ESC ENGINEERING OF NEW YORK, P.C.
11911 Freedom Drive, Suite 900 • Reston, Virginia 20190 • (703) 709-6500 • Fax (703) 709-8505

SAMPLING WORK PLAN
SLAG LANDFILL

FORMER AL TECH SPECIALTY STEEL
SLAG DISPOSAL FACILITY
WATERVLIET, NEW YORK

PREPARED

BY

ESC ENGINEERING OF NEW YORK, P.C.

APRIL 11, 2006
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Contents

Acronym List

bgs	below ground surface
CFR	Code of Federal Regulations
COI	constituent of interest
CQA	construction quality assurance
FCR	field change request
HASP	Health and Safety Plan
NCR	non-conformance report
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
SSALs	Site Specific Action Levels
TAGM	Technical and Administrative Guidance Memorandum
TCLP	toxicity characteristic leaching procedure

1.0 Introduction

ESC Engineering of New York, P.C., has prepared this Work Plan in accordance with the requirements of the New York State Department of Environmental Conservation (NYSDEC) Solid Waste Management Regulations. This Work Plan has been prepared at the request of Watervliet Development to provide the procedures for collection of samples of materials contained in a stainless steel slag landfill located in Watervliet, New York (Figure 1).

The stainless steel slag landfill is a portion of the Waste Management Area (WMA), which is included in the New York State Registry of Inactive Hazardous Waste sites. It is listed as a Class 2 Site due to the commingling of industrial waste, construction and demolition debris, and a listed hazardous waste. The proposed actions under this Sampling Work Plan and the future Environmental Restoration Plan will not include the hazardous waste cell at the WMA. The proposed sampling and Environmental Restoration Plan are intended to address only the stainless steel slag and construction and demolition debris. The hazardous waste cell will remain intact throughout these activities and after the remaining areas have been restored.

Watervliet Development's goal is to develop a sustainable Environmental Restoration Process that does not require funding from the AL Tech/RealCo Trust. If the sampling and testing is successful it is Watervliet Development's intention to produce an Environmental Restoration Plan that provides the following benefits to the community: (1) recycle the metals that would otherwise be waste in the existing non-hazardous waste landfill of the WMA; (2) provide a beneficial use material that could restore a portion of the former AL Tech Specialty Steel Site, (3) restore a portion of the current landfill property for unrestricted use, and (4) reduce the cost of the perpetual care that will be required for both the WMA and Steel Mill Site.

The purpose of the sampling is to obtain slag material to perform a metals content assay for possible recovery, and to evaluate whether the residual from the recovery process is eligible for a beneficial use determination in accordance with NYSCDEC Subpart 360-1-15. This work plan describes the techniques to be used to collect the samples from the closed landfill as well as the protocols to insure the sampling locations maintain the integrity of the capping system after the repair.

ESC Engineering will provide oversight for the sampling of the slag. A drilling contractor will be subcontracted to ESC Engineering and will serve as the construction/sampling contractor (Contractor) responsible for conducting the majority of the field work. Statements of Capabilities for ESC Engineering are provided in Appendix A.

2.0 Site Description

The site is located in the town of Colonie, Albany County, New York (Figure 1). The former steel producing facility consists of two separate areas, the Main Plant Area and the Waste Management Area (WMA). The WMA occupies 50 acres. The site is that portion of the WMA used for slag disposal only. The hazardous waste containment cell is not part of the site and shall not be disturbed during this sampling program.

The WMA is bound on the south by Spring Street Road. Undeveloped property borders the WMA to the west and east. Residential development is located immediately west of the WMA. The Kromma Kill forms the northern boundary of the WMA.

The adjacent properties are typically zoned industrial, although there are a limited number of residences and commercial enterprises present east of the WMA and north of the Main Plant Area, and the cemetery are zoned appropriately for its use. Residential development was completed immediately west of the WMA in 2000.

2.1 Site Operations

The Watervliet, New York facility was used for steel producing and semi-finishing activities such as, carbon, alloy, stainless, heat resistant, and tool steel production. The steels were shipped for finishing elsewhere or semi-finished and finished into seamless tubing at the site.

Ludlum Steel and Spring Company began manufacturing operations at the site in 1907. Spring production subsequently ceased and, in 1925, the company changed its name to Ludlum Steel Company. In 1929, the company merged with Atlas Alloy Steel Company of Dunkirk, New York, and, in 1938, Ludlum Steel Company merged with Allegheny Steel Company, of Pittsburgh, Pennsylvania to form the Allegheny Ludlum Steel Company (Allegheny Ludlum).

Allegheny Ludlum continued to operate the facility to 1976, when it was purchased by AL Tech Specialty Steel Corporation. Between 1981 and 1989, the company was owned by GATX and Rio Algom. In 1989, Rio Algom sold the company to Sammi Steel, Ltd. (Sammi), of Korea. AL Tech ceased manufacturing operations in 1998. The AL Tech organization ceased to exist effective November 1, 1999.

The company's remaining assets and environmental liabilities are now owned and managed by RealCo.

2.2 Regulatory History

From 1957 to 1996, the facility used the WMA for disposal of process by-products and waste products. The landfill is estimated to cover approximately 30 of the WMA's 50 acres. Materials that were historically disposed in the WMA included slag, casting sand, metal scrap, electric arc furnace emission control "baghouse" dust, lime-neutralized waste pickle liquor sludge, and demolition debris. Disposal of baghouse dust ceased on the effective date of RCRA. Disposal of all other materials ceased by 1996.

In 1979, prior to the promulgation of RCRA, a surface impoundment was constructed at the toe of the landfill area's southern boundary to collect leachate generated from the landfill. The NYSDEC and the U.S. EPA later determined that the impoundment was subject to the requirements of RCRA because a contributing source to leachate may have been electric arc furnace dust. Consequently, AL Tech was required to submit a RCRA Part A permit application for the unit in 1980; the impoundment was then operated under interim status from 1980 to 1988. In lieu of submitting a RCRA Part B permit application, AL Tech elected to close the surface impoundment. The closure was completed in 1988 in accordance with RCRA and a closure plan approved by the NYSDEC.

The NYSDEC issued a RCRA Post-Closure Permit (Permit) for the closed surface impoundment at the facility, in accordance with 6 NYCRR and the RCRA Corrective Action Program. The Permit (NYSDEC No. 4-1026-11/27/-0) applies to both the Main Plant Area and the WMA (Figure 1). In August 1995, the Order was issued by the NYSDEC in a joint effort with AL Tech, to bring both AL Tech's Watervliet and Dunkirk, New York, facilities into full compliance with applicable environmental laws and regulations and to provide a mechanism for insuring the funding of actions necessary to meet this objective consistent with the RCRA Corrective Action Program. The Order supplements the requirements established in the Permit.

The portion of the landfill that is the subject of this Work Plan was only used to dispose of stainless steel slag. The landfill was screened to remove large pieces of metal, regarded and closed in accordance with the approved closure plan in 2004. A site plan is presented in Figure 2.

The landfill cover consists of the following layers (from the top):

- Vegetative cover
- Topsoil
- Clay (BPL)

- Geotextile Drainage
- Geomembrane
- Geosynthetic Clay Liner (EAF area)
- Filter Fabric
- Intermediate Cover (Slag Material)
- Geotextile
- Gravel

The slag is below the geotextile and is approximately 15 to 20 feet thick.

3.0 Work Plan

The sampling of slag will be conducted in 10 locations on the landfill, as shown on Figure 2. The following sections describe the sampling procedure.

3.1 Sampling Procedure

Sampling of the slag will require the removal of small portions of the existing cover at each of the ten sampling locations; collection of a sufficiently large sample to allow both an assay and BUD analysis; and repair of the cover.

3.1.1 Landfill Cover Removal

The landfill cover will be carefully removed before slag sampling can be conducted. The following steps will be taken to carefully remove the cover components prior to sampling:

1. A three to four foot square of the vegetative cover will be removed as sod and stockpiled or reuse after sampling and cover repair has been completed.
2. Topsoil and clay will be removed and stockpiled to expose the geotextile drainage layer.
3. A two to three foot square of the geotextile drainage layer, the geomembrane layer, the geosynthetic clay liner, and the filter fabric will be cut from the liner to expose the intermediate cover.
4. The intermediate cover (slag material) will be removed and stockpiled to expose the geotextile.
5. An 18-inch square will be cut from the geotextile.
6. The gravel layer will be removed and stockpiled.

3.1.2 Slag Sample Collection

After the landfill cover has been removed, solid flight augers will be advanced to collect a slag sample. Care will be taken during drilling so that the augers do not touch the geomembrane or geotextile. Slag will be collected as material is brought to the surface on the solid flight augers.

If dust is being generated during drilling, water will be used to control dust outside of the sample zone only. The use of water will be limited to control movement of dust outside the work zone. Water will not be applied directly to the sample or the sample location.

Each sample will contain approximately 300 pounds of slag. Each assay sample will be placed in a steel container for shipment within two days to Paradigm Environmental Services in Rochester, New York. Each BUD sample will be prepared for and shipped on the day it is recovered. Each BUD sample will be analyzed for the following: volatile organic compounds by EPA 8260B, semi-volatile organic compounds by EPA 8270C, pesticides by EPA 8081A, PCBs by EPA 8082, and toxic metals by EPA6010B (arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc). After sample collection is completed, any extra drill cuttings/sample will be placed back in the borehole before the cover system is repaired. As a result all materials from under the cover will be either shipped to the laboratory or placed under the cover on the same day they are managed.

3.1.3 Cover Repair

The borehole will be filled to the level of the geotextile with slag, and supplemented with sand and gravel. The slag and supplemental materials will be tamped as they are placed. A replacement piece of geotextile will be placed on the area removed. The geotextile cannot overlap the existing fabric without disturbing additional membrane materials, so the patch will wrap up the sides of the hole. The stockpiled intermediate cover (slag materials) will be placed above the geotextile to the level of the filter fabric. Replacement pieces of the filter fabric layer and the geosynthetic clay liner (EAF area only) will be placed over the removed area one at a time, with the patches wrapping up the sides of the hole. The geomembrane will be patched using the procedures outlined in Appendix B. After the geomembrane is replaced, the geotextile drainage layer will be replaced with a patch that wraps up the side of the hole. Stockpiled clay and topsoil will be replaced, followed by the sod. Each sample location will be marked with a stake, and the location of the stake shall be surveyed to allow location in the future if necessary. Any ruts will be filled in and seeded.

