrist and ankle), kidney disease, eye irritant, hypotension

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs	0.05 mg/m3		
ACGIH TLVs	0.05 mg/m3		
NIOSH RELs	0.05 mg/m3		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Resonse or Conversion Factor	Meter Specific Action Level
Dust Meter **Action Limit based on soil concentration. Contact C. Sundquist for action limits	Any		N/A	**

Checked by: Date:

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits Uncoated Tyveks
Polycoated Tyveks

Gloves Any Chemical resistant Gloves

Boots Any Chemical resistant Boots

Service Limit Concentration (ppm): NA

MUC 1/2 Mask APR = TWA x 10 = **0.25 mg/m3

MUC Full-Face APR = TWA x *50 = **0.25 mg/m3

*If quantitative fit testing is conducted, otherwise, use protection factor of 10

**Action limit will be based on soil concentrations. Contact C. Sundquist for action limits

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA

Fire Extinguishing Media:

Dry Chemical Foam

Water Spray CO_2

Incompatibilities:

Strong Oxidizers, hydrogen peroxide, acid

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Mercury
CAS Number:7439-97-6
Synonyms:
Mercury metal, quicksilver, elemental mercury, colloidal mercury metallic memrcury

HEALTH HAZARD DATA

Color: Silver-white

Physical State: Solid ___ Liquid X Gas ___

Odor: odorless

Odor Threshold: N/A

Vapor Density: N/A

Ionization Potential (IP): Unknown

IDLH: 10 mg/m³

Carcinogen: OSHA ___ IARC ___ NTP ___ ACGIH ___ NIOSH ___

Skin absorbable: yes X no ___

Skin corrosive: yes X no ___

Signs/Symptoms of Acute Exposure:
Irritates eyes and skin, cough, chest pain tremors, insomnia, difficult breathing, headache, irritability, weakness, salivation, GI disturbance

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs			0.1 mg/m³
ACGIH TLVs	0.025 mg/m³ (inorganic)		
NIOSH RELs	0.05 mg/m³ (vapor)		0.1 mg/m³

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Not Applicable				

Checked by: Emmet F. Curtis Date: 10/4/2004

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits ___

Gloves Nitrile, Viton, Rubber

Boots Rubber

Service Limit Concentration (ppm): NA

MUC 1/2 Mask APR = TWA x 10 = 0.25 mg/m³

MUC Full-Face APR = TWA x 10 = 0.25 mg/m³

FIRE/REACTIVITY DATA

Flash Point: N/A

LEL/UEL: N/A / N/A

Fire Extinguishing Media:

Dry Chemical X Foam X

Water Spray X CO_2 X

Incompatibilities:
Acetylene, ammonia, chlorine dioxide, azides, calcium, sodium carbide, lithium rubidium, copper

2004 by MACTEC Engineering & Consulting, Inc.

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

APPENDIX A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name: Nickel

CAS Number: 7440-02-0

Synonyms: Ni, nickel metal dusts

HEALTH HAZARD DATA

Color: Silver metallic

Physical State: Solid X

Liquid

Gas

Odor: NA

Odor Threshold NA

Vapor Density: NA

Ionization Potential (IP): NA

IDLH: 10 mg/m^3

Carcinogen: OSHA

IARC X

NTP X

ACGIH

NIOSH X

Skin absorbable: Yes

Skin corrosive: No

Signs/Symptoms of Acute Exposure:

Fumes/dust may cause eye/upper respiratory irritation; may induce allergic contact dermatitits in susceptible individuals.

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs	1 mg/m^3		
ACGIH TLVs	1.5 mg/m^3		
NIOSH RELs	0.015 mg/m^3		

AIR MONITORING

Type	Brand/ Model No.	Calibration Method/ Media	Relative Response or Conversion Factor	Meter Specific Action Level
Collection on a Mixed Cellulose Ester Filter (MCEF) 0.8 microns at a flow rate of 2 liters/minute until a maximum collection volume of 960 liters is reached. Analysis via AAS or ICP	NA	NA	NA	NA
Dust Meter **Action Limit based on soil concentration. Contact C. Sundquist for action limits	Any		N/A	**

Checked by: Date:

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits Uncoated Tyveks

Polycoated Tyveks

Gloves Any Chemical resistant Gloves

Boots Any Chemical resistant Boots

Service Limit Concentration (ppm):

MUC 1/2 Mask APR = TWA x 10 = **10 mg/m^3

MUC Full-Face APR = TWA x *50 = **50 mg/m^3

*If quantitative fit testing is conducted, otherwise, use protection factor of 10

**Action limit will be based on soil concentrations. Contact C. Sundquist for action limits

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA

Fire Extinguishing Media:

Dry Chemical X Foam

Water Spray X CO_2

Note: Flammable as dust or fume and may release toxic vapors; dusts may combust spontaneously

Incompatibilities:

Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate

ATTACHMENT A

CONTAMINANT FACT SHEET

CONTAMINANT FACT SHEET

Chemical Name:
Aroclors-General 1336-36-3,
CAS Number: 11097-69-1, 53469-21-9
Synonyms:
Chlorodiphenyls
Polychlorinated biphenyls (PCBs)

HEALTH HAZARD DATA

Color: Colorless to pale yellow

Physical State: Solid X (below 50^0 F)
Liquid (Viscous)
Gas

Odor: Hydrocarbon-like

Odor Threshold: NA

Vapor Density: NA

Ionization Potential (IP): Unknown

IDLH: 5 mg/m^3

Carcinogen: OSHA
IARC X
NTP X
ACGIH X
NIOSH X

Skin absorbable: yes X no ___

Skin corrosive: yes X no ___

Signs/Symptoms of Acute Exposure:
Irritant to eyes, chloracne, liver damage

Source	TWA (units)	STEL (units)	C (units)
OSHA PELs	0.5 mg/m^3 (1254)		
ACGIH TLVs	0.5 mg/m^3 (1254)		
NIOSH RELs	0.001 mg/m^3 (1254)		

AIR MONITORING

Type	Brand/Model No.	Calibrations Method/Media	Relative Response or Conversion Factor	Meter Specific Action Level
Not Applicable (NA)				

Checked by: Emmet F. Curtis Date: 12/5/03

PERSONAL PROTECTIVE EQUIPMENT

Recommended Protective Clothing Materials:

Suits: Saranex, Butyl Rubber, Neoprene, Viton, Teflon, Barricade, Responder

Gloves: Viton, Butyl Rubber; Teflon, Neoprene

Boots: Butyl Rubber, Neoprene

Service Limit Concentration (ppm): NA

MUC 1/2 Mask APR = TWA x 10 = 2.5 mg/m^3

MUC Full-Face APR =TWA x 10 = 2.5 mg/m^3

FIRE/REACTIVITY DATA

Flash Point: NA

LEL/UEL: NA/NA

Fire Extinguishing Media:
Dry Chemical X Foam X
Water Spray X CO_2 X

Incompatibilities:
Strong oxidizers

2003 by MACTEC Engineering & Consulting, Inc.

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

Safety Data Sheets (SDS)
Materials Brought to the Site

Nitric Acid
Liquinox

SAFETY DATA SHEET

1. Identification

Product identifier: NITRIC ACID

Other means of identification

Synonyms: Aqua Fortis, Azotic Acid

Product No.: 9604, V471, V231, V230, V077, 6623, 2712, 2707, 2706, 2704, H988, 5876, 5856, 5801, 5796, 1409, 9761, 9670, 9618, 9617, 9616, 9615, 9612, 9607, 9606, 9601, 9598, 9597, 5371, 20758, 20754, 20752, 20750

Recommended use and restriction on use

Recommended use: Not available.
Restrictions on use: Not known.

Details of the supplier of the safety data sheet

Manufacturer

Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
Center Valley, PA 18034

Telephone: Customer Service: 855-282-6867

Fax: 610-573-2610
Contact Person: Environmental Health & Safety
E-mail: info@avantormaterials.com

Emergency telephone number:
CHEMTREC: 1-800-424-9300 within US and Canada
CHEMTREC: 1-703-527-3887 outside US and Canada

2. Hazard(s) identification

Hazard Classification

Physical Hazards

Oxidizing liquids	Category 3
Corrosive to metals	Category 1

Health Hazards

Skin Corrosion/Irritation	Category 1A
Serious Eye Damage/Eye Irritation	Category 1
Specific Target Organ Toxicity - Single Exposure	Category 3

Unknown toxicity - Health

Acute toxicity, oral	65 %
Acute toxicity, dermal	65 %
Acute toxicity, inhalation, vapor	100 %
Acute toxicity, inhalation, dust or mist	100 %

Unknown toxicity - Environment

Acute hazards to the aquatic environment	65 %
Chronic hazards to the aquatic environment	65 %

Label Elements

Hazard Symbol:

Signal Word: Danger

Hazard Statement: May intensify fire; oxidizer.
May be corrosive to metals.
Causes severe skin burns and eye damage.
May cause respiratory irritation.

Precautionary Statement

Prevention: Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Keep only in original container. Keep away from heat. Keep/Store away from clothing/combustible materials. Take any precaution to avoid mixing with combustibles. Use only outdoors or in a well-ventilated area.

Response: In case of fire: Use water spray, foam, dry powder or carbon dioxide for extinction. Immediately call a POISON CENTER/doctor. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Absorb spillage to prevent material damage.

Storage: Store locked up. Store in corrosive resistant container with a resistant inner liner. Store in a well-ventilated place. Keep container tightly closed.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
NITRIC ACID		7697-37-2	65 - 70%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Call a physician or poison control center immediately. If breathing stops, provide artificial respiration. If breathing is difficult, give oxygen.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

Most important symptoms/effects, acute and delayed

Symptoms: Causes severe skin burns and eye damage. Causes digestive tract burns. Spray mists may cause respiratory tract irritation.

Hazards: Corrosive.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: Strong oxidizer - contact with other material may cause fire.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, fog, CO_2, dry chemical, or regular foam.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: Oxidizing Contact with combustible material may cause fire. Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Keep unauthorized personnel away. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Use personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and material for containment and cleaning up: Keep combustibles (wood, paper, oil, etc.) away from spilled material. Stop leak if possible without any risk. Do not absorb in sawdust or other combustible materials. Absorb spill with vermiculite or other inert material. Collect in a non-combustible container for prompt disposal. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Keep away from combustible material. Do not get in eyes, on skin, on clothing. Wash hands thoroughly after handling. Do not eat, drink or smoke when using the product. Do not taste or swallow. Never add water to acid! Never pour water into acid/base. Dilute by slowly pouring the product into water while stirring.

Conditions for safe storage, including any incompatibilities: Do not store in metal containers. Store away from heat and light. Keep away from combustible material. Keep containers closed when not in use. Store in a cool, dry place. Keep container in a well-ventilated place.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	type	Exposure Limit Values		Source
NITRIC ACID	STEL	4 ppm		US. ACGIH Threshold Limit Values (2011)
	TWA	2 ppm		US. ACGIH Threshold Limit Values (2011)
	STEL	4 ppm	10 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	REL	2 ppm	5 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	2 ppm	5 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	STEL	4 ppm	10 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	TWA	2 ppm	5 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)

Appropriate Engineering Controls Adequate ventilation should be provided so that exposure limits are not exceeded.

Individual protection measures, such as personal protective equipment

General information:	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.
Eye/face protection:	Wear safety glasses with side shields (or goggles) and a face shield.
Skin Protection	
Hand Protection:	Chemical resistant gloves
Other:	Wear suitable protective clothing.
Respiratory Protection:	In case of inadequate ventilation use suitable respirator. Chemical respirator with acid gas cartridge.
Hygiene measures:	Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance

Physical state:	liquid
Form:	liquid
Color:	Colorless to slightly yellow
Odor:	Pungent
Odor threshold:	No data available.
pH:	1 (6.30 g/l,)
Melting point/freezing point:	-42 °C
Initial boiling point and boiling range:	122 °C
Flash Point:	not applicable
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	6.4 kPa
Vapor density:	2.5
Relative density:	1.41 (20 °C)
Solubility(ies)	
Solubility in water:	Soluble
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity: Reacts violently with strong alkaline substances.

Chemical Stability: Material is stable under normal conditions.

Possibility of hazardous reactions: Hazardous polymerization does not occur. Decomposes on heating.

Conditions to avoid: Reacts violently with strong alkaline substances. Avoid contact with strong reducing agents. Excessive heat. Contact with incompatible materials.

Incompatible Materials: Alcohols. Reducing agents. Metals. Alkalies.

Hazardous Decomposition Products: Nitrogen Oxides By heating and fire, corrosive vapors/gases may be formed.

11. Toxicological information

Information on likely routes of exposure

Ingestion: May cause burns of the gastrointestinal tract if swallowed.

Inhalation: May cause damage to mucous membranes in nose, throat, lungs and bronchial system.

Skin Contact: Causes severe skin burns.

Eye contact: Causes serious eye damage.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product: No data available.

Dermal

Product: No data available.

Inhalation

Product: No data available.