3.2 Regulatory Requirements

Work performed under this contract shall comply with applicable federal, state, and local safety and occupational health laws and regulations. This includes, but is not limited to, Occupational Health and Safety Administration (OSHA) standards, 29 Code of Federal Regulations (CFR) 1910.120, "Hazardous Waste Site Operations and Emergency Response" and 29 CFR 1926.65, "Hazardous Waste Site Operations and Emergency Response." Where the requirements of this Work Plan, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

3.3 Safety and Health Program

OSHA Standards 29 CFR 1910.120(b) and 29 CFR 1926.65(b) require employers to develop and implement a written Health and Safety Program for employees involved in hazardous waste operations. The site-specific program requirements of the OSHA Standards shall be integrated into one site-specific document, the HASP. The HASP shall interface with the employer's overall Health and Safety Program. Any portions of the overall Health and Safety Program that are referenced in the HASP shall be included as appendices to the HASP.

3.4 Site Health and Safety Plan

A HASP will be prepared to cover the work to be performed by the Contractor and all subcontractors. The Health and Safety Manager shall be responsible for the implementation and oversight of the HASP. The HASP shall establish, in detail, the protocols necessary for the anticipation, recognition, evaluation, and control of hazards associated with each task performed. The HASP will address site-specific health and safety requirements and procedures based upon site-specific conditions. The level of detail provided in the HASP will be tailored to the type of work, complexity of operations to be performed, and hazards anticipated.

A copy of the written HASP shall be maintained onsite. As work proceeds, the HASP shall be adapted to new situations and new conditions. Changes and modifications to the accepted HASP shall be made with the knowledge and concurrence of the Health and Safety Manager, the Site Superintendent, and the Engineer. Should any unforeseen hazard become evident during the performance of the work, the Site Health and Safety Officer shall bring such hazard to the attention of the Health and Safety Manager, the Site Superintendent, and the Engineer, both verbally and in writing, for resolution as soon as possible. In the interim, necessary action shall be taken to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of the accepted HASP shall be cause for stopping work until the matter has been rectified.

Topics required by 29 CFR 1910.120(b) (4) and 29 CFR 1926.65 (b) (4) and those described in this section have been addressed in the HASP. Where the use of a specific topic is not applicable to the project, the HASP includes a statement to justify its omission or reduced level of detail and establish that adequate consideration was given the topic. The following topics have been addressed:

- health and safety organization
- site description and hazard evaluation
- health and safety risk or hazard analysis
- provisions for employee training
- use of personal protective equipment
- medical surveillance requirements
- air monitoring requirements (personnel and community)
- site control measures
- personnel and equipment decontamination procedures
- standard operating work practices
- confined space entry procedures
- emergency response procedures
- first aid procedures
- temperature extremes monitoring

Action levels shall be established for the situations listed below, at a minimum. The action levels and required actions (engineering controls, changes in personal protective equipment [PPE], etc.) have been presented in the HASP in both text and tabular form.

- implementation of engineering controls and work practices
- upgrade or downgrade in level of personal protective equipment
- work stoppage and/or emergency evacuation of onsite personnel

- prevention and/or minimization of public exposures to hazards created by site activities

The Site HASP details the minimum PPE ensembles (including respirators) and specific materials from which the PPE components are constructed for each site-specific task and operation to be performed based upon the hazard/risk analysis. Components of levels of protection (B, C, D, and modifications) must be relevant to site-specific conditions, including heat and cold stress potential and safety hazards. Only respirators approved by the National Institute for Occupational Safety and Health shall be used. Onsite personnel shall be provided with appropriate personal protective equipment. Protective equipment and clothing shall be kept clean and well maintained. The PPE section of the HASP shall include site-specific procedures to determine PPE program effectiveness and for onsite fit-testing of respirators, cleaning, maintenance, inspection, and storage of PPE.

The Health and Safety Manager shall establish appropriate levels of protection for each work activity based on review of historical site information, existing data, an evaluation of the potential for exposure (inhalation, dermal, ingestion, and injection) during each task, past air monitoring results, and a continuing health and safety monitoring program. The Health and Safety Manager shall also establish action levels for upgrade or downgrade in levels of PPE from the specified levels of protection. Protocols and the communication network for changing the level of protection shall be described in the HASP. The PPE reassessment protocol shall address air monitoring results, potential for exposure, changes in site conditions, work phases, job tasks, weather, temperature extremes, individual medical considerations, etc.

At a minimum, the personal breathing zone and downwind perimeters of the work areas shall be monitored using real-time dust and vapor monitoring equipment. Action levels for airborne dust and vapor shall be determined for each constituent of interest (COI). Action levels to trigger dust operations shall not be less than 380 micrograms per cubic meter (g/m^3) average 1-hour standard (equivalent to 150 g/m^3 for assessing 24-hour standard) or visible dust near the fence line.

3.5 Equipment Decontamination

Vehicles and equipment that come into contact with affected media shall be decontaminated prior to leaving the exclusion zone established for the Site(s). The procedures for decontamination of vehicles and equipment are addressed in the HASP.

4.0 Quality Control and Quality Assurance

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system. The quality control system shall consist of an organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction and drilling operations. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Engineer for non-compliance with the quality requirements specified in the contract and work plans. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Engineer, and shall be responsible for all construction and construction related activities at the site. The work shall conform to the documents approved for construction.

4.1 Data Quality Requirements and Assessments

DQOs are quantitative and qualitative statements specifying the quality of environmental data required to support the decision making process. DQOs define the total uncertainty in the data that is acceptable for each activity. This uncertainty includes both sampling error and instrument error. The overall objective is to keep the total uncertainty within an acceptable range that will not limit the intended use of the data. This objective will be achieved by establishing specific data quality requirements such as detection limits, criteria for accuracy and precision, data comparability, and data completeness. Data quality requirements and assessments consistent with the projected data use have been developed. The requirements and assessments applicable to the analytical laboratory for water and soil sample analyses are described in this section.

4.1.1 Chemical Analyses and Quality Assurance Protocols

Slag samples collected during the investigation will be analyzed using approved EPA methods included in SW-846 (3rd Edition), including updates, other EPA manuals, or promulgated regulations. The proposed analytical methods for the solid samples, including the associated analytes and practical quantitation limits, are summarized in Table 1. The DQOs for precision, accuracy, and completeness will be based on the QC requirements stipulated by the analytical methods. The sample containers, preservatives, and holding times for each analysis are summarized in Table 2. For purposes of QC, a minimum of 5 percent of all samples collected in the field for laboratory analyses will be replicated (in this case there will be 1 duplicate sample for the 10 samples of slag collected). These duplicates are “blind” to the laboratory. Laboratory duplicates will also be analyzed at the rate of 1 per every 10 samples.

The accuracy of analytical techniques and instrument calibration is monitored through the use of calibration standards. QC checks, such as the analysis of equipment blanks and trip blanks, will provide guidance and will ascertain the integrity of the analyses. Equipment blanks will be prepared at a rate of one per equipment type per decontamination event, not to exceed one per day. A trip blank will be submitted with each batch of aqueous or soil samples shipped to the laboratory for analysis of VOCs.

The sample matrices (i.e., slag) will be examined to evaluate their effect on the analytical protocol. Examination will be performed by analysis of 1 matrix spike/matrix spike duplicate (MS/MSD) for every 20 samples of the same matrix. As less than 20 samples of a given matrix are to be collected, 1 MS/MSD will be collected.

Laboratory QC reference samples are integrated into the analytical scheme to assess accuracy and precision. All laboratory QC samples are to be analyzed according to the same protocols as the investigative samples, including all dilutions, spikes, and processing. QC reference samples will be evaluated based on the EPA acceptance criteria specified in SW-846. Laboratory blanks are to be analyzed with each run to detect container, sample preparation, reagent, or system contamination.

4.1.2 Field Investigation Quality Requirements

The field investigation objective for collecting samples is to maximize the confidence in the data in terms of precision, accuracy, completeness, and comparability. This QAPP presents the frequency with which field duplicates and blanks will be collected such that a certain degree of precision and accuracy can be calculated. The DQOs for field duplicates are to achieve precision equal to or greater than laboratory duplicate precision requirements specified in SW-846. The DQO, for the completeness of data, with respect to sampling, is 100 percent. It is anticipated that there may be deficiencies. However, every effort will be made to obtain valid data for all sampling points. Deficiencies will be discussed with appropriate personnel and a determination will be made as to whether they affect the numerical accuracy of the data and the objectives of the project.

4.2 Data Quality Assurance Assessment

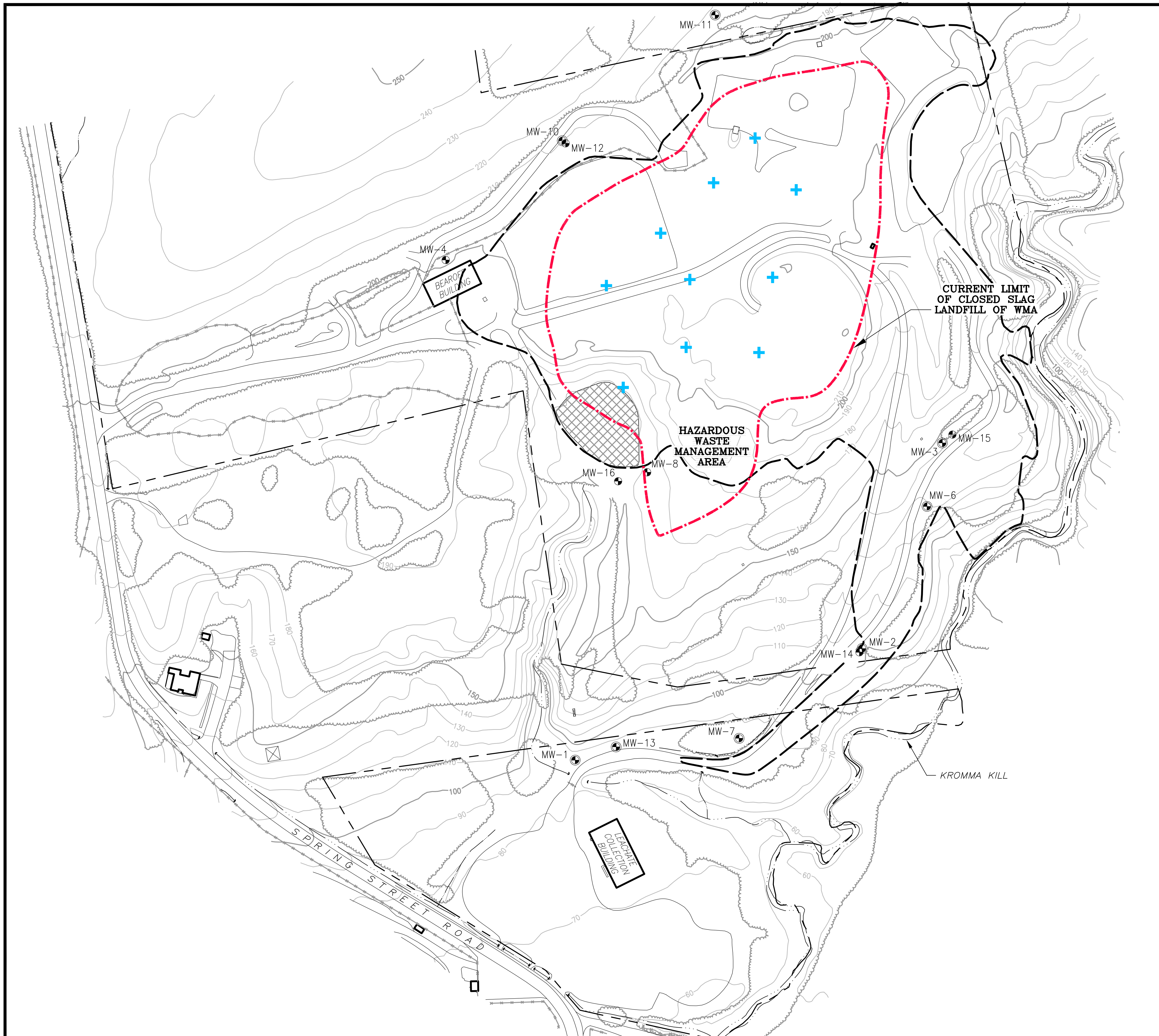
All data will be reported completely. No data will be omitted unless an error occurred in the analyses or the run was invalidated because of QC sample recovery or poor precision.

Method-specific requirements for accuracy and precision will be followed. Data precision is routinely evaluated based on the results of the samples analyzed in duplicate. The range is calculated and then divided by the average of the two analyses. When multiplied by 100, this value equals the relative percent difference (RPD). The RPD of duplicates in each data set are compared with method-specific precision requirements.

5.0 Schedule

After approval of the work plan by the NYSDEC, ESC Engineering anticipates that work plan will take approximately 5 days to complete.

Figures



LEGEND

- PROPOSED SAMPLING LOCATION
- MW-8 — OVERBURDEN MONITORING WELL LOCATION AND DESIGNATION
- MW-7 — BEDROCK MONITORING WELL LOCATION AND DESIGNATION
- FENCE LINE
- PROPERTY LINE
- APPROXIMATE LIMITS OF FORMER WASTE PLACEMENT
- CLOSED SURFACE IMPOUNDMENT
- APPROXIMATE LIMITS OF REGRADED WMA

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. ALL SAMPLING LOCATIONS ARE APPROXIMATE AND MAY BE CHANGED DUE TO FIELD CONDITIONS.

REFERENCES:

1. C.T. MALE ASSOCIATES, P.C. DRAWINGS NUMBERED 6025S1 THROUGH 6025S7.
2. WESTON GEOPHYSICAL CORPORATION, "SEISMIC REFRACTION SURVEY, AL TECH SPECIALTY STEEL CORPORATION LANDFILL, WATERVLIET, NEW YORK," DATED: DECEMBER 1992, PREPARED FOR: McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION, FIGURE 2, DRAWING TITLED "PLAN MAP WITH SURVEY COVERAGE."

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK & WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

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Drawn By: JME 100606

Checked:

Approved:

DWG Name: 48380201

SLAG LANDFILL
WATERVLIET, NEW YORK
PREPARED FOR
ONTARIO SPECIALTY CONTRACTING
BUFFALO, NEW YORK

FIGURE 2

SAMPLING LOCATIONS
SAMPLING WORKPLAN

ESC
ENGINEERING OF
NEW YORK, P.C.
11911 FREEDOM DRIVE SUITE 900
RESTON, VIRGINIA 20190
(703) 709-6500

Appendix A – Qualifications

Appendix B – Health and Safety Plan

HEALTH AND SAFETY PLAN

FORMER AL TECH SPECIALTY STEEL
SLAG DISPOSAL FACILITY
WATERVLIET, NEW YORK

DRAFT

PREPARED

BY

ESC ENGINEERING OF NEW YORK, P.C.

JUNE 8, 2006

Contents

1.0 Introduction

This Health and Safety Plan has been prepared to supplement the Ontario Specialty Contracting (OSC) Health and Safety Plan (HASP) for the AL Tech Specialty Steel Corporation (AL Tech) Waste Management Areas (WMA) in Watervliet, New York.

The HASP was developed to comply with the following applicable guidelines and regulations:

- U.S. Environmental Protection Agency (U.S. EPA), Occupational Safety and Health Administration (OSHA), National Institute of Occupational Safety and Health, 1985, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities"
- 29 CFR, Part 1910.120, 1926, and 1910.146 and 40 CFR Part 1311
- U.S. EPA, 1987, "Development of an RFI Work Plan and General Considerations for RFI," EPA 530/SW-87-001

The information presented herein specifically addresses those activities associated with the implementation of the Sampling Work Plan (Work Plan) to which this Addendum is appended (ESC Engineering, 2006). Because this addendum is meant to supplement the OSC HASP, onsite workers involved in the project are required to be familiar with both documents.

Subcontractors for the test pit and augering activities, shall rely upon their own corporate policies and existing facility protocols.

2.0 Scope of Work

The scope of work to be implemented during the Work Plan:

- cover removal
- subsurface soil sampling
- drilling
- cover replacement

3.0 Hazard Review

Hazards which may be encountered during implementation of the Work Plan include chemical and physical hazards. A summary of specific issues associated with these hazards are identified below, as are measures to address these issues.

3.1 Chemical Hazards

Site-specific chemical hazards as identified in the HASP, and as refined based on the results of the RFI at the plant site, include:

- polychlorinated biphenyls (PCBs)
- metals and cyanide

Specific substances of concern (SOCs) for each area and unit to be addressed are identified in the Work Plan.

Information on applicable limits for specific parameters, identification of potential exposure pathways, and acute and chronic health affects are summarized in Table 3-3 of the HASP. Table 3-2 of the HASP identifies the potential sources of these SOCs.

Brief toxicological profiles of the major site SOCs are included in Attachment A.

3.2 Physical Hazards

Potential physical hazards that are applicable to sampling activities include:

- slips, trips, and falls
- noise
- heat and cold stresses
- fire

Hazards which may be associated with intrusive activities include:

- overhead utilities (electrical and telephone)
- ▪underground utilities (electrical, telephone, gas, and water)
- heavy equipment and machinery
- lightning

Excavation of the test pits, pose a potential for collapse of the excavations.

3.3 Hazard Assessment

Measures have been identified for onsite project personnel with which to address the potential chemical and physical hazards. These measures are presented in Sections 3.3.1 and 3.3.2.

3.3.1 Chemical Hazards

Based on a review of the potential hazards identified in Sections 3.1 and 3.2, a hazard assessment was performed to ascertain appropriate levels of protection. The assessment is the basis for the choice of the level of protection used to initiate each activity. The levels of protection may be modified, as necessary, based on the results of ongoing monitoring programs, predetermined action levels, and weather conditions.

Minimum PPE requirements for al site project personnel include:

- hard hats
- steel-toed boots
- safety glasses

All activities, excluding those associated with will be initiated in Level D PPE.

Level D PPE requirements are specified in Section 4.0 of the HASP.

3.3.2 Physical Hazards

Onsite project personnel will take care to avoid potential slips, trips and falls. These hazards can be anticipated and avoided by following the safety rules and personal hygiene outlined in Attachment B.

Sound judgment will be used when operating heavy equipment and machinery.

Ear plugs will be available onsite for workers, as provided by their employers.

Onsite personnel must be aware of hazard associated with heat stress while conducting sampling activities. Attachment C provides further details for recognizing these hazards.

Fire extinguishers will be present in the area of operation of the various equipment to be used during the sampling, including drilling rigs and excavators.

Representatives of ESC Engineering will be responsible for identifying the locations of intrusive activities to be performed. ESC Engineering will work in coordination with a private utility location service to identify and mark all underground utilities within the vicinity of the intrusive locations.

ESC Engineering and the various subcontractors may suspend work activities, based on their best professional judgment due to weather conditions, specifically thunder and lightning storms and during precipitation events.

It is unlikely that oxygen deficiency or explosive atmospheres will occur during drilling operations, based on the nature of the potential SOCs.

Shoring will be used, as appropriate based on engineering practices and as dictated by site conditions encountered. Additional requirements for excavating activities are addressed in Sections 5.3 and 5.4 of the HASP.

Medical information for field personnel will be requested before site activities are initiated. This information will be kept onsite and used in case of medical emergencies. Also, the appropriate first aid equipment will be made available onsite.

4.0 Training and Monitoring Requirements

Several types of health and safety training and monitoring are required for the personnel participating in the implementation of this Work Plan in accordance with 29 CFR 1910.120.

All personnel participating in the field activities will have received training for both initial and refresher training. Onsite management and supervisors directly responsible for employees in hazardous waste operations will have received an additional 8 hours of supervisor training.

All visitors to the site for purposes of observation of the sampling will be briefed by the field team leader or site safety officer on the health and safety procedures to be followed. The visitors will be provided with the HASP to review and will sign a certification that the plans have been provided and reviewed.

All onsite project workers and visitors must have documentation of medical monitoring consistent with 29 CFR 1910.120. An example medical monitoring program is presented in Attachment D.

Proof of medical monitoring information and training will be required for all onsite RFI workers and visitors. Appropriate documentation will be required before workers or visitors are permitted to enter work zones established at the site. Documentation of this training will be maintained by ESC Engineering in project files for all personnel who conduct onsite activities.

If visitors do not have the appropriate training, they will not be permitted in areas where site conditions require the use of PPE.

5.0 References

29 CFR, Part 1910.120. "

29 CFR, Part 1910.146. "

29 CFR, Part 1926. "

40 CFR Part 1311. "

U.S. Environmental Protection Agency. 1987. "Development of an RFI Work Plan and General Considerations for RFI." EPA 530/SW-87-001.