Specified substance(s):

NITRIC ACID	LC 50 (Rat, 1 h): 7 mg/l LC 50 (Rat, 4 h): 65 ppm LC 50 (Mouse, 4 h): 67 ppm

Repeated dose toxicity

Product: No data available.

Skin Corrosion/Irritation

Product: Causes severe skin burns.

Serious Eye Damage/Eye Irritation

Product: Causes serious eye damage.

Respiratory or Skin Sensitization

Product: Not a skin nor a respiratory sensitizer.

Carcinogenicity

Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro

Product: No mutagenic components identified

In vivo

Product: No mutagenic components identified

Reproductive toxicity

Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure

Product: Respiratory tract irritation.

Specific Target Organ Toxicity - Repeated Exposure

Product: None known.

Aspiration Hazard

Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish

Product: No data available.

Specified substance(s):

NITRIC ACID — LC 50 (Starfish (Asterias rubens), 48 h): 100 - 330 mg/l Mortality

Aquatic Invertebrates

Product: No data available.

Specified substance(s):

NITRIC ACID — LC 50 (Cockle (Cerastoderma edule), 48 h): 330 - 1,000 mg/l Mortality
LC 50 (Green or European shore crab (Carcinus maenas), 48 h): 180 mg/l Mortality

Chronic hazards to the aquatic environment:

Fish

Product: No data available.

Aquatic Invertebrates

Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: Expected to be readily biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in Soil: The product is water soluble and may spread in water systems.

Other Adverse Effects: The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN Number:	UN 2031
UN Proper Shipping Name:	Nitric acid
Transport Hazard Class(es)	
Class(es):	8, 5.1
Label(s):	8, 5.1
Packing Group:	II
Marine Pollutant:	Not a Marine Pollutant
Special precautions for user:	–

IMDG

UN Number:	UN 2031
UN Proper Shipping Name:	NITRIC ACID
Transport Hazard Class(es)	
Class(es):	8, 5.1
Label(s):	8, 5.1
EmS No.:	F-A, S-Q
Packing Group:	II
Marine Pollutant:	Not a Marine Pollutant
Special precautions for user:	–

IATA

UN Number:	UN 2031
Proper Shipping Name:	Nitric acid
Transport Hazard Class(es):	
Class(es):	8, 5.1
Label(s):	8, 5.1
Marine Pollutant:	Not a Marine Pollutant
Packing Group:	II
Special precautions for user:	–

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Identity	Reportable quantity
NITRIC ACID	1000 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Acute (Immediate)
Chronic (Delayed)
Fire

SARA 302 Extremely Hazardous Substance

Chemical Identity	Reportable quantity	Threshold Planning Quantity
NITRIC ACID	1000 lbs.	1000 lbs.

SARA 304 Emergency Release Notification

Chemical Identity	Reportable quantity
NITRIC ACID	1000 lbs.

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
NITRIC ACID	500lbs

SARA 313 (TRI Reporting)

Chemical Identity	Reporting threshold for other users	Reporting threshold for manufacturing and processing
NITRIC ACID	10000 lbs	25000 lbs.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

Chemical Identity	Reportable quantity
NITRIC ACID	Reportable quantity: 1000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

Chemical Identity	Reportable quantity
NITRIC ACID	15000 lbs

US State Regulations

US. California Proposition 65

No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity
NITRIC ACID

US. Massachusetts RTK - Substance List

Chemical Identity
NITRIC ACID

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity
NITRIC ACID

US. Rhode Island RTK

Chemical Identity
NITRIC ACID

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	Not in compliance with the inventory.
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

16.Other information, including date of preparation or last revision

NFPA Hazard ID

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible
OXY: Oxidizer

Issue Date:	03-15-2016
Revision Date:	No data available.
Version #:	3.0
Further Information:	No data available.

Disclaimer:

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Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

Effective date: 05/12/2015 **Revision:** 05/12/2015

LIQUINOX

1 Identification of the Substance/mixture and of the Company/Undertaking

1.1 Product identifier

Trade name: LIQUINOX

Application of the substance / the preparation: Hand detergent.

1.2 Relevant identified uses of the substance or mixture and uses advised against:

No additional information available.

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer/Supplier:

Alconox, Inc.
30 Glenn St., Suite 309
White Plains, NY 10603
Phone: 914-948-4040

Further information obtainable from: Product Safety Department.

1.4 Emergency telephone number:

ChemTel Inc.: (800)255-3924, +1 (813)248-0585

2 Hazards Identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008:

Classification according to Directive 67/548/EEC or Directive 1999/45/EC:

GHS07

Skin Irrit. 2, H315: Causes skin irritation.

Information concerning particular hazards for human and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to the latest editions of the EU-lists, and extended by company and literature data

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008:

The product is classified and labelled according to the CLP regulation.

Hazard pictograms:

GHS07

Signal word: Warning

Hazard-determining components of labelling:

Alkyl benzene sulfonic acid, sodium salt.

Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

Effective date: 05/12/2015 **Revision:** 05/12/2015

LIQUINOX

Hazard statements:
H315: Causes skin irritation.

Precautionary statements:

P332+P313: If skin irritation occurs: Get medical advice/attention.

P302+P352: IF ON SKIN: Wash with plenty of soap and water.

P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

Other Hazard description:
WHMIS-classification and symbols:
D2B - Toxic material causing other toxic effects

NFPA ratings (scale 0 - 4)

Health = 1
Fire = 0
Reactivity = 0

HMIS-ratings (scale 0 - 4)

HEALTH	1
FIRE	0
REACTIVITY	0

Health = 1
Fire = 0
Reactivity = 0

2.3 Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

3 Composition/Information on Ingredients

3.2 Chemical characterization: Mixture
Description: Hazardous ingredients of mixture listed below.

Identifying Nos.	Description	Wt. %
CAS: 68081-81-2	Alkyl benzene sulfonic acid, sodium salt	10 - 25%
CAS: 1300-72-7 EINECS: 215-090-9	Sodium xylene sulphonate	2.5 - 10%
CAS: 84133-50-6	Alcohol Ethoxylate	2.5 - 10%
CAS: 68603-42-9 EINECS: 271-657-0	Coconut diethanolamide	2.5 - 10%
CAS: 17572-97-3 EINECS: 241-543-5	Ethylenediaminetetraacetic acid, tripotassium salt	2.5 - 10%

Additional information: For the wording of the listed risk phrases refer to section 16.

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4 First Aid Measures

4.1 Description of first aid measures

General information:

Take affected persons out into the fresh air.

After inhalation:

Supply fresh air; consult doctor in case of complaints.

After skin contact:

Immediately wash with water and soap and rinse thoroughly for 30 minutes. If skin irritation continues, consult a doctor.

After eye contact:

Remove contact lenses if worn.

Rinse opened eye for at least 30 minutes under running water, lifting upper and lower lids occasionally. Immediately consult a doctor.

After swallowing:

Do not induce vomiting; call for medical help immediately. Rinse out mouth and then drink plenty of water.

A person vomiting while laying on their back should be turned onto their side.

4.2 Most important symptoms and effects, both acute and delayed:

Irritating, all routes of exposure.

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information available.

5 Firefighting Measures

5.1 Extinguishing media:

Suitable extinguishing agents:

CO_2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

5.2 Special hazards arising from the substance or mixture:

No additional information available.

5.3 Advice for firefighters:

Protective equipment:

Wear self-contained respiratory protective device.

Wear fully protective suit.

6 Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation.

Particular danger of slipping on leaked/spilled product.

6.2 Environmental precautions:

Dilute with plenty of water.

Do not allow to enter sewers/ surface or ground water.

6.3 Methods and material for containment and cleaning up:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Clean the affected area carefully; suitable cleaners are: Warm water

Dispose contaminated material as waste according to item 13. Ensure adequate ventilation.

6.4 Reference to other sections:

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information

7 Handling and Storage

7.1 Precautions for safe handling:

No special precautions are necessary if used correctly.

Information about fire - and explosion protection:

No special measures required.

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7.2 Conditions for safe storage, including any incompatibilities:
Storage:
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: No special requirements.
Further information about storage conditions: None

7.3 Specific end use(s): No additional information available.

8 Exposure Controls/Personal Protection

8.1 Control parameters
Ingredients with limit values that require monitoring at the workplace:
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: The lists valid during the making were used as basis.

8.2 Exposure controls:
Personal protective equipment:
General protective and hygienic measures:
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Respiratory protection:
Not required under normal conditions of use.
Protection of hands:


Protective gloves

The glove material has to be impermeable and resistant to the product. Selection of the glove material should be based on the penetration time, rates of diffusion and the degradation of the glove material.

Material of gloves:
The selection of a suitable gloves does not only depend on the material, but also on the quality, and varies from manufacturer to manufacturer.
Penetration time of glove material:
The exact break through time has to be determined by the manufacturer of the protective gloves. DO NOT exceed the breakthrough time set by the Manufacturer.
For long term contact, gloves made of the following materials are considered suitable:
Butyl rubber, BR
Nitrile rubber, NBR
Natural rubber (NR)
Neoprene gloves
Eye protection:


Safety glasses
Goggles recommended during refilling.

Body protection: Protective work clothing

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9 Physical and Chemical Properties

9.1 Information on basic physical and chemical properties:

General Information:	
Appearance:	
Form:	Liquid
Color:	Light Yellow
Odor:	Odorless
Odor threshold:	Not determined.
pH-value:	8.5
Change in condition:	
Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	100°C
Flash point:	Not applicable.
Flammability (solid, gaseous):	Not applicable.
Ignition temperature:	Not applicable.
Decomposition temperature:	Not determined.
Self-igniting:	Product is not selfigniting.
Danger of explosion:	Product does not present an explosion hazard.
Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
Vapor pressure at 20°C:	23 hPa
Density:	1.08 g/cm³
Relative density:	Not determined.
Vapor density:	Not determined.
Evaporation rate:	Not determined.
Solubility in / Miscibility with water:	Fully miscible.
Segregation coefficient (n-octanol/water):	Not determined.
Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
Solvent content:	
Organic solvents:	Not determined.
Solids content:	Not determined.
9.2 Other information:	No additional information available.

10 Stability and Reactivity

10.1 Reactivity:

10.2 Chemical stability:

Thermal decomposition / conditions to be avoided:

No decomposition if used according to specifications.

10.3 Possibility of hazardous reactions:

Reacts with strong oxidizing agents. Reacts with strong acids.

10.4 Conditions to avoid:

No additional information available.

10.5 Incompatible materials:

No additional information available.

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10.6 Hazardous decomposition products:
Carbon monoxide and carbon dioxide
Sulphur oxides (SOx)
Nitrogen oxides

11 Toxicological Information

11.1 Information on toxicological effects:
Toxicity data: Toxicity data is available for mixture:
Primary irritant effect:
On the skin: Irritating to skin and mucous membranes.
On the eye: Strong irritant with the danger of severe eye injury.
Sensitization: No sensitizing effects known.
Additional toxicological information:
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version: Irritant

12 Ecological Information

12.1 Toxicity:
Aquatic toxicity: No additional information available.
12.2 Persistence and degradability: Biodegradable.
12.3 Bioaccumulative potential: Does not accumulate in organisms.
12.4 Mobility in soil: No additional information available.
Additional ecological information:
General notes:
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water.
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or un-neutralized.
12.5 Results of PBT and vPvB assessment:
PBT: Not applicable.
vPvB: Not applicable.
12.6 Other adverse effects: No additional information available.

13 Disposal Considerations

13.1 Waste treatment methods:
Recommendation:
Smaller quantities can be disposed of with household waste.
Small amounts may be diluted with plenty of water and washed away. Dispose of bigger amounts in accordance with Local Authority requirements.
The surfactant used in this product complies with the biodegradability criteria as laid down in Regulation (EC) No. 648/2004 on detergents. Data to support this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them, at their direct request or at the request of a detergent manufacturer.
Uncleaned packaging:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agents: Water, together with cleansing agents, if necessary.

14 Transport Information

14.1 UN-Number:
DOT, ADR, ADN, IMDG, IATA: Not Regulated

14.2 UN proper shipping name:
DOT, ADR, IMDG, IATA: Not Regulated

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14.3 Transport hazard class(es):
DOT, ADR, IMDG, IATA:
Class: Not Regulated
Label: -

14.4 Packing group:
DOT, ADR, IMDG, IATA: Not Regulated

14.5 Environmental hazards:
Marine pollutant: No

14.6 Special precautions for user: Not applicable.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

UN "Model Regulation": Not Regulated

15 Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:
United States (USA):
SARA:
Section 355 (extremely hazardous substances): None of the ingredient is listed.
Section 313 (Specific toxic chemical listings): None of the ingredient is listed.
TSCA (Toxic Substances Control Act): All ingredients are listed.

Proposition 65 (California):
Chemicals known to cause cancer: None of the ingredient is listed.
Chemicals known to cause reproductive toxicity for females: None of the ingredient is listed.
Chemicals known to cause reproductive toxicity for males: None of the ingredient is listed.
Chemicals known to cause developmental toxicity: None of the ingredient is listed.