U.S. Environmental Protection Agency, Occupational Safety and Health Administration (OSHA), National
Institute of Occupational Safety and Health. 1985. "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities"

Attachment A - Properties of Materials and Toxicological Profiles

Arsenic
Cadmium
Chromium
Copper
Cyanide
Iron
Lead
Manganese
Nickel
Polychlorinated Biphenyls
Selenium
Zinc and Zinc Compounds

Properties of Materials and Toxicological Profiles

Arsenic

Arsenic is a gray metal that is ubiquitous in the environment both from natural and anthropogenic sources, such as pesticide residues. Arsenic commonly is found in three valence states: arsenate (+5), arsenite (+3), and arsine (-3). In one form or another, arsenic is persistent in the environment. In systems with a low pH, low dissolved oxygen, and a low redox potential, the lower valence state will be favored. The main routes of exposure to arsenic are by inhalation and ingestion. The soluble salts are absorbed readily after ingestion, and some nonpolar forms also are absorbed. The extent of inhalation exposure will depend on particle size. Absorbed arsenic is distributed to the liver, kidneys, intestine, spleen, and lungs and is deposited in the hair and nails. Urine is the primary route of excretion, and the arsenates, being more soluble, are excreted more rapidly.

The toxicity of various arsenic compounds varies, and the toxicity is also variable among species. In general, the compounds decrease in toxicity from arsines to arsenates, to arsenates, to the metal. Acute exposures usually are manifested by cardiac abnormalities and damage to the gastrointestinal tract. Trivalent arsenic compounds react with sulfhydryl groups to disrupt enzyme function. The arsenates are believed to interfere with phosphorylation, disrupting cellular energy production. The TWA has been set at 10 ug/m^3.

Chronic exposure to arsenic compounds is characterized by a thickening of the skin on the palms and soles, which usually manifests itself before more serious damage. Chronic exposure also can cause a gangrenous condition of the hands and feet. There is strong epidemiological evidence that chronic inhalation exposure can result in respiratory cancer, and other exposures can result in skin cancers. An increase in chromosomal aberrations has been found in occupationally exposed populations. Arsenic compounds have been found to be mutagenic in bacterial test systems. Testing with pregnant laboratory animals has revealed an increase in spontaneous abortions and, at high levels of administration, various teratogenic malformations. Liver damage, cardiac disfunction, neurological disturbances, and effects on the production of blood cells also are reported to result from chronic arsenic exposure.

A 10^{-6} cancer risk level for arsenic has been calculated to be 0.0022 ug/l. The EPA has set the primary drinking water standard at 0.05 mg/l. The level set to protect freshwater aquatic life in acute arsenic exposures is 440 ug/l.

Cadmium

Cadmium is a soft, whitish metal. The solubility of cadmium in the environment is influenced by the carbonate content and pH of the water. Cadmium adsorbs strongly to clays and organic materials.

Cadmium is absorbed mainly by ingestion and inhalation. The amount absorbed depends on particle size and its solubility. Inhalation exposures occur mainly in the workplace, while ingestion exposures occur in the public at large. Only about 10% of ingested cadmium is absorbed, which accumulates in the liver and the renal cortex. The initial symptoms of acute exposure include vomiting, diarrhea, and cramps. Death can follow within one day or up to two weeks and can result from shock from loss of liquid or acute renal failure. Lethal ingested doses are usually above about 2,000 mg/kg. Inhalation exposures result in lung damage, including pulmonary edema and emphysema. OSHA has set the TWA at 10 ug/m^3.

Chronic exposure to cadmium can result in liver and kidney damage. Cadmium has not been found to be carcinogenic in humans, but it has been found to cause mutations and chromosomal aberrations in humans and laboratory systems. Cadmium also has been found to cause embryotoxicity.

The EPA drinking water standard for cadmium has been set at 10 ug/l. The water quality criteria to protect freshwater aquatic life vary with hardness (as defined by the carbonate concentration). The acute level has been set at exp (1.05 - ln[hardness] - 3.73), which generally ranges from 1.5-6.3 ug/l.

Chromium

Chromium exists in compounds mostly in the trivalent or hexavalent states. Trivalent chromium compounds are more common and less toxic than the hexavalent forms. It is mainly the hexavalent compounds that are irritants and corrosives. Acute exposures to dusts or mists of chromium compounds can result in coughing, headache, dyspnea, loss of weight, and painful respiration. Industrial exposures to hexavalent chromic acid mists have resulted in ulcers of the skin and nasal septa. Hexavalent chromium compounds can cause severe contact dermatitis. Absorption through the skin can result in kidney damage. Although chromates are absorbed poorly after ingestion, hexavalent compounds can cause gastrointestinal hemorrhaging. Large oral doses also can cause kidney damage. The LD_{50}s for oral administration of hexavalent compounds to laboratory animals have been found to range from around 300 to 500 mg/kg. The OSHA TWA is 0.5 mg/m^3 for soluble chromium compounds and 1.0 mg/m^3 for insoluble ones.

Some hexavalent chromium compounds are carcinogenic at the site of exposure. Lung cancers have been found to result from inhalation exposures in the workplace. While hexavalent compounds have been found to be mutagenic in bacterial and other test systems, the trivalent compounds have not shown mutagenic activity. Some hexavalent compounds also appear to be teratogenic and embryotoxic. The EPA primary drinking water standard for chromium is 0.05 mg/l.

Trivalent chromium compounds tend to be insoluble in water except at a very low pH. Hexavalent compounds are moderately soluble. In the environment, hexavalent chromium, being a strong oxidizer, readily reacts with reducing agents to form trivalent compounds, which are far more stable. Trivalent chromium compounds readily precipitate except in highly acid solutions. Both types of compounds only adsorb weakly to sediments. The EPA standard for chromium to protect freshwater aquatic life varies with the hardness of the water body but generally ranges from 2.2 to 9.9 mg/l. For hexavalent chromium, the standard is 21 ug/l.

Copper

Copper is an essential trace element in animals and plants. It occurs widely in enzymes and is critical to their function. Copper toxicity generally is not a problem in humans because absorption of the metal is poor. For example, far less than 1% of ingested copper is absorbed; practically all ingested copper is excreted in the feces. Mammals and birds generally have barriers to copper absorption. Some fish, some invertebrates, fungi, and algae are less able to control copper absorption and thus are more susceptible to its toxicity. Therefore, copper can inhibit secondary sludge treatment at treatment plants at levels of 1 mg/l, and copper compounds are used sometimes as algicides, fungicides, or antihelminthics. Some plant species have been found to adapt rapidly to locally high concentrations of copper in soils. Concentrations in natural soils generally range from 2 to 100 ppm. The EPA water quality criteria for acute toxicity to fresh water organisms for copper vary from about 12 to 43 mg/l, depending on the hardness of the water.

Copper sulfate and chloride are some of the more toxic salts of the metal. The LD_{50}s for oral administration to rats are 960 mg/kg for the sulfate and 140 mg/kg for the chloride. A number of cases of acute toxicity of copper sulfate in humans have been reported for ingestion of quantities between 1 and 12 g. Symptoms included a metallic taste, epigastric burning, vomiting, and, in severe cases, diarrhea and injury to the gastric mucosa and the liver. Chronic toxicity studies with laboratory animals have found damage to the liver, kidney, and spleen with high levels of exposure. More severe toxic responses to copper in humans can be found in individuals with Wilson's disease, a rare genetic disorder.

Copper fumes, dusts, and mists are irritants. Exposure to copper fumes by industrial workers can result in metal fume fever. The TWA for copper fumes is 0.2 mg/m^3, while for dusts and mists it is 1.0 mg/m^3. The EPA has established a secondary drinking water standard of 1 mg/l for copper.

<u>Cyanide</u>

Cyanide is a highly toxic white solid. While it is found in a variety of forms, bound to sodium, potassium, or metal complexes, or as hydrogen cyanide gas, its toxicity in all cases is because of the cyanide ion, CN^-. Inorganic cyanides are absorbed rapidly through the skin, by ingestion, and by inhalation. Cyanide is distributed by the blood to all organs and tissues, and, in mammals, it is rapidly converted to hydrogen cyanide. Cyanide is not stored in the tissues. Eventually it is converted to less toxic thiocyanate and is eliminated in the urine.

Cyanide poisoning causes acute hypoxia, an inability of the tissues to use oxygen. Cyanide inhibits the enzyme cytochrome C oxidase in mitochondria, disrupting cellular respiration and electron transport. Cyanide forms stable complexes with a number of other biologically active metal-containing ions, particularly those containing iron and copper. Cyanide poisoning is rapidly fatal. Exposure to 270 ppm by humans results in instant death, while 135 ppm is fatal in 30 minutes. The mean lethal dose for ingestion by humans varies from 50 to 200 mg, about 1-3 mg/kg. Nonfatal doses of the compound can cause weakness, headache, nausea, and vomiting; however, recovery is rapid and complete.

The LC_{50}s for inhalation exposures are 484 ppm for 5 minutes in rats, 323 ppm for 5 minutes in mice, 616 mg/m^3 for 1 minute for dogs, and 1,226 mg/m^3 for 1 minute for cats. The LD_{50} for oral exposures is 3,700 ug/kg in mice. OSHA has established an 8-hour TWA of 5 mg/m^3, but NIOSH suggests a limit of 10 minutes of exposure to this level.

Cyanide does not accumulate in the body, and no effects have been found from repeated sublethal doses. There is no evidence to indicate that cyanide is carcinogenic or mutagenic. It apparently can cross the placenta and cause fetotoxicity but is not teratogenic.

Cyanides are unlikely to be persistent in many environmental situations. Cyanide is very soluble in water, where it stays in equilibrium among cyanide ion, hydrogen cyanide, and forms bound to organic or inorganic compounds. Hydrogen cyanide is very volatile, so the cyanide will disappear gradually from aquatic systems. In aquatic systems, a free cyanide concentration of 50-200 ug/l is fatal to most species. A concentration of 1.0 mg/l can have an inhibitory effect on activated sludge treatment systems. Even in soils, contact with moisture will liberate hydrogen cyanide gas. Because of its water solubility, cyanide is mobile in soils.

<u>Iron</u>

Iron is an essential element, being a critical part of the hemoglobin molecule. The body burden is about 4 g, and of this amount, 67% is in hemoglobin, and 27% is stored as ferritin in the liver. Iron is absorbed mainly through the intestinal mucosa, but the rate of absorption is limited by the quantity of iron stored in the body. Iron is more poorly absorbed in nonanemic persons. Iron can cross the placenta and accumulate in the fetus.

Acutely toxic exposures to iron are usually the result of the ingestion of oral iron supplements. Exposure can cause gastrointestinal irritation and vomiting, followed in a few days by pneumonitis, convulsions, and gastrointestinal bleeding. Chronic excess iron intake can lead to hemosiderosis and hemochromatosis. The former is a general increase in the body's iron content, while the latter is an increase in the cellular iron content. Long-term inhalation exposure to ferric oxide can cause mottling of the lungs and a benign pneumoconiosis. The cause of death from iron toxicity is generally respiratory failure from the iron interfering with mitochondrial function.

The TLV for iron oxide fumes is 5 mg/m^3, while for soluble iron salts it is 1 mg/m^3. The EPA has set a secondary drinking water standard for iron of 0.3 mg/l. Drinking water standard of 0.05 mg/l for manganese.

Lead

Lead is a common metal. Lead is found at an average concentration of 10 ppm in natural soils and of 1-10 ug/l in rivers and lakes. Most lead salts are fairly insoluble in water, although lead nitrate and lead acetate are soluble. The solubility depends on the pH, with solubility increasing in more acidic conditions. Movement of lead in soils depends on its adsorption, chelation with organic matter, and the precipitation of the less soluble salts. In general, lead will react with soil anions or clays to form insoluble complexes, inhibiting its mobility.

Most human exposure to lead comes in food, with an estimated average daily intake of 100-500 mg/day. In adults, only about 8% of ingested lead is absorbed, while in children the fraction is much higher, up to about 50%. Therefore, children are at much greater risk from lead exposures. Lead also can be absorbed by inhalation, although the amount will depend on the solubility of the compound and the particle size. After absorption, lead initially accumulates in soft tissues but later accumulates in the bones. About 95% of the adult body burden of lead is in the bones, while 72% of a child's body burden is.

Poisoning from acute exposure to lead is uncommon. The primary toxic effects from chronic exposure are on the blood and the nervous system. Lead induces anemia by impairing heme synthesis (heme is the functional portion of the hemoglobin molecule) and by causing an increase in the destruction of red blood cells. The nervous system is particularly sensitive to lead, although lead induced nervous system disorders are usually only found in children. Lead also can have renal effects, damaging the proximal tubule and causing a decrease in glomerular filtration. Rats exposed to lead have developed renal tumors; however, the evidence concerning the carcinogenicity of lead in humans is uncertain. Lead has been shown to be embryotoxic, increasing the number of miscarriages and stillbirths. The OSHA TWA for lead is 0.05 mg/m^3.

The EPA National Ambient Air Quality Standard for lead is 1.5 ug/m^3. The primary drinking water standard is 0.05 mg/l. The EPA has set an acute exposure standard of 74-400 ug/l for freshwater, depending on hardness, to protect aquatic life.

Manganese

Manganese is a metal found in the earth's crust principally as pyrolusite ore (manganese dioxide). It can exist in seven oxidation states, although the bivalent form is the most stable.

Manganese is an essential trace element. It is a cofactor in a number of enzymatic reactions. The principal route of intake of manganese is from food, and the body burden is about 20 mg, mainly in the liver, kidney, intestine, and pancreas. The level of manganese in the body is regulated closely by a homeostatic mechanism. The major route of excretion is through the gastrointestinal tract via the bile.

In general, manganese shows a lack of oral or dermal toxicity. Large doses of manganese salts are gastrointestinal irritants and, therefore, do not get absorbed. Evidence of manganese toxicity in humans is found mainly from inhalation exposures in the workplace. Acute exposure to manganese can result in pneumonitis and epithelial necrosis in the lungs.

The major health hazards from manganese occur from chronic exposures. Chronic inhalation of manganese dioxide dust can cause manganism in six months to two years. Manganism first manifests itself with a psychotic period, including hallucinations, delusions, and compulsions. After three months, neurological symptoms appear, including abnormal slowness of movement, loss of facial expression, rigidity, and impairment of speech. Manganism is very similar to Parkinsonism and frequently is treated the same way, with L-dopa. Manganese has not been found to be carcinogenic.

The TLV for manganese dust set by the ACGIH is 5 mg/m^3, while for manganese fumes it is 1 mg/m^3. The risk from manganese should be considerably more severe in the workplace than from environmental exposures. The EPA has set a secondary drinking water standard of 0.05 mg/l for manganese.

<u>Nickel</u>

Nickel is a common metal that forms a variety of compounds. It is an essential element but in very small quantities. Most exposure to nickel, other than at the workplace, is through foods; the average daily ingestion is about 300-600 ug. Only about 1-10% of dietary nickel is absorbed; the remainder is excreted in the feces. Absorbed nickel eventually is excreted in the urine. In the workplace, inhalation is a significant route of nickel exposure. Also, nickel is a component of cigarette smoke. Smokers are exposed to an additional 3-15 ug/day via inhalation.

Because of its poor absorption, ingested nickel is not highly acutely toxic. The lowest lethal dose found in oral administration to guinea pigs was 5 mg/kg (for metallic nickel), while the LD_{50} for oral administration of nickel chloride to rats was 105 mg/kg. Symptoms of acute toxicity have their onset 24 hours or more after exposure. Oral exposure can result in acute gastrointestinal irritation.

Acute or chronic exposure to nickel metal can result in a dermatitis in some individuals. In industrial exposures, this mainly occurs in the nickel plating industry, although some people have this reaction from wearing nickel jewelry.

Chronic oral exposure to nickel generally does not result in systemic toxicity. Inhalation can result in the thickening of the alveolar walls and the production of lesions in the lungs. It is well documented that inhalation exposures in nickel workers have resulted in carcinomas of the lungs and nasal sinuses. There is no evidence, however, that oral exposure to nickel is carcinogenic.

Nickel has not been found to be mutagenic in test systems. Apparently, no teratogenic effects have been reported. Nickel has been found to be gametotoxic in laboratory animals and to produce an increase in neonate mortality and a decrease in litter size.

The OSHA TWA for nickel has been set at 1 mg/m^3, while the NIOSH recommended standard in 15 ug/m^3. The EPA has set an acceptable daily intake for nickel at 750 ug/l.

Nickel can be toxic to aquatic organisms, and the toxicity is influenced by the hardness of the water. The EPA water quality criteria to protect aquatic life are based on the hardness of the system. The levels generally vary between 1,100-3,100 ug/l for acute exposures and 56-160 ug/l for chronic exposures.

<u>Polychlorinated Biphenyls</u>

Polychlorinated biphenyls (PCBs) are complex liquid mixtures of chlorinated biphenyls that have varying degrees of chlorination. The commercial PCB mixtures used most commonly in the United States are Arochlor 1016, Arochlor 1242, and Arochlor 1254. These products contain 41%, 42%, and 54% chlorine, respectively. The chemical, physical, and toxicologic properties of these and other PCB mixtures depend on the amount and location of the chlorine atoms on the two benzene rings of each specific PCB and on the overall mix of PCB components present. Because of their chemical stability, resistance to biodegradation, and lipid solubility, PCBs are environmentally persistent and can accumulate in food chains. These compounds may be harmful to humans and other organisms.

PCBs are absorbed through the gastrointestinal tract, the lungs, and, to a lesser extent, through the skin. Most reports of toxicity in humans are associated with exposure in the workplace. Some of the potential toxic effects associated with exposure to PCBs include chloracne, liver damage, a variety of neurobehavioral problems, menstrual disorders, and adverse reproductive effects. In addition to most of these same effects, experimental animals exposed to PCBs have exhibited suppression of immunological functions and pathological changes to the stomach and other organs. PCBs are carcinogenic in rats and mice, and, depending on the experimental protocols used, either may enhance or inhibit the potency of other carcinogens. The evidence for carcinogenicity of PCBs in humans is inconclusive.

The American Conference of Governmental Industrial Hygienists (ACGIH) has recommended Threshold Limit Value-Time Weighted Average (TLV-TWA) concentrations of 1 mg/m^3 and 0.5 mg/m^3 for airborne exposure to Arochlor 1242 and Arochlor 1254, respectively. The Environmental Protection Agency (EPA) has recommended ambient water quality criteria for exposure of humans and aquatic life to PCBs in surface water and is developing criteria for exposure through public drinking water supplies.

Selenium

The toxicity of selenium to animals has been known for centuries, but the essentiality of selenium as a nutrient was established only recently. The estimated safe and adequate daily intake range of selenium for humans is about 50 to 200 ug per day. Epidemiological studies have been performed of populations in China living in areas with extremely high selenium levels in the soil and diet. The estimated dietary level required to cause toxic effects was about 3 to 5 mg of selenium per day.

Systemic effects in animals and humans following inhalation or oral exposure to selenium compounds are similar. One proposed mechanism of toxicity is that, under conditions of excess body levels of selenium, selenium atoms begin to replace sulfur atoms in both enzymatic and structural proteins, destroying the protein's structural and functional integrity. This mechanism of action is unlikely to be organ specific, and toxic levels of selenium are associated with effects on multiple organ systems.

The primary toxic effects of short-term exposure to selenium are on the lungs. Pulmonary edema, lesions of the lungs, and respiratory arrest have been reported in humans and cattle that ingested lethal doses of selenium. Pulmonary edema and persistent bronchitis have been observed in workers exposed briefly to high concentrations of selenium in industrial situations.

The lungs do not appear to be an important target organ for less acute exposures. Longer term exposure causes growth inhibition, skin effects, and neurological effects. Toxic effects on the cardiovascular system, liver, and kidneys are also common. Exposure of cattle to excess selenium causes a condition known as the "blind staggers." Chinese villagers exposed to high levels of selenium in the diet experienced loss of hair, loss and deformities of fingernails, skin and tooth discoloration, problems with walking, diminished reflexes, and some paralysis.

Zinc and Zinc Compounds

Zinc is a silvery white metal. Zinc ion is absorbed poorly by ingestion. Large doses can damage the mucous membranes of the gastrointestinal system. Inorganic zinc compounds are nontoxic by ingestion but can act as irritants. Soluble zinc salts have a metallic taste and can cause vomiting. Chronic exposures can cause digestive disorders. Zinc is the most abundant trace metal in the body. It occurs widely in metalloenzymes and in metal-protein complexes.

Inhalation of zinc oxide fumes by foundry workers has been reported to cause a metal fume fever and gastrointestinal effects. Zinc oxide dust is relatively innocuous but can present an explosion hazard. The TLV for zinc oxide fumes is 5 mg/m^3 and for zinc oxide dust, 10 mg/m^3 as a nuisance dust.