Carcinogenic Categories:
EPA (Environmental Protection Agency): None of the ingredient is listed.
TLV (Threshold Limit Value established by ACGIH): None of the ingredient is listed.
NIOSH-Ca (National Institute for Occupational Safety and Health): None of the ingredient is listed.
OSHA-Ca (Occupational Safety & Health Administration): None of the ingredient is listed.

Canadá:
Canadian Domestic Substances List (DSL): All ingredients are listed.
Canadian Ingredient Disclosure list (limit 0.1%): None of the ingredient is listed.
Canadian Ingredient Disclosure list (limit 1%): None of the ingredient is listed.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other Information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant phrases:
H315: Causes skin irritation.

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Abbreviations and Acronyms:

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
IMDG: International Maritime Code for Dangerous Goods.
DOT: US Department of Transportation.
IATA: International Air Transport Association.
GHS: Globally Harmonized System of Classification and Labelling of Chemicals.
ACGIH: American Conference of Governmental Industrial Hygienists.
NFPA: National Fire Protection Association (USA).
HMIS: Hazardous Materials Identification System (USA).
WHMIS: Workplace Hazardous Materials Information System (Canada).
VOC: Volatile Organic Compounds (USA, EU).
LC50: Lethal concentration, 50 percent.
LD50: Lethal dose, 50 percent.

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Lead and Cadmium Standards

REQUIREMENTS OF THE LEAD STANDARD

3.1.4.2 Personal Monitoring. Personal monitoring will be undertaken to characterize the personal exposure of high-risk employees to the hazardous substances they may encounter on-site. Personal monitoring will be conducted on a representative basis and personnel who are represented by the sampling will be noted in field logs.

The following personal monitoring equipment will be used at the site. Refer to Appendix F of this HASP for information on the maintenance and calibration of the equipment.

(1) Gillian pump, with 37 mm two or three piece, mixed cellulose ester cassettes with 0.8 micron pore size.

Personal Monitoring:

Personal monitoring will be undertaken to characterize the worker exposure to lead through the monitoring of representative employees. Employee selection will be based on work task and duration of exposure. Sampling and analysis will be done in accordance with NIOSH methodology and is summarized below. Contact Cindy Sundquist, Regional Health and Safety Manager prior to sampling.

1. One worker per task will be selected. The worker selected will be the one thought to have the greatest exposure for the longest duration (if two workers have equal exposures, personal monitoring can be rotated if sampling is to be conducted on more than one day). The exposures to all other workers will assumed to be the same as the chosen individual, or lower. Record the name, social security number, job classification, and company of all workers for whom the sample represents plus record the date(s), number, duration, and location, of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable. Record the type of respiratory protection devices worn, if any, and any environmental variables (e.g., rain, mist, snow, wind, temperature) that could affect the measurement of employee exposure.

2. Full shift (at least 7 hours) breathing zone samples will be conducted using personal sampling pumps, calibrated before and after each use, and set at 2 liters per minute. Minimum sample volume is 200 liters. Two or three piece mixed cellulose-ester filters with 0.8 micrometer pore size and 37 mm diameter, will be used to collect the sample.

3. Collect samples, closed face, and ship together along with one open and one closed blank. Open blanks are filter cassettes that are handled in the same manner that the samples are, except that no air is drawn through them (e.g., remove the end plugs and store until sampling is complete, then replace the plugs.) Closed blanks are media blanks to ensure that the cassettes were not contaminated prior to sampling. You will need two **open** blanks per ten samples, therefore if more than 10 samples are taken, you will need to add additional blanks. Samples should be analyzed using NIOSH method 7082 (Atomic Absorption).

4. At least one sample per task per site location will be taken in the initial monitoring phase. If the results show lead levels below 0.03 mg/m^3, no further testing will be required in that area for that task. If levels are found to be above 0.03 mg/m^3, repeat testing may be needed if task duration is longer than 3 months. If conditions or tasks change that may result in new or additional exposures to lead, additional samples will be taken.

5. Notify all affected workers (both AMEC and subcontractor personnel), in writing, of the results of the analysis within 5 working days of their receipt. Affected workers include not only the worker wearing the pump and filter, but also the others working in the same general area as well.

OTHER REQUIREMENTS IN REGARDS TO LEAD STANDARD

Engineering controls, when ever feasible, shall be used.

Respirators:

Full face, cartridge respirators with an N, P or R 100 filter shall be used if there is a potential for lead levels to be above the action limit. If organics are present which require upgrade to level C PPE, use cartridge also capable of filtering organics as well.

Worst-case exposure modeling was conducted. As a result, HLA could not rule out the potential for lead levels in the breathing zone to be above the OSHA action limit of 0.03 mg/m^3. Based on the levels known to be present at the site, an action limit of _4_ mg/m^3 on the respirable dust meter is required to upgrade to Level C PPE. This is based on prior sampling that resulted in a soil concentration of _____ mg/kg. An uncertainty (safety) factor of 4 was used in the calculation.

Upgrade to level B PPE is required when respirable dust readings reach or exceed _____ mg/m^3. It is at this level where there is a potential for lead levels to exceed the OSHA maximum use concentration for lead when using a full-face cartridge respirator. This is based on maximum lead levels found of _____ mg/kg (ppm). The formula used for the above calculations is as follows: (NOTE: a safety factor of 4 was used)

$$\text{Dust Action Limit} = \frac{(1E+6)(\text{Exposure Limit mg/m}^3)}{(\text{Concentration mg/kg})(\text{Safety Factor})}$$

(0.05 mg/m^3 x 1,000,000 parts) ÷ (_____ parts x 4) = 0.34 mg/m^3

All workers who wear a cartridge respirator must have been fit-tested within the last year.

Monitoring:

Use respirable dust meter. Base action levels on maximum soil concentrations (see above)

Decontamination:

Place a sign near the decontamination station is and/or where equipment is decontaminated that states: CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS.

All workers **MUST** shower at the end of the workday if there is a potential for lead levels to be above the PEL (Level C PPE is worn).

Medical Surveillance:

Blood lead analysis (lead and zinc protoporphyrin levels) shall be conducted before working in areas with high lead contamination levels, or a potential for high lead levels, where the work conducted could result in levels above the PEL, as well as after their work at the site has been completed.

All associates will be notified in writing of the results of the biological monitoring for lead within 5 working days. (NOTE: blood levels in excess of 30 mg/100 g of whole blood require removal from work involving lead exposures.)

Training:

All workers with a potential for exposure to airborne lead at any level must receive the following training:

1. The contents of Appendices A and B of the OSHA Lead Standard (29 CFR 1910.1025).

All workers with a potential exposure to lead at or above the action limit of 0.03 mg/m^3 must receive the following training:

1. The contents of the standard (29 CFR 1910.1025) and it's appendices.

2. The specific nature of the operations which could result in exposure to lead above the action limits.

3. The purpose of the medical surveillance program in regards to monitoring for lead. Information must include the adverse health effects associated with excessive exposure to lead (especially reproductive effects).

4. The engineering controls (if any) and work practices (e.g., wetting soil to control dust) to be used at the site.

5. Instructions that chelating agents should not be used to remove lead from their bodies except under the direction of a licensed physician. (NOTE: Chelating agents remove metals from the body by binding to the metal, making is soluble so that it can be excreted in the urine. The problem with them is that they are indiscriminate and remove essential metals from the body as well. Chelation is a last resort to be used only when extremely high lead levels are found in the blood.)

6. Inform workers that copies of the standard and it's appendices are available to them if interested.

Signs:

The following sign must be posted at the entrance to any area with a potential for lead levels to exceed the PEL.

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

Recordkeeping:

Harding ESE is required to maintain records of all monitoring conducted in regards to lead, therefore, a copy of the results of the monitoring must be sent to C. Sundquist. In addition to the results, the following information must also be provided:

1. Dates, number, duration, location and results of each of the samples taken. Included with this must be a description of the sampling procedures used to determine representative employee exposure where applicable.

2. A description of the sampling and analytical methods used and evidence of their accuracy.

3. The type of respiratory protective devices worn, if any.

4. The Name, social security number, company, and job classification of the employees monitored and all other employees (or subcontractors) for whom the sample represents.

5. The environmental variables that could affect the measurement of employee exposure (e.g., cold weather, ground frozen, no wind; vs. warm day, soil dry, windy)

NOTE: These records will be maintained for duration of employment plus 30 years, or for 40 years (which ever is longer). Medical surveillance records will also be maintained for the same duration.

All records will be made available to associates, upon request.

Occupational
Safety and Health
Administration

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Cadmium

OSHA 3136-06R 2004

This informational booklet provides a general overview of a particular topic related to OSHA standards. It does not alter or determine compliance responsibilities in OSHA standards or the *Occupational Safety and Health Act of 1970*. Because interpretations and enforcement policy may change over time, you should consult current OSHA administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the Courts for additional guidance on OSHA compliance requirements.

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OSHA's role is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health.

Cadmium

U.S. Department of Labor

Occupational Safety and Health Administration

OSHA 3136-06R
2004

Contents

Introduction

Cadmium, a naturally occurring element found in the earth's crust, was discovered in 1817, but was not used commercially until the end of the 19th century. This soft, silver-white metal was first used in paint pigments and as a substitute for tin in World War I. Today, about three-fourths of cadmium is used as an electrode component in alkaline batteries, with the remainder used in pigments, coatings, and platings and as a stabilizer for plastics.

Workers in many industries face potential exposure to cadmium. The potential for exposure is highest among workers in electroplating, metal machining, plastics, ceramics, paint, and welding operations. The main exposure routes are through inhalation of dust and fumes and the incidental ingestion of dust from contaminated hands, food, or cigarettes.

Workers may also be exposed to cadmium from the smelting and refining of metals or from air in industrial plants that manufacture batteries, coatings, or plastics. The Agency for Toxic Substances and Disease Registry estimates that more than 500,000 workers in the United States face exposure to cadmium each year.

How OSHA protects workers exposed to cadmium

The primary and most serious adverse health effects of long-term exposure to cadmium include kidney dysfunction, lung cancer, and prostate cancer. Cadmium may cause local skin or eye irritation and can affect long-term health if inhaled or ingested. Workers face a greater danger of cadmium exposure from inhalation than from ingestion. Exposure to cadmium that may be dangerous to life or health may occur in jobs in which workers are exposed to cadmium dust or fumes, where they heat compounds or surfaces that contain cadmium, or where workers weld or cut with materials or solders that contain cadmium.

OSHA moved to protect workers exposed to cadmium more than 30 years ago when it adopted the American National Standards Institute's (ANSI) threshold limit values (TLVs) for cadmium as a national consensus standard under the authority of the Occupational Safety and Health Act of 1970, Section 6(a) in 1971. In 1992, OSHA reduced the exposure limits after a quantitative risk assessment and

a long-term evaluation of epidemiological studies of lung cancer and renal dysfunction among workers and animal studies. The revised exposure limits were published in the Federal Register (Title 29 CFR, Part 1910.1027) and took effect on December 14, 1992.

The full OSHA standard relating to cadmium (applicable to general industry, agriculture, and maritime) is found at 29 CFR 1910.1027. This booklet should not be used as a substitute for the full regulatory requirements of the cadmium standard. The construction industry has a separate cadmium standard, found in 29 CFR 1926.1127.

Exposure limits for cadmium

There are three exposure limits an employer must observe under the OSHA cadmium standard. The first is the action level, or AL, which is defined as the airborne level of cadmium that creates a need for airborne exposure monitoring, a medical surveillance program for employees who are at or above the AL on 30 or more days per year, and the provision of a respirator to any employee that requests one. The second limit is the Permissible Exposure Limit, or PEL, which defines the limit to which an employee may be exposed to cadmium in the workplace. The third limit level is known as a Separate Engineering Control Air Limit, or SECAL, and may be one of several specific and unique exposure limits that apply to select and defined industries and processes. The employer must achieve the PEL through engineering controls and work practices in all industries not designated with a separate SECAL.

The action level

The action level for workplace exposure to cadmium is 2.5 micrograms per cubic meter of air (2.5 $\mu g/m^3$) calculated as an 8-hour time-weighted average (TWA) exposure.

The PEL

The PEL is a time-weighted average concentration that must not be exceeded during any 8-hour work shift of a 40-hour work week. The standard sets a PEL of 5 micrograms of cadmium per cubic meter of air (5 $\mu g/m^3$) for all cadmium compounds, dust, and fumes.

The SECALs

The SECAL is a separate exposure limit to be achieved in specified processes and workplaces where it is not possible to achieve the PEL of 5 $\mu g/m^3$ through engineering and work practices alone. The SECAL for cadmium is 15 $\mu g/m^3$ or 50 $\mu g/m^3$, depending on the processes involved. The employer covered by the SECAL is required to achieve that limit by engineering and work practice controls to the extent feasible and to protect employees from exposures above the PEL by any combination of compliance methods, including engineering and work practice controls and respirators.

The industries that have separate SECALs identified for specific processes include nickel cadmium battery production, zinc/cadmium refining, pigment and stabilizer manufacturing, lead smelting, and plating.