High concentrations of zinc chloride fumes can cause fatal lung damage because of its causticity. Zinc chloride has been shown to be mutagenic in some bacterial systems. The LD_{50}s for oral exposures to rats and mice are 350 mg/kg and to guinea pigs, 200 mg/kg.

The EPA secondary standard for zinc in drinking water is 5 mg/l.

Attachment B - Safety Rules and Personal Hygiene

Safety Rules and Personal Hygiene

1. Remove all facial hair that interferes with a satisfactory fit of respiratory protective equipment.
2. Do not wear contact lenses while wearing full-face and respiratory equipment or in a shop area.
3. Do not take prescribed drugs unless specifically approved by a physician.
4. In the work zone, do not eat, drink, smoke, chew gum or tobacco, or engage in any other practice that increases the probability of hand-to-mouth transfer or ingestion of material.
5. Wash hands and face thoroughly after leaving the work area and before eating, drinking, or any other activities.
6. Thoroughly wash entire body as soon as possible after removing Level C protective garments.
7. Whenever possible, avoid contact with contaminated or suspected contaminated surfaces.
8. All employees working are responsible for their own safety and the safety of those working around them.
9. The work is potentially hazardous and must be taken seriously. No practical joking, horseplay, or inattention to work will be tolerated.
10. The work may require handling of extremely toxic materials. Smoking, eating, drinking, and chewing will be permitted only in designated areas.
11. Injuries, regardless of the severity, must be accurately reported immediately. Any exposure to a hazardous chemical must be reported IMMEDIATELY to your supervisor.
12. All damage to vehicles, property, and equipment, no matter how slight, must be reported IMMEDIATELY to your supervisor.
13. Use or possession of alcoholic beverages or illegal drugs on the job, or reporting to work under the influence of drugs or alcohol, will be cause for immediate dismissal.
14. Consult your supervisor before doing any work, operating any machinery, or using any tools with which you are unfamiliar.
15. Make sure all safety devices are in place and operational before energizing any piece of equipment. Never bypass a safety device. Do not use an obviously unsafe or obviously defective piece of equipment. Immediately tag and return defective equipment for repair.
16. Report all unsafe conditions immediately to your supervisor. Correct unsafe conditions immediately, if possible.
17. Maintain high housekeeping standards in the work area.

18. Proper authorization must be secured from the supervisor for all fires, welding, chipping, or cutting operations.

19. Access to safety and fire fighting equipment must be kept clear at all times.

20. Do not store any material closer than 10 feet from railroad tracks, roadways, or power poles.

21. Be conscious of potential fire and chemical hazards in your work area. Know the location of all safety equipment in your work area.

22. Tag broken or defective equipment. Note the exact nature of the problem on the tag. Date and sign the tag.

23. The Field Team Leader is the designated Site Health and Safety Coordinator unless he specifically designates anther.

24. Each job site should have a site specific safety plan prepared which outlines the job hazards, protective equipment, decontamination procedures, emergency equipment, and emergency procedures. The site supervisor is responsible for preparing the site safety plan and ensuring all personnel onsite are made aware of the contents of the site safety plan.

25. Material safety data (MSD) sheets SHALL be posted for all chemical hazards known to be present at each job site. Each employee should be familiar with MSD sheets posted at the job site.

26. A safety meeting SHALL be held at the job site before work commences each day. In addition to work assignments and work hazards, a different safety topic should be addressed each day.

27. A site safety log SHALL be maintained, outlining training, safety meetings, and first aid rendered.

28. Work should not commence at any job site until all necessary safety equipment has been distributed and is ready for use.

29. All personnel will thoroughly decontaminate before leaving a job site.

30. All equipment shall be thoroughly cleaned and decontaminated before leaving a job site.

31. Use all PPE required by your supervisor or the safety plan.

32. Eye protection is required in all laboratory areas and when grinding, chipping, cutting, and welding.

33. You must wear required hearing protection in all designated areas and as specified by the supervisor.

34. Respiratory equipment must be worn when there is potential for exposure to harmful materials or when an oxygen deficient atmosphere exists.

35. Steel-toed safety shoes or boots must be worn in work areas.

36. Hard hats will be worn on all project sites.

37. Only personnel certified by the manufacturer shall be permitted to make repairs to breathing apparatus.

38. All respiratory equipment and protective clothing shall be inspected before use.

39. PPE shall be cleaned and decontaminated after use before being placed back in service.

40. Tools should be inspected before use. Defective or broken tools should be tagged and removed from service, or repaired before use.

41. Tools should be used only in the manner in which they were intended. Never use a tool for a job for which it was not designed. Always take the time to get the right tool for the job.

42. Be sure that all electrical power tools are double-insulated or are grounded through a three-prong plug.

43. Hand tools should never be carried in a pocket.

44. Tools must be returned to their proper storage place after use.

45. Do not drop or throw tools or any other equipment from ladders or other heights.

46. Never handle any hazardous materials, hazardous substances, or hazardous waste without specific safety instructions and authorization from your supervisor. Treat any unknown material as potentially hazardous to people, property, and the environment.

47. Never store any potentially hazardous material in anything except the authorized secured container.

48. Use the proper company-furnished protective clothing and respirators when handling chemicals.

49. Never store food, cigarettes, gum, or cosmetics in areas where hazardous materials are stored. Never eat, drink, or use tobacco in these areas to decrease the probability of hand to mouth transfer or ingestion of material.

50. Never handle flammable liquids until all ignition sources have been extinguished in the area.

51. When transferring flammable liquids, always ground or electrically bond the containers.

52. Portable flammable liquid containers must be UL-approved and provided with a flame arrester.

53. Hazardous materials used onsite (acid, caustic, flammables, compressed gases, and gasoline) must be stored in a specifically assigned, well-protected, well-ventilated area which is not used for any other purpose.

54. Compressed gas cylinders should be protected and supported in an upright position by chain or rope at all times. The valve cap should always be kept in place, except when a cylinder is in use.

55. Contractor's employees will be expected to drive company vehicles, or vehicles rented by the company, in a safe and responsible manner, and in compliance with all traffic laws.

56. Use of seat belts is required in all company vehicles. It is the responsibility of the driver to remind all passengers of this requirement.

57. Vehicles should be visually inspected before use. The inspection should include the tires and lights. Turn signals, brakes, and steering should be tested daily at the first opportunity.

58. You must always possess a valid operator's license when driving a company vehicle.

59. Any malfunction of company vehicles should be immediately reported so repairs can be affected.

60. A spotter must be present whenever backing a company vehicle in a restricted area.

61. On the highway, travel a safety distance behind other vehicles. Always consider the weather, visibility, road conditions, and traffic.

62. Observe vehicle load rating capacities.

63. When refueling any vehicle, always turn the ignition off, set the brake, and extinguish any smoking materials.

64. Never operate a vehicle unless you have been trained and authorized to do so.

65. Drive company and personal vehicles defensively and with courtesy; you are a representative of the company and should act accordingly.

66. At all job sites, leave keys in all vehicles so the vehicle is available immediately for emergency use.

67. Vehicles should be checked by the driver for a first aid kit, fire extinguisher, and a safety reflector or flares before use.

Attachment C - Heat Stress and Heat Stress Monitoring

Heat Stress and Heat Stress Monitoring

Heat stress can be a significant hazard because of the natural environmental conditions, nature of the work, required protective clothing, and unknown physical fitness of the many individuals involved.

The largest organ of the human body is the skin. One of the many functions of the skin is to regulate body temperature through heat transfer and the process of evaporation. Temperature regulation by the skin is complex, but simply stated, blood vessels dilate (widen) when the body needs to lose heat or contract (narrow) when the body needs to reduce heat loss through the skin.

When heat production of the body increases or when the outside temperature increases, the body reacts to the higher need to dissipate heat by accelerating the production of perspiration. The rate of perspiration may outstrip the rate of sweat evaporation, particularly when the humidity is high. The rate of evaporation depends on temperature, humidity, and convection (wind currents). Because the rate of evaporation declines with the rise in humidity, this mode of heat loss is comprised.

If high humidity is combined with high temperature, other thermoregulatory mechanisms, i.e., conduction and radiation, are also compromised.

The protective garments that protect the skin from unwanted chemical exposure also insulate the body from the environment, preventing heat transfer and preventing the evaporation of perspiration from the skin because of the high humidity inside the garments. Convection currents cannot penetrate the protective garment to aid in the evaporation-cooling process. Thus heat stress problems are likely to occur if workers are not aware of the signs and symptoms of heat-related illnesses. Wearing protective garments can make heat stress disorder observation difficult.

Other factors that may contribute to heat-related problems are:

- personal hygiene
- lack of acclimatization or conditioning to heat
- health-related problems
- fatigue and stress
- consumption of alcoholic beverages
- poor dietary habits
- age

Heat-Related Problems

- Heat Stroke

Heat stroke is the most severe heat stress disorder. It is characterized by extremely high body temperatures (106° F or higher) and disturbance of sweating. Heat stroke is a life-threatening emergency, and medical care is immediately needed. The signs and symptoms are as follows:

-body temperature is high (106° F or higher)
-skin is hot, red, and dry
-pulse is rapid and strong
-victim may be unconscious

- Heat Exhaustion

Heat exhaustion is a response to heat characterized by fatigue, weakness, and collapse. Heat exhaustion occurs when the intake of water is inadequate to compensate for loss of fluids through sweating. The signs and symptoms are as follows:

-normal body temperature of 98.6° F (oral)
-pale and clammy skin
-profuse perspiration
-tiredness and weakness
-headache and perhaps cramps
-nausea and dizziness (possible vomiting)
-possible fainting

▪Heat Cramps

Heat cramps are muscular pains and spasms that are largely due to loss of salt from the body through sweating or due to inadequate intake of salt. Heat cramps may be associated with heat exhaustion. In the case of heat cramps, the muscles of the legs and abdomen are likely to be affected first.

Responsibilities

▪Safety office responsibilities:
-Recognize that heat-related problems are of major concern when protective equipment is used.
-Monitor the workplace for temperature extremes and humidity conditions in potential heat stress environments.
-Establish work-rest rules and enforce these rules.
-Monitor workers for signs and symptoms of heat illness.
-Select proper electrolyte solutions and devices that adjust the body's cooling process.
-Conduct training programs to educate workers on heat-related problems, and on their signs and symptoms.

▪Field Supervisor industrial hygienist responsibilities:
-Review the work schedule and the scope of possible hazards.
-Schedule heavy work when temperatures are lowest (morning and late afternoon).
-Conduct informal training sessions on heat-related problems.
-Know emergency first aid for heat illness.
-Supply enough drinking water at the job site, and ensure that workers take frequent breaks.
-Monitor workers for signs and symptoms of heat illness.

▪Employee Responsibilities
-Report to work well rested and free from the influence of alcoholic beverages (i.e., not hung over).
-Monitor yourself and others for signs of heat illness.
-Rest as needed.
-Consume water regularly regardless of thirst (water discipline).
-Inform the supervisor of potential heat-related problems.

Requirements for Preventing Heat-Related Problems

- Each person who is assigned a task that may potentially cause heat-related problems must fulfill all the requirements and follow the procedures specified by the Heat-Related Problem Program.
- Certification by physicians:
  - -The occupational physician shall certify that a person is physically capable of performing work in environments that present or pose a potential for heat-related problems.
  - -A physician will certify that a person is cleared to return to work after seeking medical assistance for heat-related problems.
- Training program:

Before being assigned a task that presents potential heat-related problems, ESC employees will receive training in the prevention and recognition of heat-related illness. Training sessions will cover the following subject:

-causes of heat-related problems
-relation of temperature and humidity to heat illness
-types of heat illnesses
-signs and symptoms of heat illnesses
-first aid for heat-related illnesses based on the American Red Cross Standard First Aid Test

Thermal Criteria
Permissible Heat Exposure Threshold Limit Values

The established Threshold Limit Value will maintain a maximum deep body temperature below 100.4° F for most acclimatized workers, assuming that they are wearing light clothing and have an adequate water intake. However, heat tolerance will be reduced when protective garments are worn, since cooling by the evaporation of perspiration will be decreased. With the use of protective clothing, a microclimatic condition prevails under the garment that is not determinable from environmental measurements. The Threshold Limit Values are to be used as initial guidance for evaluation of heat stress. The ESC Safety Officer will revise the recommended work cycle requirements as required based on the results of the worker monitoring described below.

Botsball Thermometer

The Botsball thermometer may be used to evaluate the probable heat stress of people working in protective gear, since this procedure combines the effects of air temperature, humidity, and the thermal radiation expected from hot equipment in the plant into a single measurement. The Botsball thermometer may be placed near the work zone to give a reading of the environmental conditions outside protective garments (i.e., the normal setting). To estimate microclimatic condition, the Botsball globe is covered with the protective garment (Tyvek suit, etc.) used by workers. This may be useful in assessing the heat stress of workers in hot areas of the building.

Monitoring Requirements

Before beginning daily work activities, including protective garment use, baseline parameters for the following should be recorded:

Heart rate:	Normal is 60-100 beats/minute
Oral temperature:	Normal is 98.6° F + 1°

Body weight: Will vary with individual

Work-Rest Cycle

- At the beginning of the work-rest cycle, the following parameters may be measured: body weight, oral temperature, and heart rate.
- These measurements shall be compared to the baseline measurements.
- At the end of the rest period, the heart rate should not exceed 100 beats per minute. If the heart rate is over 100 beats per minute, the person is to remain at rest until the heart beat is below 95 beats per minute.
- At the end of the rest period, oral body temperature will be measured. An elapsed time of 5 minutes shall be established between oral temperature and the consumption of cold liquids. The oral temperature should not exceed the baseline temperature. Workers should not be permitted to continue working when the oral temperature exceeds 100.4°F. If the oral temperature exceeds the baseline temperature but is less than 100.4°F, the worker is to remain at rest until the oral temperature is equal to baseline temperature.
- During the course of the work assignment, each worker must be monitored for signs of heat illness by the supervisor or a fellow worker.
- As a minimum for each 2-hour period worked, a 15-minute rest period is required.

Use of the Botsball Thermometer

The Botsball thermometer shall be placed in proximity to the work zone to give a reading of the environmental conditions outside protective garment (normal setting).

To estimate microclimatic conditions, the Botsball globe shall be covered with the protective garment (Tyvek suit, etc.) in question.

The Botsball temperature is roughly converted to WBGT by adding 2° F.

WBGT Determination

The WBGT can be measured directly in the worker's environment with a WBGT thermometer set or with an electronic meter. All other heat stress monitoring and control procedures described under the Botsball thermometer apply to WBGT determinations.

General Safety and Health Regulations

- Drinking water containers shall be located at each work site in a designated clean area.
- At a minimum:
  - -Disposable cups shall be used, protected from dirt and weather, and stored close to the drinking water container.
  - -Drinking water containers shall be the insulated type with a closed top, and they shall be labeled "Drinking Water" or "Potable Water."
  - -Water shall be changed on a daily basis, and the water container shall be cleaned inside and out daily.
  - -Ice shall be of the potable type made from drinking water.
- Salt tablets shall not be used.
- Rest areas shall be in a designated clean area away from the heat source or in a shaded area with good ventilation.

- Small packets of ice shall be made available for cooling purposes.
- Field showers or a portable water supply may be used to help reduce body heat.
- Heavy work may be scheduled in the mornings or late afternoons or when the sun is at its lowest.
- Work will not be permitted during heat emergencies (i.e., heat waves) without the use of cooling jackets, vests, or suits.
- Supervisors not enforcing the work-rest requirements or not supplying workers with drinking water shall be relieved of their supervisory duties.
- Only electrolyte solutions (such as squincher) approved by the Safety Officer shall be used along with water.

Table A
Signs and Symptoms of Heat Stress

▪**Heat rash** may result from continuous exposure to heat or humid air.

▪**Heat cramps** are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:

muscle spasms
pain in the hands, feet, and abdomen

▪**Heat exhaustion** occurs from increased stress on various body organs, including inadequate blood circulation caused by cardiovascular insufficiency or dehydration. Signs and symptoms include:

pale, cool, moist skin
heavy sweating
dizziness
nausea
fainting

▪**Heat stroke** is the most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms include:

red, hot, usually dry skin
lack of or reduced perspiration
nausea
dizziness and confusion
strong, rapid pulse
coma

Source: National Institute of Occupational Safety and Health/ Occupational Safety and Health Administration/U.S. Coast Guard/U.S. Environmental Protection Agency, 1985, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities."

Attachment D - Medical Monitoring Program

Medical Monitoring Program

The workers most likely to be exposed to contaminated materials at the site are sampling and inspection personnel. These personnel are included in a Medical Monitoring Program.

The purposes of the Medical Monitoring Program are to identify any illness or problem that would put an employee at an unusual risk from exposures; to ensure that each employee can use negative-pressure respirators safely and withstand heat or cold stress; and to establish and maintain a medical data base for employees to monitor any abnormalities that may be related to work exposure and that could increase injury risk for the employee or others in the performance of job functions. The Medical Monitoring Program includes:

- a baseline physical examination
- a medical determination of fitness of duty, including work restrictions after any job-related injury or illness or nonjob-related absence lasting more than three working days
- the review of each site-specific HASP and potential exposure list to determine the need for specific biological and medical monitoring
- annual and exit physical examinations with attention given to specific exposures or symptoms

Baseline Physical Examination

A baseline physical examination will be performed on each employee engaged in hazardous waste activities. The purposes of this examination are to identify any illness or problem that would put an employee at unusual risk from certain exposures; to certify the safe use of negative-pressure respirators (OSHA Safety and Health Standard 29 CFR 1910.134); and to develop a data base for the assessment of exposure-related events detected through periodic medical monitoring. Variable data, such as age, sex, race, smoking, prior employment and exposure history, that may have a bearing on the occurrence of subsequent events after employment begins will be gathered.

The content of the Baseline Physical Examination will include:

- medical, occupational, and fertility histories
- a physical examination, stressing neurological, cardiopulmonary, musculoskeletal, and skin systems
- an electrocardiogram
- PA and lateral chest X-rays
- a pulmonary function test (FEV1, FVC, FEV 25-75)
- an audiogram
- a multichemistry blood panel, including kidney and liver function tests, CBC with differential, and urinalysis
- tests deemed necessary by symptoms or exposure history
- a red blood cell cholinesterase
- physical parameters, including blood pressure and visual acuity testing

Annual Physical Examination

An examination and updated occupational history will be performed on an annual basis during the anniversary month of the baseline physical examination. This annual examination serves to identify and prevent illness caused by cumulative exposure to toxic substances.

The Annual Physical Examination will include:

- a personal work history (based on specific project histories)
- a physical examination, stressing neurological, cardiopulmonary, musculoskeletal, and skin systems
- pulmonary function test (FEV1, FVC, FEV 25-75)
- a multichemistry blood panel, including kidney and liver function test
- an audiogram
- tests deemed necessary by symptoms or exposure history
- an optional wellness profile

Return to Work Examination

Any job-related illness or injury will be followed by a medical examination to determine fitness for duty or possible job restrictions based on the physical findings of the medical examiner. A similar examination will be performed following three missed workdays caused by a nonjob-related illness or injury requiring medical intervention. In addition, a medical examination will also be conducted as soon as possible on notification by an employee that the employee has developed signs or symptoms indicating possible exposure to hazardous substances or health hazards.

Exit Physical Examination

The content of the Exit Physical Examination will include:

- a personal work history (based on specific project histories)
- medical, exposure, and fertility histories
- a physical examination, stressing neurological, cardiopulmonary, musculoskeletal, and skin systems
- a pulmonary function test (FEV1, FVC, FEV 25-75)
- an electrocardiogram
- PA and lateral chest X-rays
- an audiogram
- a multichemistry blood panel, including kidney and liver function tests, CBC with differential, and urinalysis
- tests deemed necessary by symptoms or exposure history
- a red blood cell cholinesterase
- physical parameters, including blood pressure and visual acuity testing

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Appendix C – Geomembrane Repair Instructions

Appendix C
Geomembrane Repair
Sampling Work Plan
Former Al Tech Specialty Steel Slag Disposal Facility
Watervliet, New York

The geomembrane cover will be cut in order to collect samples of the slag. The procedure for repairing the geomembrane is as follows:

1. The borehole below the membrane shall be filled to within 6 inches of the former membrane with non-shrink grout or granular materials.
2. The six inches below the repair shall be filled with well tamped, uniformly graded sand.
3. A minimum of 6-inches around the cut through the membrane shall be clean and free of any dirt, oils, or other deleterious substances.
4. The patch shall be one layer of geomembrane that is the same as or compatible with the original capping membrane, and shall be cut to lie flat over the opening with a minimum of 6-inches on all sides of the opening.
5. All corners of patches will be rounded with a radius of 3 inches or more.
6. An extrusion weld shall be applied around the perimeter of the patch.
7. After the extrusion weld is applied, the soil cover shall be replaced in kind with the removed sections of soil cover and seeded. The center of the patch shall be marked with a 6-inch long metal stake to allow relocation in the event the landfill is not exhumed for recycling of the metals.