The SECAL is set at 50 $\mu g/m^3$ for the following industries and processes:

- Nickel cadmium battery industry
  Plate making, plate preparation process
- Zinc/cadmium refining
  Cadmium refining, casting melting, oxide production, sinter plant
- Pigment manufacturing
  Calcine, crushing, milling, and blending
- Stabilizer production
  Cadmium oxide charging, crushing, drying, and blending
- Lead smelting
  Sinter plant, blast furnace, baghouse, and yard area

The SECAL is set at 15 $\mu g/m^3$ for the following industries and processes:

- Nickel cadmium battery industry
  All processes not identified above
- Pigment manufacturing
  All processes not identified above
- Plating manufacturing
  Mechanical plating

Communicating cadmium hazards to employees

Employees must be made aware of the dangers associated with exposure to cadmium in the workplace. The employer must comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200), including the placement of warning signs and labels in visible locations, access to material safety data sheets (MSDS), and providing appropriate employee training.

Warning signs must be displayed in regulated areas and in all approaches to regulated areas. (A regulated area is defined as the area in which an employee may face exposure to cadmium at levels above the PEL.) The signs must be illuminated, cleaned, and maintained so that the legend is readily visible, and they must include the following words:

- Danger
- Cadmium
- Cancer hazard
- Can cause lung and kidney disease
- Authorized personnel only
- Respirators required in this area

Shipping and storage containers that contain cadmium, cadmium compounds, or cadmium-contaminated clothing, equipment, waste, scrap, or debris must be labeled with the following information:

- Danger
- Contains cadmium
- Cancer hazard
- Avoid creating dust
- Can cause lung and kidney disease

Installed cadmium products must have a visible label or other indication that cadmium is present, where feasible.

Employee training

Employees must receive training prior to or at the time of their initial assignment to a position that involves potential exposure to cadmium and at least annually thereafter. Required training elements include:

- Explanation of the health hazards associated with cadmium exposure (See Appendix A of the cadmium standard at 29 CFR 1910.1027).
- Information about where and how cadmium is used, stored, and released at the worksite, including processes or operations that involve potential cadmium exposure, especially above the PEL.
- Explanation of engineering controls and work practices for the employee's job assignment to control exposure to cadmium associated with the employee's job assignment.
- Description of measures employees can take to protect themselves from cadmium exposure, such as modification of smoking, personal hygiene precautions, and appropriate work practices.
- Explanation of emergency procedures.
- Information on the purpose, selection, fitting, use, and limitations of personal protective equipment.
- Explanation of the medical surveillance program.
- Make a copy of the cadmium standard and its appendices readily available and provide employees with a copy of the standard if requested.
- Informing employees of their rights of access to records.

The employer must ensure that employees understand that they are prohibited from eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics of any kind in regulated areas. This also includes a prohibition on carrying or storing these materials or items in a regulated area.

The employer must make information about the company training program available to the Assistant Secretary of Labor for Occupational Safety and Health or the Director of the National Institute for Occupational Safety and Health upon request.

Requirements for air monitoring for cadmium

If your business or workplace has the potential to expose employees to cadmium, the first step is to determine whether that exposure will be at or above the action level of 2.5 $\mu g/m^3$. Levels of exposure are measured by taking breathing zone air samples that reflect an employee's regular, daily TWA exposure over an eight-hour period. The monitoring method and analysis must have an accuracy rate of not less than plus or minus 25 percent with a confidence level of 95 percent.

The breathing zone samples must be taken for every employee on each shift, for each job classification, in each work area. Where several employees perform the same job tasks, in the same job classification, on the same shift, in the same work area, for the same duration, and levels of cadmium exposures are similar, the employer may sample a representative fraction of employees instead of all employees. Those selected for sampling are expected to have the highest exposure levels.

If air monitoring shows that employees are exposed at or above the action level, periodic monitoring must be performed at least every six months. If periodic air monitoring shows levels of exposure below the action level and a repeat test at least seven days later also shows levels below the action level, the employer may discontinue the semi-annual air monitoring for those employees whose exposures are represented by such monitoring.

If new equipment is added, raw materials are changed, new personnel are hired, work practices and final products are altered that may result in additional employees being exposed to cadmium at or above the action level, additional monitoring must be performed. If, at any time, the employer has reason to suspect that exposure to cadmium may increase and employees already exposed to cadmium at or above the action level will be exposed above the PEL, additional air monitoring should be undertaken.

If the employer has "objective data", which means information that demonstrates that a specific product, material, or process involving cadmium cannot release dust or fumes in concentrations at or above the action level based on an industry-wide study or

laboratory product test results that closely resemble conditions in the employer's facilities, then the employer may rely on this data instead of implementing initial monitoring as described above.

Notifying employees of monitoring results

Within 15 days after the receipt of the air monitoring results, each affected employee must be notified of these results individually and in writing. The results must also be posted where all affected employees can view them. Employees exposed to cadmium above the PEL must be informed in writing that the PEL has been exceeded, along with a written explanation of the corrective actions being taken by the employer to reduce the employee exposure level to or below the PEL.

Mechanical ventilation

If mechanical ventilation is used to control exposure, measurements that demonstrate the effectiveness of the system in controlling exposure, such as capture velocity, duct velocity, or static pressure, must be made as necessary, to maintain the system's effectiveness. Any change in production processes or controls that might increase cadmium exposure requires the effectiveness of the ventilation system to be reevaluated within five working days of the change.

If air is recirculated from exhaust ventilation into the workplace, the system must be equipped with a high efficiency filter and be monitored periodically to ensure effectiveness.

Requirements for a compliance program

In any workplace or business that experiences exposure levels above the PEL or SECAL, a written compliance program must be established and implemented to reduce employee exposure to or below the PEL by means of engineering and work practice controls. If engineering and work practice controls cannot reduce exposure to or below the PEL, the employer must include the use of appropriate respiratory protection in the written compliance program to achieve compliance with the PEL. This written program must be updated at least annually (more often, if necessary) and

must be available for examination and copying to employees as well as the Assistant Secretary of Labor for Occupational Safety and Health and the Director of the National Institute for Occupational Safety and Health upon request.

A written compliance program must contain the following elements:

- A description of each operation that involves the emission of cadmium, the type of machinery used, the material processed, controls in place, and crew size.
- Description of operating and maintenance procedures and employee job responsibilities.
- Description of how the employer will achieve compliance, such as engineering plans and studies and the use of respiratory protection.
- A report on the technology used or considered for use to meet the PEL.
- Air monitoring data to document the sources of cadmium emissions.
- A schedule for implementation of the program that includes documentation such as copies of purchase orders for equipment and construction contracts.
- A plan for emergency situations that includes the use of respirators and personal protective equipment and methods to restrict access to an area to non-essential employees until the problem is corrected.

Requirements for protective equipment

Employees working in areas where exposure to cadmium is expected to exceed the PEL or where skin or eye irritation can result from cadmium exposure at any level must be provided with respiratory protection and other protective work clothing and equipment to prevent contamination of both the employee and the employee's clothes. If skin or eye irritation is associated with cadmium exposure at any level, the worker must be provided with equipment that protects the worker's skin and eyes. Examples of

appropriate personal protective equipment include coveralls, gloves, head coverings, boots, face shields, and goggles. The employer must provide and maintain necessary personal protective equipment to employees at no cost and provide changing rooms, hand washing facilities, and showers.

The following precautions must be taken to protect workers:

- Employees must remove all protective work clothing and equipment at the end of a shift in a changing area designated for this purpose, taking care not to shake or blow any cadmium residue from the clothing or equipment.
- Changing rooms must have separate storage areas for street clothes and for cadmium-contaminated protective clothing.
- The employer must clean and maintain protective work clothing and equipment, which includes washing at least once a week and repairing or replacing as necessary; tears or rips in protective clothing must be repaired immediately or the item replaced.
- Employees exposed to cadmium above the PEL must shower at the end of a work shift when exposure occurred and may not eat, drink, smoke, chew tobacco or gum, or apply cosmetics before washing their hands and face.

Special cleaning requirements for protective clothing

Cleaning or laundering cadmium-contaminated work clothing requires special precautions. The employer must ensure that any person designated to handle protective clothing and equipment contaminated with cadmium understands the potential harmful effects of exposure and knows how to launder or clean such items in a safe manner that prevents the release of cadmium at levels above the PEL.

An important step in this process is to ensure that only authorized employees remove cadmium-contaminated clothing or equipment from the workplace for any purpose, including laundering, cleaning, or disposal. Items removed from the work area for cleaning, maintenance, or disposal must be placed in sealed, impermeable bags designed to prevent dispersion of

cadmium dust. These bags must be labeled as described in the section on communicating hazards to employees.

Types of respirators

The respiratory protection program must comply with 29 CFR 1910.134 (Respiratory Protection), including the need for a written respiratory protection program administered by a trained administrator. Respirators must be used any time employees are exposed to cadmium at levels above the PEL, including maintenance and repair activities as well as normal operations.

The following table (page 13) depicts specific requirements for respirators, depending on the exposure level, but respirators assigned for higher environmental concentrations may be used at lower exposure levels. Quantitative fit testing is required for all tight-fitting air purifying respirators when the airborne concentration of cadmium exceeds 10 times the PEL. If there is any indication of eye irritation, a full face piece respirator is required.

Requirements for medical monitoring

The employer must institute a medical surveillance program for all employees who are or may be exposed to cadmium at or above the action level for 30 or more days per year (or in a 12-month consecutive period). All medical examinations related to this requirement must be provided at no cost to the employee at a reasonable time and convenient place, and they must be performed by or under the supervision of a licensed physician who is familiar with the regulatory text of the cadmium standard, including appendices that provide details on health effects and protocols for sample handling and laboratory selection. Biological samples must be collected in a manner that assures their reliability, and analyses must be performed in laboratories with demonstrated proficiency in the testing performed.

The employer must promptly inform the employee of the option to seek a second medical opinion after any medical examination or consultation provided by a physician provided by the employer to review any findings, determinations, or recommendations or to

Table 1: Respiratory Protection for Cadmium

Airborne Concentration	*Required Respirator Type*
Less than 10 times the PEL	A half mask, air purifying equipped with a high-efficiency particulate air (HEPA) filter.
Up to 25 times the PEL	A powered air-purifying respirator (PAPR) with a loose-fitting hood or helmet equipped with a HEPA filter or a supplied-air respirator with a loose-fitting hood or helmet face piece operated in the continuous flow mode.
Up to 50 times the PEL	A full face piece air-purifying respirator equipped with a HEPA filter or a powered air-purifying respirator with a tight-fitting half mask equipped with a HEPA filter or a supplied-air respirator with a tight-fitting half mask operated in the continuous flow mode
Up to 250 times the PEL	A powered air-purifying respirator with a tight fitting full face piece equipped with a HEPA filter or a supplied-air respirator with a tight-fitting full face piece operated in the continuous flow mode.
Up to 1,000 times the PEL	A supplied air respirator with half mask or full face piece operated in the pressure demand or other positive pressure mode.
More than 1,000 times the PEL or unknown levels of concentration	A self-contained breathing apparatus with a full face piece operated in the pressure demand or other positive pressure mode, or a supplied-air respirator with a full face piece operated in the pressure demand or other positive pressure mode and equipped with an auxiliary escape type self-contained breathing apparatus operated in the pressure demand mode.
Fire Fighting	A self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

Source: Respiratory Decision Logic, NIOSH, 1987

conduct examinations, consultations, or laboratory tests. The employer may require the employee to notify the employee that he or she intends to seek a second medical opinion and to initiate steps to make an appointment within 15 days of being told of this option or of receiving the physician's written opinion from an employer-provided examination, whichever is later, as a condition of providing payment for a second medical opinion.

Medical surveillance begins with an initial examination for each employee covered by this requirement within 30 days of employment in a position that involves exposure to cadmium. The only exception is for employees who can show that they have had an examination that includes all required elements in the last 12 months. Results from a qualifying examination within the last 12 months must be maintained as part of the employee's medical record and are treated as the initial examination. The examination must include:

- Medical and work history
  - Any past, present, or anticipated future exposure to cadmium
  - History of renal, cardiovascular, respiratory, hematopoietic, reproductive or musculoskeletal system dysfunction
  - Current use of medication with potential nephrotoxic side effects
  - Smoking history and current status
- Biological monitoring
  - Cadmium in urine (CdU), standardized to grams of creatinine (g/Cr)
  - Beta-2 microglobulin in urine (β2-M), standardized to grams of creatinine (g/Cr), with pH specified
  - Cadmium in blood (CdB), standardized to liters of whole blood (lwb)

The following parameters will determine what level of medical surveillance will follow the initial examination. Levels at or below the levels specified below require only the minimum level of periodic medical surveillance, which includes a follow-up exam within one year of the initial exam and a periodic exam every two

years from that point forward. Biological sampling must be provided at least annually.