Appendix D – Field Change Request Form

Field Change Request (FCR)

FCR No. __________

PART 1 **ESC Project No. ___________**

Project: Slag Landfill Sampling Date: _______________

Location: Watervliet, New York

Reference(s): Technical Specification No.: _______________________________
Construction Drawing No.:__________________________________

Description of Change Requested:

____
____
____
____
____

Reason for Change:

____
____
____

____
Originator's Signature

PART 2

Disposition: [ ] Accepted as minor change [ ] Rejected

[ ] Major FCR, accepted, requires FDEP and USEPA approval before implementation

Remarks:

____
____
____

Reviewed By: ______________________________________ ____________
CQA Officer Date

Dispositioned By: ______________________________________ ____________
Lead Design Engineer/Engineer-of-Record Date

Distribution: ____

1.0 Purpose

The purpose of this procedure is to describe the method for requesting acceptance for the implementation of field changes to design, specifications, drawings, and procedures applicable to the Removal Action.

A Field Change Request (FCR) is a document used to request and acquire the necessary reviews and acceptance for implementing a field change involving design, process, or method.

2.0 Discussion

During the course of field activities, conditions may be encountered that necessitate a change in requirements affecting design, processes, or methods.

These changes may be necessary to correct or revise a design, institute an additional requirement, or request approval for relief from an existing requirement with suitable justification. Field changes may also be requested to address and acquire guidance for unforeseen or unanticipated conditions, or to acquire acceptance for alternate methods or processes to be employed.

To provide a mechanism for controlling these changes, CQA Consultant has established a FCR system which documents a complete description of the change, acquires the necessary acceptance, and provides disposition of the request and affected documents.

3.0 Responsibilities

The Contractor initiating the field change request will complete Part 1 - Initiation of the FCR form and submit each FCR to the CQA Officer for processing and acceptance.

The Lead Design Engineer/Engineer-of-Record will be responsible for acquiring all necessary reviews and disposition(s) for each FCR. The Lead Design Engineer/Engineer-of-Record will ensure that the use of the FCR is not in conflict with contractual requirements and shall also determine (1) if the change is considered minor or requires approval by the Owner due to additional costs; (2) if the change requires FDEP and USEPA approval before implementation; or (3) if the requested change is rejected and will not be implemented. The disposition of each FCR will address the need for changes to any affected documents.

The Lead Design Engineer/Engineer-of-Record, or designee shall review all FCRs involving design, specifications, plans, drawings, or procedures and for compliance with regulatory requirements and protocols, as requested by the CQA Officer.

4.0 Procedure

4.1 General

When conditions are encountered in the field that require either a change in specified design or the need for procedural deviation in method process, a FCR may be initiated by the Contractor and submitted for review and disposition.

FCRs will be reviewed and accepted prior to implementing any field change.

4.2 Preparation

The FCR is a two (2) part form which identifies the details of the requested change and provides the disposition for the request.

Part 1 to be completed by the originator consists of the following information:

- Project (title description)
- Location
- FCR Number (sequential number)
- Date of Issue
- ESC Project Number
- Description of the requested change including referenced requirements and documents affected by the change
- Justification with an explanation of the basis or reason for the change
- Signature of the originator.

Upon completing Part 1 of the FCR, the Contractor shall submit the form to the CQA Officer. The CQA Officer will forward the FCR to the Lead Design Engineer/Engineer-of-Record for review, disposition, and acceptance.

4.3 FCR Processing, Review, and Acceptance

After the FCR has been submitted to the Lead Design Engineer/Engineer-of-Record, the Lead Design Engineer/Engineer-of-Record, or designee will review the FCR and determine the initial basis or justification for the change to be implemented. If the FCR is rejected, no further review processing will be performed and the FCR will be returned to the originator.

The Lead Design Engineer/Engineer-of-Record will review all provided input and recommendations and acknowledge the disposition recorded in Part 2 of the FCR original by signature and date. The disposition of each FCR should provide sufficient instruction to implement the requested change and address subsequent actions to be performed involving the need to revise affected documents such as procedures, reports, drawings, etc. Major FCRs that are to be implemented will be submitted to the FDEP and USEPA prior to construction for FDEP and USEPA concurrence.

FCRs that are deemed by the CQA Consultant to be "Accepted as a Minor Change," based on the Lead Design Engineer/Engineer-of-Record's review/disposition, will be implemented in the field without FDEP and USEPA approval. Distribution of the completed FCR, with supportive documentation, will be shown on the FCR form (Attachment A). FDEP and USEPA approvals will be provided on separate letter responses to each affected FCR.

5.0 Records

The CQA Officer shall file every FCR. The FCRs shall be archived in accordance with the requirements of this CQAP.

Appendix E - Nonconformance Report

Nonconformance Report

NCR No. __________

PART 1 **ESC Project No. ___________________**

Project: Slag Landfill Sampling Date: ______________

Location: Watervliet, New York

Reference(s): Technical Specification No.: ______________________________
Construction Drawing No.: ______________________________

Nonconformance Description:

____
____
____
____
____

____
Originator's Signature

PART 2

Disposition: [ ] Accepted as is (See FCR No.________)

[ ] Rework/reperform work to satisfy intent of the specifications and drawings

Remarks:

____
____
____

Reviewed By: ____________________________________ ______________
CQA Officer Date

____________________________________ ______________
Other Date

Dispositioned By: ____________________________________ ______________
Lead Design Engineer/Engineer-of-Record Date

Distribution: ____

1.0 Purpose

The purpose of this procedure is to establish and provide a system for identifying, reporting, evaluating, and dispositioning nonconforming items to prevent their inadvertent use or installation.

2.0 Scope

This procedure applies to permanent installations and items of hardware or materials which are procured, constructed, installed, or used in conjunction with the Removal Action activities. This procedure does not apply to expendable tools, supplies, or temporary equipment, items or materials.

3.0 Definition

3.1 Nonconformance

A deficiency in characteristic, documentation, or procedure that renders the quality of an item or material unacceptable or indeterminate.

3.2 Disposition

A disposition is a written order to correct or place a nonconforming condition into a conclusive form. Acceptable dispositions may require nonconforming conditions to be repaired, reworked, scrapped, or used-as-is with suitable justification.

4.0 Discussion

This procedure for the control of nonconforming items and materials has been established by the CQA Consultant to ensure that such conditions are properly identified, reported, evaluated, and dispositioned. The application of this procedure is intended to augment the requirements of the CQAP. Any conflicts between the requirements of this procedure and the CQAP shall be brought to the immediate attention of the CQA Officer for resolution.

5.0 Responsibilities

The CQA Inspector initiating the Nonconformance Report (NCR) will provide a detailed description of the nonconforming condition(s), including any reference(s) to drawings, specifications, or procedures which may provide acceptance criteria for the item or material being reported. The CQA Inspector will acquire a nonconformance report number from the CQA Nonconformance Report Log and shall submit the report to the CQA Officer. The CQA Officer will forward the NCR to the Lead Design Engineer/Engineer-of-Record who is responsible for acquiring the disposition.

The CQA Officer, or designee, will maintain a log of NCRs which shall reflect the current status of each report.

The Lead Design Engineer/Engineer-of-Record will be responsible for receipt and review of the initiated NCR. The Lead Design Engineer/Engineer-of-Record shall also be responsible for providing the recommended disposition.

The CQA Inspector assigned to verify the performance of the disposition and any corrective action measures shall verify and attest to the completion of such measures by signature and date on the NCR form.

6.0 Procedure

6.1 General

The Contractor or CQA Inspector engaged in project work who discovers a nonconforming condition shall immediately notify the CQA Officer via submittal of a formal NCR.

Any nonconforming conditions that can be immediately corrected within the Contractor's scope of work may not require the initiation of an NCR. However, in all cases, an NCR will be issued for:

a) Nonconforming conditions that are required to be documented in accordance with contractual requirements;

b) Nonconforming items or materials, supplied by others, which are not with the Contractor's scope of work, or responsibility, for repair or rework;

c) Nonconforming conditions that may require extensive repair or rework, engineering evaluation, or significant corrective action measures;

d) Nonconforming conditions that are repetitive; and

e) Nonconforming conditions, items, or materials whose failure could attribute to undue risks to the health and safety of personnel.

6.2 Preparing and Processing the Nonconformance Report

After the condition has been determined to be nonconforming, an NCR will be initiated in accordance with this procedure. Each nonconforming condition will be brought to the immediate attention of the CQA Officer. The CQA Inspector initiating the report will log the NCR, acquiring a sequential number from the CQA Nonconformance Log and shall complete the initiation (i.e., upper) portion of the report. The original NCR will be immediately submitted to the CQA Officer with a copy submitted to the Lead Design Engineer/Engineer-of-Record and the Contractor. Nonconforming items or materials will be identified and/or segregated in accordance with Section 6.3 of this procedure.

The Lead Design Engineer/Engineer-of-Record will evaluate the nonconforming condition and provide a recommended disposition (repair/rework, reject, or accept as-is). After the disposition and any steps for corrective action have been determined, they will be reviewed by the Contractor who shall sign and date the "accepted by" line in the disposition portion of the NCR. The Lead Design Engineer/Engineer-of-Record will send the original NCR to the Contractor for performance of the disposition. A copy will also be sent to the CQA Officer.

After the disposition has been performed, verification shall be documented by signature and date of the CQA Inspector performing the verification. The completed NCR original shall be sent by the CQA Officer to the Lead Design Engineer/Engineer-of-Record with a copy submitted to the Contractor. The Lead Design Engineer/Engineer-of-Record will maintain the original NCR in the project file and shall be responsible for any required distribution prior to filing. If the NCR prompts any change, the FDEP and USEPA must approve of the change prior to implementation.

6.3 Tagging and Segregation

The CQA Inspector will identify the nonconforming item(s) or material(s) by affixing a "hold tag", which will reflect the NCR Number, date of the report and name of the Inspector and a brief description of the nonconformity (i.e., material not per specification, incorrectly installed, damaged, or failed required test(s), etc.).

When the use of hold tags is considered impractical, item(s) or material(s) should be segregated to prevent inadvertent use. All hold tags will be removed from items or materials upon completion of disposition activities.

7.0 Records

Each completed NCR will be maintained on file in accordance with the CQAP.