Trigger levels for medical surveillance:

- CdU level: at or below 3 μg/g Cr
- β2-M level: at or below 300 μg/g Cr
- CdB level: at or below 5 μg/lwb

If the initial biological monitoring tests for an employee show levels exceeding any of the above parameters, then the employer must reassess the employee's occupational exposure to cadmium within two weeks of receiving the results of the tests. This reassessment must include a reevaluation and reassessment of the employee's work practices and personal hygiene, respirator use (if any) and respirator program, smoking history and current usage, as well as available hygiene facilities and engineering controls in use. If any deficiencies are noted during this reevaluation, the employer must correct them within 30 days.

An employee who shows biological test results elevated relative to the trigger levels noted above must receive a full medical examination within 90 days after receiving the results from the initial testing. At this point, the examining physician should make a decision whether to medically remove the employee from cadmium exposure. If the physician decides not to medically remove the employee, biological monitoring must continue on a semiannual basis along with an annual medical exam.

If an employee shows biological testing results during both the initial and follow-up medical examination elevated above the following trigger levels, that employee must be medically removed from exposure to cadmium at or above the action level:

(1) CdU level: above 7 μg/g Cr

or

(2) CdB level: above 10 μg/liter of whole blood

or

(3) β2-M level: above 750 μg/g Cr

and

(a) CdU exceeds 3 μg/g Cr

or

(b) CdB exceeds 5 μg/liter of whole blood

Employee removal is mandatory if the second set of biological monitoring results from the medical examination shows that one of the above mandatory removal trigger levels has been exceeded. The employer must continue to monitor the employee with biological monitoring on a quarterly basis along with semiannual medical examinations until such time as the employee's levels fall within the acceptable trigger levels for medical surveillance. Employee removal is also required if the examining physician determines that the employee needs removal from exposure to cadmium based on other findings from the examination regardless of the above testing results.

Required periodic medical exams

The minimum level of medical surveillance for employees who face exposure to cadmium but who do not test above trigger limits during biological sampling includes an exam within one year after the initial exam and thereafter an exam at least every two years. This exam must include the following:

- Detailed medical and work history.
- Complete physical examination, emphasizing blood pressure, the respiratory system, and the urinary system.
- A 14 x 17 inch or a reasonably-sized posterior-anterior chest x-ray (frequency to be determined by the examining physician).
- Pulmonary function tests.
- Blood analysis.
- Urinalysis.
- Prostate exam for males over 40 years old.
- Other tests deemed appropriate by the physician.

Annual biological sampling is required, either as part of the medical exam or separately as periodic biological monitoring. When an employee who has been previously provided with medical surveillance is terminated or voluntarily leaves

employment, the employer must provide a medical examination that includes a chest x-ray. If the last periodic or other required exam was less than six months prior to the date of termination or departure, no further exam is required.

Access to and protection of medical information

The employer must provide the examining physician with a copy of the OSHA cadmium standard and all appendices, a description of each affected employee's former, current, and anticipated duties and exposure levels as they relate to the employee's occupational exposure to cadmium, results of any previous medical and biological monitoring, and a description of personal protective equipment used by each employee.

The employer shall obtain from the examining physician a written medical opinion for each medical examination performed on each employee. The physician must be told not to reveal any findings or diagnoses unrelated to occupational exposure to cadmium to the employer. The written opinion must include:

- A diagnosis for the employee.
- A written opinion as to whether the employee has any medical condition that places him or her at increased risk of material impairment to health from further exposure to cadmium, including evidence of cadmium toxicity.
- Results of biological tests.
- Any recommended removal from or limitation on the activities or duties of the employee, or on the employee's use of personal protective equipment, such as respirators.
- A statement that the physician has clearly and carefully explained the results of the medical examination to the employee, including results of biological tests.

A copy of this written opinion and the results of the biological monitoring tests (including an explanation of the results) must be provided to the employee within two weeks after the employer receives it. If the employee requests access to the information provided by the employer to the physician, this information must be provided within 30 days.

Exposures created through emergencies

In the case of an emergency that may result in acute cadmium exposure for an employee, the employer must provide a medical examination equivalent to the standard periodic medical exam as soon as possible, with special emphasis on the respiratory system, other organ systems considered appropriate by the examining physician, and monitoring for symptoms of overexposure.

Procedures to remove an employee from duty

The employer must temporarily remove any employee from work where there is excess exposure to cadmium if biological monitoring tests show that employee to have reached any specific trigger zones or on each occasion that a physician determines in a written medical opinion that the employee must be removed. The employer must place that employee in another position where exposure to cadmium is below the action level. If such a position is not immediately available, the employer must provide one as soon as it becomes available. An employee must also be removed from excess cadmium exposure if a physician recommends this action, which can be based on biological monitoring results, an employee's inability to wear a respirator, evidence of illness or other signs or symptoms of cadmium-related dysfunction, or any other reason deemed medically appropriate by the physician. Inability to wear a respirator requires removal of the employee from work where exposure to cadmium is above the PEL; any other reason for removal requires removal of the worker from work where exposure to cadmium is below the action level.

Follow-up biological monitoring must be provided for any employee removed from duty at least every three months with follow-up medical examination semiannually until the examining physician provides a written opinion that the employee may be returned to the former job status or that the employee must be permanently removed from excess cadmium exposure.

The employer must provide Medical Removal Protection Benefits (MRPB) for up to a maximum of 18 months to an employee each time the employee is temporarily medically removed from a position because of excess cadmium exposure.

This requires the employer to sustain the normal earnings, seniority, and all other employee rights and benefits, including the right to former job status during this period. In return, the employer may require the employee to participate in medical surveillance. If an employee is unable to return to the former position by the end of the 18-month period, the employer must provide the employee with a medical examination to obtain a final medical determination regarding whether the employee can return to the former position or needs permanent removal from excess cadmium exposure.

Recordkeeping requirements

There are three distinct types of records required for an employer who operates a facility with the potential for occupational exposure to cadmium: air monitoring, medical surveillance, and training records.

Air monitoring records

The record of air monitoring must include the following:

- The date, duration, and results of air monitoring tests, in terms of an 8-hour TWA for each sample.
- The name, social security number, and job classification of the employees monitored as well as all employees the monitoring is intended to represent.
- A description of the sampling and analytical methods used and evidence of their accuracy.
- The type, if any, of respiratory protection worn by the monitored employee(s).
- A notation of any conditions that may affect the outcome of the monitoring results.

The employer must maintain these records for 30 years.

The employer may use "objective data" as an exemption from the requirement for initial monitoring under the OSHA standard. OSHA defines "objective data" as "information demonstrating that a particular product or material containing cadmium or a specific

process, operation, or activity involving cadmium cannot release dust or fumes in concentrations at or above the action level even under the worst-case release conditions." Such information may be obtained from industry wide studies or from laboratory test results conducted under conditions similar to those used by the employer in current operations. If the employer chooses to use objective data, records to substantiate this decision must be maintained for 30 years.

Medical surveillance records

The employer must maintain records for every employee subject to medical surveillance that includes the following:

- The name and social security number of the employee.
- A description of the employee's duties.
- A copy of the physician's written opinions and an explanation sheet for biological monitoring results.
- A copy of the medical history and results of the physical examination and all test results.
- A description of any employee symptoms that might be related to cadmium exposure.
- A copy of the information provided to the physician.

These records must be maintained for the duration of the employee's employment with the company plus 30 years. Upon request of the employee, an employee's designated representative, anyone having the written consent of the employee, and members of the employee's family after the employee's death or incapacitation, the employer must provide copies of these records within 15 days of such a request.

Training records

The employer must create a certification record showing that employees have been trained, to include the identity of the trained employee, the signature of the trainer or the employer, and the date the training was completed. These records must be retained for one year after the training.

If an employer ceases to do business and no successor employer is available to retain the records required to be maintained by the business, the employer must comply with the requirements for transferring records contained in 29 CFR 1910.1020 (h).

OSHA assistance

OSHA can provide extensive help through a variety of programs, including technical assistance about effective safety and health programs, state plans, workplace consultations, voluntary protection programs, strategic partnerships, and training and education, and more. An overall commitment to workplace safety and health can add value to your business, to your workplace, and to your life.

Safety and health program management guidelines

Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity of work-related injuries and illnesses and their related costs. In fact, an effective safety and health program forms the basis of good worker protection and can save time and money (about $4 for every dollar spent) and increase productivity and reduce worker injuries, illnesses, and related workers' compensation costs.

To assist employers and employees in developing effective safety and health programs, OSHA published recommended Safety and Health Program Management Guidelines (54 Federal Register (16): 3904-3916, January 26, 1989). These voluntary guidelines can be applied to all places of employment covered by OSHA.

The guidelines identify four general elements critical to the development of a successful safety and health management system:

- Management leadership and employee involvement.
- Work analysis.
- Hazard prevention and control.
- Safety and health training.

The guidelines recommend specific actions, under each of these general elements, to achieve an effective safety and health program. The Federal Register notice is available online at www.osha.gov.

State programs

The Occupational Safety and Health Act of 1970 (OSH Act) encourages states to develop and operate their own job safety and health plans. OSHA approves and monitors these plans. There are currently 26 state plans: 23 cover both private and public (state and local government) employment; 3 states, Connecticut, New Jersey, and New York, cover the public sector only. States and territories with their own OSHA-approved occupational safety and health plans must adopt standards identical to, or at least as effective as, the Federal standards.

Consultation services

Consultation assistance is available on request to employers who want help in establishing and maintaining a safe and healthful workplace. Largely funded by OSHA, the service is provided at no cost to the employer. Primarily developed for smaller employers with more hazardous operations, the consultation service is delivered by state governments employing professional safety and health consultants. Comprehensive assistance includes an appraisal of all-mechanical systems, work practices, and occupational safety and health hazards of the workplace and all aspects of the employer's present job safety and health program. In addition, the service offers assistance to employers in developing and implementing an effective safety and health program. No penalties are proposed or citations issued for hazards identified by the consultant. OSHA provides consultation assistance to the employer with the assurance that his or her name and firm and any information about the workplace will not be routinely reported to OSHA enforcement staff.

Under the consultation program, certain exemplary employers may request participation in OSHA's Safety and Health Achievement Recognition Program (SHARP). Eligibility for participa-

tion in SHARP includes receiving a comprehensive consultation visit, demonstrating exemplary achievements in workplace safety and health by abating all identified hazards, and developing an excellent safety and health program.

Employers accepted into SHARP may receive an exemption from programmed inspections (not complaint or accident investigation inspections) for a period of 1 year. For more information concerning consultation assistance, visit OSHA's website at www.osha.gov.

Voluntary Protection Programs (VPP)

Voluntary Protection Programs and onsite consultation services, when coupled with an effective enforcement program, expand worker protection to help meet the goals of the OSH Act. The three levels of VPP are Star, Merit, and Demonstration designed to recognize outstanding achievements by companies that have successfully incorporated comprehensive safety and health programs into their total management system. The VPP motivate others to achieve excellent safety and health results in the same outstanding way as they establish a cooperative relationship between employers, employees, and OSHA.

For additional information on VPP and how to apply, contact the OSHA regional offices listed at the end of this publication.

Strategic Partnership Program

OSHA's Strategic Partnership Program, the newest member of OSHA's cooperative programs, helps encourage, assist, and recognize the efforts of partners to eliminate serious workplace hazards and achieve a high level of worker safety and health. Whereas OSHA's Consultation Program and VPP entail one-on-one relationships between OSHA and individual work sites, most strategic partnerships seek to have a broader impact by building cooperative relationships with groups of employers and employees. These partnerships are voluntary, cooperative relationships between OSHA, employers, employee representatives, and others (e.g., trade unions, trade and professional associations, universities, and other government agencies).

For more information on this and other cooperative programs, contact your nearest OSHA office, or visit OSHA's website at www.osha.gov.

Alliance Programs

Alliances enable organizations committed to workplace safety and health to collaborate with OSHA to prevent injuries and illnesses in the workplace. OSHA and its allies work together to reach out to, educate, and lead the nation's employers and their employees in improving and advancing workplace safety and health.

Alliances are open to all, including trade or professional organizations, businesses, labor organizations, educational institutions, and government agencies. In some cases, organizations may be building on existing relationships with OSHA through other cooperative programs.

There are few formal program requirements for alliances, which are less structured than other cooperative agreements, and the agreements do not include an enforcement component. However, OSHA and the participating organizations must define, implement, and meet a set of short- and long-term goals that fall into three categories: training and education; outreach and communication; and promotion of the national dialogue on workplace safety and health.

OSHA training and education

OSHA area offices offer a variety of information services, such as compliance assistance, technical advice, publications, audiovisual aids and speakers for special engagements. OSHA's Training Institute in Arlington Heights, IL, provides basic and advanced courses in safety and health for federal and state compliance officers, state consultants, federal agency personnel, and private sector employers, employees, and their representatives.

The OSHA Training Institute also has established OSHA Training Institute Education Centers to address the increased demand for its courses from the private sector and from other Federal agencies.

These centers are nonprofit colleges, universities, and other organizations that have been selected after a competition for participation in the program.

OSHA also provides funds to nonprofit organizations, through grants, to conduct workplace training and education in subjects where OSHA believes there is a lack of workplace training. Grants are awarded annually. Grant recipients are expected to contribute 20 percent of the total grant cost.

For more information on grants, training, and education, contact the OSHA Training Institute, Office of Training and Education, 2020 South Arlington Heights Rd., Arlington Heights, IL 60005, (847) 297-4810. For further information on any OSHA program, contact your nearest OSHA area or regional office listed at the end of this publication.

Information available electronically

OSHA has a variety of materials and tools available on its website at www.osha.gov. These include e-Tools such as Expert Advisors, Electronic Compliance Assistance Tools (e-cats), Technical Links; regulations, directives, publications; videos, and other information for employers and employees. OSHA's software programs and compliance assistance tools walk you through challenging safety and health issues and common problems to find the best solutions for your workplace.

OSHA's CD-ROM includes standards, interpretations, directives, and more and can be purchased on CD-ROM from the U.S. Government Printing Office. To order, write to the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 or phone (202) 512-1800, or order online at http://bookstore.gpo.gov.

OSHA publications

OSHA has an extensive publications program. For a listing of free or sales items, visit OSHA's website at www.osha.gov or contact the OSHA Publications Office, U.S. Department of Labor, 200 Constitution Avenue, NW, N-3101, Washington, DC 20210. Telephone (202) 693-1888 or fax to (202) 693-2498.

OSHA
www.osha.gov

Contacting OSHA

To report an emergency, file a complaint, or seek OSHA advice, assistance, or products, call (800) 321-OSHA or contact your nearest OSHA regional or area office listed at the end of this publication. The teletypewriter (TTY) number is (877) 889-5627.

You can also file a complaint online and obtain more information on OSHA federal and state programs by visiting OSHA's website at www.osha.gov.

For more information on grants, training, and education, contact the OSHA Training Institute, Office of Training and Education, 2020 South Arlington Heights Rd., Arlington Heights, IL 60005, (847) 297-4810, or see "Outreach" on OSHA's website at www.osha.gov.

OSHA Regional Offices

Region I
(CT,* ME, MA, NH, RI, VT*)
Boston, MA 02203
(617) 565-9860

Region II
(NJ,* NY,* PR,* VI*)
201 Varick Street, Room 670
New York, NY 10014
(212) 337-2378

Region III
(DE, DC, MD,* PA,* VA,* WV)
The Curtis Center
170 S. Independence Mall West
Suite 740 West
Philadelphia, PA 19106-3309
(215) 861-4900

Region IV
(AL, FL, GA, KY,* MS, NC,*
SC,* TN*)
Atlanta Federal Center
61 Forsyth Street SW, Room 6T50
Atlanta, GA 30303
(404) 562-2300

Region V
(IL, IN,* MI,* MN,* OH, WI)
230 South Dearborn Street
Room 3244
Chicago, IL 60604
(312) 353-2220

Region VI
(AR, LA, NM,* OK, TX)
525 Griffin Street, Room 602
Dallas, TX 75202
(214) 767-4731 or 4736 x224

Region VII
(IA,* KS, MO, NE)
City Center Square
1100 Main Street, Suite 800
Kansas City, MO 64105
(816) 426-5861

Region VIII
(CO, MT, ND, SD, UT,* WY*)
1999 Broadway, Suite 1690
P.O. Box 46550
Denver, CO 80202-5716
(303) 844-1600

Region IX
(American Samoa, AZ,* CA,* HI,
NV,* Northern Mariana Islands)
71 Stevenson Street, Room 420
San Francisco, CA 94105
(415) 975-4310

Region X
(AK,* ID, OR,* WA*)
1111 Third Avenue, Suite 715
Seattle, WA 98101-3212
(206) 553-5930

*These states and territories operate their own OSHA-approved job safety and health programs (Connecticut, New Jersey, and New York plans cover public employees only). States with approved programs must have a standard that is identical to, or at least as effective as, the Federal standard.

Note: Please visit www.OSHA.gov or call (800) 321-OSHA for information on OSHA area offices, OSHA-approved state plans, and OSHA consultation projects.

ATTACHMENT 2

FIELD DATA RECORDS

SOIL BORING LOG

MACTEC

511 Congress Street, Portland Maine 04101

Project Name: **Batavia Iron and Metal**			Boring ID:
Project Location: **Batavia, New York**			Page No.
Project No.: **3617137301**	Client: **NYSDEC**		of:
Boring Location:	Refusal Depth:	Total Depth:	Bore Hole ID/OD:
Weather:	Soil Drilled:	Method:	Casing Size:
Subcontractor: **Natures Way**		Protection Level: D	Sampler:
Driller:	Date Started:	Date Completed:	Sampler ID/OD:
Rig Type/Model: Geoprobe	Logged By:	Checked By:	
Reference Elevation:	Water Level:	Time:	

Sample Information			Monitoring	Sample Description and Classification	USCS Group Symbol	Remarks
Depth (feet bgs)	Sample Number	Penetration/ Recovery (feet)	NA			
0.0						

NOTES:

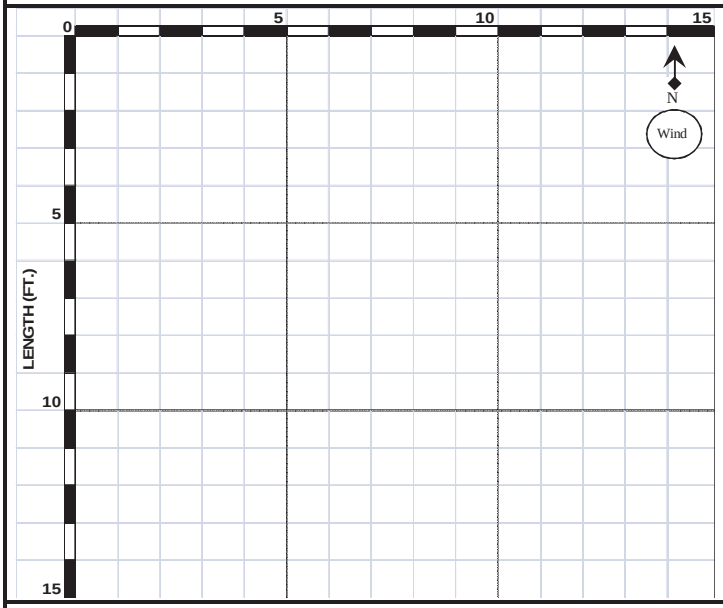
TEST PIT RECORD

MACTEC
511 Congress Street, Portland Maine 04101

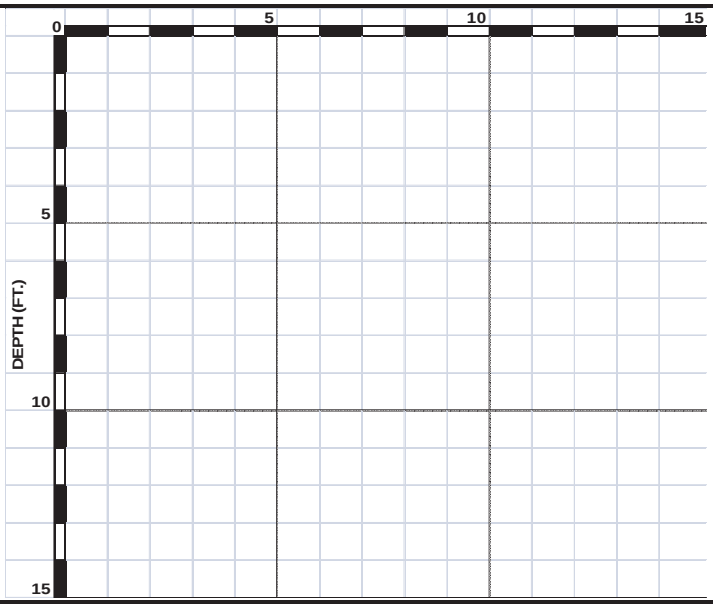
Project Name: Batavia Iron & Metal Site Characterization		Test Pit ID:
Project Location: Batavia NY		Page No.
Project No.: 3617137301	Client: NYSDEC	of:
Test Pit Location:	Monitoring Equipment: Mini-Rae 2000 PID	**Location Sketch** (N, Wind)
Weather:	Photographs (Y/N):	Protection Level: D
Surface Conditions:	Length of Exc:	Width of Exc:
Subcontractor:	Date Started:	Date Completed:
Operator:	Logged By:	Checked By:
Equipment: Back Hoe	Refusal Depth:	Total Depth:
Reference Elevation:	Water Level:	Time:

Sample Information			Monitoring						
Depth (ft. bgs)	Sample No. & Type	Pocket Pen/ Torvane (Kg/cm^2)	PID Field Scan	PID Headspace	Lab Tests Performed	Lab Sample ID	Sample Description and Classification	USCS Group Symbol	Remarks

PLAN VIEW



CROSS-SECTIONAL VIEW



NOTES:

FIGURE 4.3
TEST PIT RECORD
NYSDEC QUALITY ASSURANCE PROGRAM PLAN

WELL DEVELOPMENT RECORD

MACTEC

511 Congress Street, Portland Maine 04101

PROJECT NAME	Batavia Iron and Metal Company
PROJECT NUMBER	3617137301
WELL INSTALLATION DATE	**WELL DEVELOPMENT DATE**

LOCATION ID	**PAGE** OF
START TIME	**START DATE**
END TIME	**END DATE**

WELL DIAMETER (INCHES) ☐ 1-IN. ☐ 2-IN. ☐ 4-IN. ☐ 6-IN. ☐ 8-IN. ☐ OTHER _____

CASING DIAMETER (INCHES) ☐ 4-IN. ☐ 6-IN. ☐ 8-IN. ☐ 10-IN. ☐ 12-IN. ☐ OTHER _____

MEASUREMENT POINT (MP) ☐ TOP OF RISER (TOR) ☐ TOP OF CASING (TOC) ☐ OTHER _____

INITIAL WELL DEPTH (BMP)	FT	**FINAL WELL DEPTH (BMP)**	FT	**SCREEN LENGTH**	FT	**PROT. CASING STICKUP (AGS)**	FT
INITIAL DTW (BMP)	FT	**SEDIMENT REMOVED** (final well depth - initial well depth)	FT	**SCREENED INTERVAL (BMP)**	TO	**TOC/TOR DIFFERENCE**	FT
WATER COLUMN (initial well depth - initial depth to water)	FT	**DTW AFTER DEVELOP. (BMP)**	FT	**PUMPING DEPTH (BMP)**	FT	**PID AMBIENT AIR**	PPM
CALCULATED GAL/VOL (column X well diameter squared X 0.041)	GAL	**FINAL RECOVERY DEPTH (BMP)**	FT	**APPROXIMATE RECHARGE RATE**	FT/MIN	**PID WELL MOUTH**	PPM
TOTAL VOL. PURGED (mL per minute X total minutes X 0.00026 gal/mL)	GAL	**FINAL RECOVERY TIME (elapsed)**	MIN	**FLUIDS LOST DURING DRILLING**	GAL	**END OF WELL DEVELOPMENT SAMPLE TAKEN?**	Y ☐ N ☐

FIELD PARAMETERS

TIME	DTW (ft BMP)	PURGE RATE (mL/min)	TEMP. (°C)	SP. CONDUCTANCE (mS/cm)	pH (units)	DISS. O_2 (mg/L)	TURBIDITY (ntu)	REDOX (mv)	VOLUME PURGED (gal)	TOTAL GALLONS	COMMENTS

EQUIPMENT DOCUMENTATION

☐ DEDICATED SUBMERSIBLE
☐ SURGE BLOCK
☐ BAILER ☐ 2" ☐ _____
☐ GRUNDFOS ☐ 2" ☐ 4"
☐ OTHER

☐ WATER LEVEL METER
☐ PID _____
☐ WQ METER _____
☐ TURB. METER _____
☐ OTHER _____
☐ OTHER _____
☐ OTHER

WELL DEVELOPMENT CRITERIA

	Y	N
Well water clear to the unaided eye?	☐	☐
Sediment thickness remaining in well <1.0% of screen length?	☐	☐
Total water removed = a minimum of 5x calculated well volumes plus 5x drilling fluids lost?	☐	☐
Turbidity < 5NTUs?	☐	☐
10% change in field parameters?	☐	☐

WAS DEVELOPMENT CRITERIA MET? Y ☐ N ☐

ADDITIONAL OBSERVATIONS

PURGE WATER CONTAINERIZED Y ☐ N ☐

NUMBER OF GALLONS GENERATED _____

SKETCH

NOTES

Well Developer Signature:
Checked By:

Print Name:
Date:

FIGURE 4.9
WELL DEVELOPMENT RECORD
NYSDEC QUALITY ASSURANCE PROGRAM PLAN

Water Level Monitoring and Monitoring Well Inspection Checklist
Batavia Iron and Metal Company Site

Inspection Date/Signature:	**Reviewed by (signature and date):**

Location ID	Monitoring Well Depth	Measurement Reference Point on PVC Riser Marked (Y/N)	TOC-TOR Difference (ft.)	Depth to Water (ft.) (TOR)	Depth to BOW (ft.) (TOR)	Well ID Clearly Labeled (Y/N)	Well Lock/Cap (G/F/P)	Protective Casing (G/F/P)	Water in Annular Space (Y/N)	Concrete Pad (G/F/P)	Well Riser/Cap (G/F/P)	Well Obstruction (Y/N)	Comments
MW-1	24.5												
MW-2	22.2												
MW-3	23.7												
MW-4	11.5												
MW-5	8.5												
MW-7	10.0												
MW-8	15.0												
MW-9	15.1												
MW-101	NA												
MW-102	NA												
MW-103	NA												
MW-104	NA												
MW-105	NA												
MW-106	NA												
MW-107	NA												
SP-15	~11.5												

Notes:

MW= Monitoring Well	F = Fair	Poor or notable observations require input into "Comments"
in. = inches	G = Good	BOW = bottom of well
ft. = feet	N = No	NA = not applicable
TOC = top of casing	P = Poor	
TOR = top of riser	Y = yes	

Prepared by: NWV 04/18/18
Checked by: CRS 04/18/18

LOW FLOW GROUNDWATER SAMPLING RECORD

PROJECT NAME Batavia Iron and Metal Company Site	
PROJECT NUMBER 3617137301	
SAMPLE ID	**SAMPLE TIME**

LOCATION ID	**DATE**
START TIME	**END TIME**
SITE NAME/NUMBER 819018	**PAGE** OF

WELL DIAMETER (INCHES) ☐ 1 ☐ 2 ☐ 4 ☐ 6 ☐ 8 ☐ OTHER _____

TUBING ID (INCHES) ☐ 1/8 ☐ 1/4 ☐ 3/8 ☐ 1/2 ☐ 5/8 ☐ OTHER _____

MEASUREMENT POINT (MP) ☐ TOP OF RISER (TOR) ☐ TOP OF CASING (TOC) ☐ OTHER _____

WELL INTEGRITY

	YES	NO	N/A
CAP			
CASING			
LOCKED			
COLLAR			

INITIAL DTW (BMP)	FT	**FINAL DTW (BMP)**	FT	**PROT. CASING STICKUP (AGS)**	FT	**TOC/TOR DIFFERENCE**	FT
WELL DEPTH (BMP)	FT	**SCREEN LENGTH**	FT	**PID AMBIENT AIR**	PPM	**REFILL TIMER SETTING**	SEC
WATER COLUMN	FT	**DRAWDOWN VOLUME** (initial DTW- final DTW X well diam. squared X 0.041)	GAL	**PID WELL MOUTH**	PPM	**DISCHARGE TIMER SETTING**	SEC
CALCULATED GAL/VOL (column X well diameter squared X 0.041)	GAL	**TOTAL VOL. PURGED** (mL per minute X total minutes X 0.00026 gal/mL)	GAL	**DRAWDOWN/ TOTAL PURGED**		**PRESSURE TO PUMP**	PSI

FIELD PARAMETERS WITH PROGRAM STABILIZATION CRITERIA (AS LISTED IN THE QAPP)

TIME 3-5 Minutes	DTW (FT) 0.0-0.33 ft Drawdown	PURGE RATE (mL/min)	TEMP. (°C) (+/- 3 degrees)	SP. CONDUCTANCE (mS/cm) (+/- 3%)	pH (units) (+/- 0.1 units)	DISS. O_2 (mg/L) (+/- 10%)	TURBIDITY (ntu) (+/- 10% <10 ntu)	REDOX (mv) (+/- 10 mv)	PUMP INTAKE DEPTH (ft)	COMMENTS
	BEGIN PURGING									

FINAL STABILIZED FIELD PARAMETERS (to appropriate significant figures[SF])

TEMP.: nearest degree (ex. 10.1 = 10)
COND.: 3 SF max (ex. 3333 = 3330, 0.696 = 0.696)
pH: nearest tenth (ex. 5.53 = 5.5)
DO: nearest tenth (ex. 3.51 = 3.5)
TURB: 3 SF max, nearest tenth (6.19 = 6.2, 101 = 101)
ORP: 2 SF (44.1 = 44, 191 = 190)

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- ☐ PERISTALTIC
- ☐ SUBMERSIBLE
- ☐ BLADDER
- ☐ _____
- ☐ WATTERA
- ☐ OTHER _____
- ☐ OTHER _____

DECON FLUIDS USED
- ☐ LIQUINOX
- ☐ DEIONIZED WATER
- ☐ POTABLE WATER
- ☐ NITRIC ACID
- ☐ HEXANE
- ☐ METHANOL
- ☐ OTHER _____

TUBING/PUMP/BLADDER MATERIALS
- ☐ SILICON TUBING
- ☐ TEFLON TUBING
- ☐ TEFLON LINED TUBING
- ☐ HDPE TUBING
- ☐ LDPE TUBING
- ☐ OTHER _____
- ☐ OTHER _____

- ☐ S. STEEL PUMP MATERIAL
- ☐ PVC PUMP MATERIAL
- ☐ GEOPROBE SCREEN
- ☐ TEFLON BLADDER
- ☐ OTHER _____
- ☐ OTHER _____
- ☐ OTHER _____

EQUIPMENT USED
- ☐ WL METER _____
- ☐ PID _____
- ☐ WQ METER _____
- ☐ TURB. METER _____
- ☐ PUMP _____
- ☐ OTHER _____
- ☐ FILTERS NO. ___ TYPE _____

ANALYTICAL PARAMETERS

	PARAMETER	METHOD NUMBER	FIELD FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	QC COLLECTED	SAMPLE BOTTLE ID NUMBERS
☐								
☐								
☐								
☐								
☐								
☐								
☐								

PURGE OBSERVATIONS

	YES	NO
PURGE WATER CONTAINERIZED	☐	☐
NO-PURGE METHOD UTILIZED	☐	☐

NUMBER OF GALLONS GENERATED _____

If yes, purged approximately 1 standing volume prior to sampling or _____mL for this sample location.

SKETCH/NOTES

Sampler Signature: Print Name:

Checked By: Date:

MACTEC
511 Congress Street, Portland Maine 04101

LOW FLOW GROUNDWATER SAMPLING RECORD

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME: **Batavia Iron and Metal** TASK NO: 03 DATE:
PROJECT NUMBER: **3617137301** MACTEC CREW:
PROJECT LOCATION: **Batavia, New York** SAMPLER NAME:
WEATHER CONDITIONS (AM): SAMPLER SIGNATURE:
WEATHER CONDITIONS (PM): CHECKED BY: DATE:

MULTI-PARAMETER WATER QUALITY METER

METER TYPE
MODEL NO.
UNIT ID NO.

AM CALIBRATION Start Time _____/End Time_____ | **POST CALIBRATION CHECK** Start Time _____/End Time_____

	Units	Standard Value	Meter Value	*Acceptance Criteria (AM)	Standard Value	Meter Value	*Acceptance Criteria (PM)
pH (4)	SU	4.0		+/- 0.1 pH Units			
pH (7)	SU	7.0		+/- 0.1 pH Units	7.0		+/- 0.3 pH Units
pH (10)	SU	10.0		+/- 0.1 pH Units			
Redox	+/- mV	240		+/- 10 mV	240		+/- 10 mV
Conductivity	mS/cm	1.413		+/- 0.5 % of standard	1.413		+/- 5% of standard
DO (saturated)	%	100		+/- 2% of standard			
DO (saturated)	mg/L[1] (see Chart 1)			+/- 0.2 mg/L			+/- 0.5 mg/L of standard
DO (<0.1)	mg/L	<0.1		< 0.5 mg/L			
Temperature	°C						
Baro. Press.	mmHg						

TURBIDITY METER

METER TYPE
MODEL NO.
UNIT ID NO.

	Units	Standard Value	Meter Value	Standard Value	Meter Value	*Acceptance Criteria (PM)
<0.1 Standard	NTU	<0.1		<0.1		+/- 0.3 NTU of stan.
20 Standard	NTU	20		20		+/- 5% of standard
100 Standard	NTU	100		100		+/- 5% of standard
800 Standard	NTU	800		800		+/- 5% of standard

PHOTOIONIZATION DETECTOR

METER TYPE
MODEL NO.
UNIT ID NO.

Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE
MODEL NO.
UNIT ID NO.

Methane	%	50		50		+/- 10% of standard
O_2	%	20.9		20.9		+/- 10% of standard
H_2S	ppmv	25		25		+/- 10% of standard
CO	ppmv	50		50		+/- 10% of standard

OTHER METER

METER TYPE
MODEL NO.
UNIT ID NO.

See Notes Below for Additional Information

☐ Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above.
☐ Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source:
Lot#/Date Produced:
Trip Blank Source:
Sample Preservatives Source:
Disposable Filter Type: 0.45µm cellulose
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L)
- Other
- Other
- Other

	Cal. Standard Lot Number	Exp. Date
pH (4)		
pH (7)		
pH (10)		
ORP		
Conductivity		
<0.1 Turb. Stan.		
20 Turb. Stan.		
100 Turb. Stan.		
800 Turb. Stan.		
PID Span Gas		
O_2-LEL Span Gas		
Other		

NOTES:

* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-FieldCalibrat) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additonal acceptance criteria obtained from instrument specific manufacturer recommendations.
** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.
1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-FieldCalibrat), dated 1/19/2010.

ATTACHMENT 3

FIELD SAMPLING PROTOCOLS TO AVOID CROSS-CONTAMINATION OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

FIELD SAMPLING PROTOCOLS TO AVOID CROSS-CONTAMINATION OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

1.0 PURPOSE

This Standard Operating Procedure (SOP) is to be used on New York State Department of Environmental Conservation (NYSDEC) project sites, in conjunction with the NYSDEC Engineering Services Contract Number D007619 Field Activities & Quality Assurance Program Plan (QAPP) prepared by MACTEC Engineering and Consulting, P.C. (MACTEC, 2011). The purpose of this SOP is to describe the procedures/considerations when collecting soil, sediment, surface water, and groundwater samples at potential per- and polyfluoroalkyl substances (PFAS) release areas. This SOP also describes a tiered approach that should be used to assist with field decisions. Sampling specific SOPs should also be reviewed prior to conducting field sampling activities at PFAS areas.

2.0 SCOPE

This procedure applies to all Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) personnel and subcontractors who collect or otherwise handle samples of soil, sediment, surface water, and groundwater for analysis of PFAS. This SOP should be reviewed by all on-site personnel prior to implementation of field activities.

3.0 REFERENCES

MACTEC, 2011. Field Activities & Quality Assurance Program Plan; Submitted to New York State Department of Environmental Protection; Submitted by MACTEC Engineering and Consulting, P.C. June.

NYSDEC, 2016. Collection of Groundwater Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) from Monitoring Wells- Sample Protocol. Revision 1.2 June 29, 2016

4.0 GENERAL

Given the low detection limits associated with laboratory PFAS analysis, and the many potential sources of trace levels of PFAS, field personnel are advised to act on the side of caution by strictly following the subject protocols, frequently replacing nitrile gloves, and rinsing field equipment to help mitigate the potential for false detections of PFAS. Specific items related to field sampling are discussed below.

5.0 PROCEDURES

This section contains both the responsibilities and procedures involved with field sampling for analysis of PFAS. Proper procedures are necessary to insure the quality and integrity of the samples. The details within this SOP should be used in conjunction with site-specific work plans. The site-specific work plans will generally provide the following information:

- Sample collection objectives;
- Locations to be sampled;
- Number and volume of samples to be collected at each location;
- Types of chemical analyses to be conducted for the samples;
- Specific quality control (QC) procedures, including type (MS/MSD, field duplicates, and blanks) and sampling required;
- Any additional sampling requirements or procedures beyond those covered in this SOP, as necessary; and,
- At a minimum, the procedures outlined in this SOP for field sampling will be followed.

5.1 RESPONSIBILITIES

Project Manager

The Project Manager shall provide the Quality Assurance Program Plan (QAPP)(MACTEC, 2011), and site-specific work plan to the Field Lead and Field Personnel, which shall include the sampling requirements for each investigation area. The Project Manager will detail deviations to the procedure provided in this SOP in the site-specific report.

Field Lead

The Field Lead shall ensure that samples are collected using procedures that are in accordance with the QAPP (MACTEC, 2011), site-specific work plans, and applicable SOPs. The Field Lead shall also be required to make rational and justifiable decisions when deviations from these procedures are necessary because of field conditions or unforeseen issues and report the deviations to the Project Manager.

Field Personnel

Field personnel assigned to sampling activities are responsible for completing their tasks according to specifications outlined in the QAPP (MACTEC, 2011), site-specific work plans,

applicable SOPs, and other appropriate procedures. Field personnel are responsible for reporting deviations from procedures to the Project Manager.

5.2 FIELD PROCEDURES/CONSIDERATIONS

The following are procedures/considerations to be made during field activities at potential PFAS release or sampling areas. A summary of the prohibited and acceptable items for PFAS investigation areas is included in Table 1. A checklist, provided as Attachment 1, shall be used by the Field Personnel daily prior to the commencement of fieldwork to ensure the field team is in compliance with this protocol.

Field Equipment

- **Do not use Teflon®-containing materials** (e.g., Teflon® tubing, bailers, tape, plumbing paste, or other Teflon® materials) since Teflon® contains fluorinated compounds.
- Sample containers and collected samples will be stored and shipped using dedicated coolers provided by the laboratory.
- Stainless steel, high-density polyethylene (HDPE), polypropylene, and silicon materials are acceptable for sampling. Samples should not be collected with tubing or stored in containers made of low-density polyethylene (LDPE) materials (fluorinated compounds are known to adsorb to LDPE). All sampling equipment components and sample containers should not come in contact with aluminum foil, LDPE, glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.
- Amec Foster Wheeler will use peristaltic pumps for groundwater sample collection at depths shallower than 25 feet. Amec Foster Wheeler will use ProActive SS Pumps with polyvinyl chloride (PVC) leads or Geotech SS Geosub pumps for groundwater sample collection at depths greater than 25 feet. These pumps are constructed with stainless steel and will minimize introductions of PFAS. However, for groundwater sample depths greater than 150 feet, a Grundfos RediFlo pump (or similar) may be used due to the pumping limitations of stainless steel pumps. PFAS-free bladder pumps may also be used for sampling. Whale® pumps can be used for well development, if needed, but should not be used for sampling, or left in the wells.
- When using liners to collect soil samples during direct-push technology or during conventional drilling and sampling methodologies, acetate liners are to be used.
- **Rite in the Rain products are the only waterproof field books that may be used**. To avoid plastic coating or glue materials, do not use other brands of waterproof field books. If Rite

in the Rain products are not available, field reports will be documented on loose paper secured on masonite or aluminum clipboards (i.e. plastic clipboards, binders, or spiral hard cover notebooks are not acceptable) using a pen or pencil.

- **Post-It Notes are not allowed** on project sites.
- Use ballpoint pens. Pens will be used when documenting field activities in the field log and on field forms as well as labeling sample containers and preparing the Chain of Custody.
- **Do not use chemical (blue) ice packs** during the sampling program. This includes the use of ice packs for the storage of food and/or samples.

Field Clothing and Personal Protective Equipment

- **Do not wear water resistant, waterproof, or stain-treated clothing** during the field program. Field clothing made of synthetic and natural fibers (preferably cotton) are acceptable. Field clothing should be laundered without the use of fabric softener. Preferably, field gear should be cotton construction and well laundered (i.e., washed a minimum of three times prior to use after purchase). New clothing may contain PFAS related treatments. **Do not use new clothing** while sampling or sample handling.
- **Do not wear clothing or boots containing Gore-Tex™** during the sampling program as it contains a PFAS membrane.
- Safety footwear will consist of steel-toed boots made with polyurethane and PVC, untreated leather boots, or well-worn leather boots. Newer leather boots may be worn if they are covered with polypropylene, polyethane, or PVC boot covers.
- Disposable nitrile gloves must be worn at all times. Further, a new pair of nitrile gloves shall be donned prior to the following activities at each sample location:
  - Decontamination of re-usable sampling equipment;
  - Prior to contact with sample bottles or water containers;
  - Insertion of anything into the well (e.g., HDPE tubing, HydraSleeve bailer, etc.);
  - Insertion of silicon tubing into the peristaltic pump;
  - Completion of monitor well purging, prior to sample collection;
  - Handling of any quality assurance/quality control samples including field blanks and equipment blanks; and,
  - After the handling of any non-dedicated sampling equipment, contact with non-decontaminated surfaces, or when judged necessary by field personnel.

Sample Containers

- Different laboratories may supply sample collection containers of varying sizes dependent on the type of media to be sampled (e.g., soil, groundwater, etc.). All samples should be collected in polypropylene or HDPE bottles. The screw cap will be made of polypropylene or HDPE and may be lined or unlined. However, if lined, the liner may not be made of Teflon® or contain PFAS.
- Container labels will be completed using pen after the caps have been placed back on each bottle.
- Glass sample containers are not to be used due to potential loss of analyte through adsorption.

Wet Weather

- Field sampling occurring during wet weather (e.g., rainfall and snowfall) should be conducted while wearing appropriate clothing that will not pose a risk for cross-contamination. Teams will avoid synthetic gear that has been treated with water-repellant finishes containing PFAS. Use rain gear made from polyurethane, vinyl, and wax or rubber-coated materials.
- Teams should consider the use of a gazebo tent, which can be erected overtop of the sample location and provide shelter from the rain. It should be noted that the canopy material is likely a treated surface and should be handled as such; therefore, gloves should be worn when setting up and moving the tent, changed immediately afterwards and further contact with the tent should be avoided until all sampling activities have been finished and the team is ready to move on to the next sample location.

Equipment Decontamination

- Field sampling equipment, including oil/water interface meters and water level indicators, and other downhole equipment used at each sample location, will require cleaning between uses. Alconox® and Liquinox® soap is acceptable for use since the Safety Data Sheets do not list fluoro-surfactants as an ingredient (do not use Liquinox® soap if also sampling for 1,4-dioxane). However, Decon 90 will not be used during decontamination activities. Water used for the final rinse during decontamination of sampling equipment will be laboratory certified “PFAS-free” water.
- For larger equipment (e.g., drill rig and large downhole drilling and sampling equipment), decontamination will be conducted with potable water using a high-pressure washer and then rinsed using potable water.

Groundwater Sampling

- At sites with dedicated sampling equipment installed in the wells that contains Teflon (e.g., tubing, pumps), this equipment should be removed from the wells and replaced with HDPE tubing and non-Teflon containing equipment, if possible. These wells will be re-developed by removing three well volumes of water, if possible, and letting the wells recover for at least 48 hours prior to sampling.
- At sites with dedicated sampling equipment installed in the wells that contain LDPE tubing, this tubing should be removed from the wells and replaced with HDPE tubing. These wells can be sampled immediately following replacement of tubing; however, attempts should be made to remove one well volume prior to sampling. For larger wells, with higher volumes of water, it may be preferable to redevelop the wells and remove one well volume with a higher volume pump. In such cases the wells should be allowed to recover for at least 48 hours prior to sampling.

Personnel Hygiene

- Field personnel will not use cosmetics, moisturizers, hand cream, or other related products as part of their personal cleaning/showering routine on the morning of a sampling event, unless the products are applied to a part of the body that will be coved by clothing. These products may contain surfactants and represent a potential source of PFAS.
- All clothing worn by sampling personnel must have been laundered multiple times.
- Many manufactured sunblock and insect repellants contain PFAS and should not be brought or used on-site. Sunblock and insect repellants that are used on-site should consist of 100% natural ingredients, unless previously vetted by the project chemist. A list of acceptable sunscreens and insect repellents is provided in Table 1.
- For washroom breaks, field personnel will leave the exclusion zone and then remove gloves and overalls. Field personnel should wash as normal with extra time for rinsing with water after soap use. When finished washing, the use of a mechanical dryer is preferred and the use of paper towel for drying is to be avoided (if possible).

Food Considerations

- No food or drink shall be brought on-site, with the exception of bottled water and hydration drinks (e.g., Gatorade® and Powerade®), which will only be allowed to be brought and consumed within the staging area.

Visitors

- Visitors to the investigation area are asked to remain outside of the exclusion zone during sampling activities.

6.0 TIERED APPROACH TO ASSIST WITH FIELD DECISIONS

In evaluating whether products contain PFAS and are suitable for use in the field, the tiered approach presented in Table 2 will be used to assist with field decisions. Any member of the field team should contact the Project Manager with questions.

Table 1. Summary of Prohibited and Acceptable Items for PFAS Sampling

Prohibited Items	Acceptable Items
Field Equipment	
Teflon® containing materials	High-density polyethylene (HDPE) materials
Storage of samples in containers made of LDPE materials	Acetate liners, HDPE bottles
Teflon® tubing	HDPE or silicon tubing
Waterproof field books not manufactured by Rite in the Rain	Rite in the Rain products or Loose paper (non-waterproof)
Plastic clipboards, binders, or spiral hard cover notebooks	Aluminum field clipboards or with Masonite
Sharpies®, if possible	Ballpoint pens
Post-It Notes	
Chemical (blue) ice packs	Regular ice
Excel Purity Paste TFW Multipurpose Thread Sealant Vibra-Tite Thread Sealant	Gasoils NT Non-PTFE Thread Sealant Bentonite
Equipment with Viton Components (need to be evaluated on a case by case basis, Viton contains PTFE, but may be acceptable if used in gaskets or O-rings that are sealed away and will not come into contact with sample or sampling equipment.)	
Field Clothing and PPE	
New clothing or water resistant, waterproof, or stain-treated clothing, clothing containing Gore-Tex™	Well-laundered clothing, defined as clothing that has been washed 6 or more times after purchase, made of synthetic or natural fibers (preferable cotton)
Clothing laundered using fabric softener	No fabric softener
Boots containing Gore-Tex™	Boots made with polyurethane and PVC, well-worn or untreated leather boots, leather boots with boot covers
	Reflective safety vests, Tyvek®, Cotton Clothing, synthetic under clothing, body braces
No cosmetics, moisturizers, hand cream, or other	**Sunscreens** - Alba Organics Natural Sunscreen, Yes To

related products as part of personal cleaning/showering routine on the morning of sampling, unless the products are applied to body parts that will be covered by clothing.	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, Herbal Armor, California Baby Natural Bug Spray, BabyGanics, Deep Woods Off **Sunscreen and insect repellant -** Avon Skin So Soft Bug Guard Plus – SPF 30 Lotion
Sample Containers	
LDPE or glass containers	HDPE or polypropylene
Teflon®-lined caps	Lined or unlined HDPE or polypropylene caps
Rain Events	
Waterproof or resistant rain gear	Polyurethane, vinyl, wax or rubber-coated rain gear. Gazebo tent that is only touched or moved prior to and following sampling activities
Equipment Decontamination	
Decon 90	Alconox® and/or Liquinox® (Do not use Liquinox® if also sampling for 1,4-dioxane).
Water from an on-site well	Potable water from municipal drinking water supply
Food Considerations	
All food and drink, with exceptions noted on the right	Bottled water and hydration drinks (i.e. Gatorade® and Powerade®) to be brought and consumed only in the staging area

Table 2. Tiered Approach

Tier and Description	Action
Tier 1: Products that *will come into direct contact* with field samples include, but are not limited to, drilling grease, sampling equipment, sample containers, and well construction materials	These products will undergo the greatest scrutiny and requires chemist's input to help evaluate the materials as a possible source of contamination[A] and as possible sampling or storage materials or both
Tier 2: Products that *will not come into direct contact* with samples, but could be *reasonably expected to contain PFAS*, such as waterproof or nonstick products	Project team/affected person can review the Safety Data Sheet (SDS)[B] and if it shows PFAS, product should not be used. If product SDS does not indicate PFAS, confirm with chemist before use
Tier 3: Products that *will not come into direct contact* with samples and are *not expected to contain PFAS*, such as ballpoint pens, zipper bags, and body braces	Project team/affected person can review SDS and if no PFAS, then appropriate to use

[A] Tier 1 products will undergo the closest scrutiny. It may be necessary to have Tier 1 products analyzed for PFAS to confirm that a specific batch or lot number does not contain PFAS. Alternate products will need to be evaluated/used if PFAS are identified in the product.

[B] SDS Check: To evaluate product SDS and/or manufacturing specs, check if the product contains anything with "fluoro" in the name or the acronyms TPE, FEP, ETFE, and/or PFA. If fluorinated compounds are not listed in the manufacturing specs and/or on the SDSs, product can be used.

Attachment 1
Daily PFAS Protocol Checklist

Date: _____ Installation Name: _____

Weather (*temp./precipitation*): _____ Investigation Area:_____

Field Clothing and PPE:

☐ Field crew in compliance with Tables 1 and 2 in SOP

☐ Field crew has not used fabric softener on clothing

☐ Field crew has not used cosmetics, moisturizers, hand cream, or other related products on exposed body parts this morning

☐ Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

☐ No Teflon® containing materials on-site

☐ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene

☐ No waterproof field books on-site other than Rite in the Rain products

☐ No plastic clipboards, binders, or spiral hard cover notebooks on-site

☐ No adhesives (Post-It Notes) on-site

☐ Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

☐ All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE

☐ Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

☐ For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of vinyl, polyurethane, PVC, wax or rubber- coated materials only

Equipment Decontamination:

☐ "PFAS-free" water on-site for decontamination of sample equipment

☐ Alconox and Liquinox to be used as decontamination materials (Do not use Liquinox if also sampling for 1,4-dioxane).

Food Considerations:

☐ No food or drink on-site with exception of bottled water and/or hydration drinks (e.g., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFAS sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

_____

_____

_____

Field Lead Name: _____

Field Lead Signature: _____ Time: _____