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1.0 Introduction

This Voluntary Clean-Up Program (VCP) Investigation Work Plan (Work Plan) was developed to meet the New York State VCP site characterization requirements at the Closed Alumax Extrusions, Inc. facility, located at 320 South Roberts Road, Dunkirk, New York (Site). Alcoa Inc. (Alcoa), as the Volunteer, has received correspondence dated 25 July 2002 from Mr. Glen Bailey, Senior Attorney with the New York State Department of Environmental Conservation (NYSDEC), indicating that their VCP application is complete and that they are eligible to participate in the VCP as a PRP Volunteer. Accordingly, Alcoa has submitted an executed copy of the VCP Agreement and is submitting this Work Plan for review by NYSDEC in parallel with finalization of the Agreement. It is Alcoa's desire to have this Work Plan appended to the final Agreement. The site location and general site layout are shown on Figures 1 and 2, respectively.

The scope of work presented in this Work Plan is based on previous Phase I, II, and III Environmental Site Assessments and a Chlorinated Hydrocarbon Investigation, as discussed herein. Each of these reports has previously been provided to the NYSDEC. Sample results presented in these reports indicated the presence of chlorinated hydrocarbons in soil and groundwater within certain areas of the site exceeding the NYSDEC Technical Assistance Guidance Manual (TAGM) soil clean-up objectives. The site is entering the VCP to address the concerns associated with the chlorinated hydrocarbons, with the goal of achieving a release of liability at the site under the VCP and returning the property to productive use as an industrial site. In addition to restricting future use to industrial development, institutional controls (e.g., soil management plan and/or soil cover/paving requirements; site use restrictions) may be required for portions of the site. These items were considered when deriving the level of detail for the scope of work.

Site history, potential environmental conditions, description of the existing conditions, evaluation of data gaps, and the proposed scope of work are presented herein.

1.1 Site History

The purpose of this brief summary is to provide an introduction to the history and potential concerns associated with the property located at 320 South Roberts Road, Dunkirk, NY.

In July 1998, Alcoa acquired the assets of Alumax Inc., and with this acquisition the property in Dunkirk, New York. Alcoa is now the owner of the property as the successor to Alumax Inc.

At the time of the acquisition, the Alumax property had been idled and Alcoa has conducted no operations at the site since the acquisition. The property had been used as a heavy industrial property for nearly a century prior to acquisition by Alumax.

Alcoa has undertaken four phases of site investigation including cleanup of some site soils, a former oil storage tank site, and storm drain sediments. These investigation results and cleanup activities are documented in the following reports, incorporated by reference in the current submittal:

- **Phase I Environmental Site Assessment of 320 Roberts Road, Dunkirk, New York.** Prepared by ICF Kaiser Engineers, December 15, 1998.

- **Phase II Environmental Site Assessment of the Closed Alumax Extrusion Facility, 320 South Roberts Road, Dunkirk, New York.** Prepared by IT Corporation, July 19, 1999.

- **Phase III Environmental Site Assessment, The Closed Alumax Extrusions, Inc. Facility, 320 South Roberts Road, Dunkirk, New York.** Prepared by IT Corporation, October 2000.

- **Chlorinated Hydrocarbon Source Investigation, The Closed Alumax Extrusions, Inc. Facility, 320 South Roberts Road, Dunkirk, New York**. Prepared by IT Corporation, January 2002.

These reports collectively document what is currently known about the environmental conditions at the property, as well as specific actions that have been taken to date to address certain instances of environmental contamination. The Phase I Environmental Assessment focused on historical activities and current site observations to identify potential environmental conditions. The Phase II Report presents the findings of sampling activities performed to further evaluate conditions identified in the Phase I. The Phase II activities focused on items that were of concern to a then potential purchaser. The Phase III activities included remediation of concerns identified in the Phase II. The potential purchaser also installed wells on the property boundary between the former Alumax Extrusions property and the adjacent Roblin Steel property to assess groundwater quality. The sample results of the offsite wells indicated the presence of chlorinated solvents in offsite groundwater and a focused groundwater investigation was included in the Phase III scope of work. The Phase III sample results and groundwater elevations resulted in conflicting interpretations for the origin of the chlorinated hydrocarbons. The "Chlorinated Hydrocarbon Investigation," which included ground penetrating radar/ geophysical, soil gas, and soil sampling activities was intended to determine whether a source of chlorinated hydrocarbons existed on the subject property. The findings of this investigation identified a suspected former aboveground storage tank, the remnants of which are visible within the floor of the main building and also identified elevated concentrations of chlorinated solvents in soils in the vicinity of the suspected tank.

1.1.1 Property History

<u>**Brooks Locomotive/American Locomotive Company (1918-1962)**</u>

Volunteer's relationship - none

The Brooks Locomotive Company and American Locomotive Company (American Locomotive) initially developed the subject property, along with adjacent properties to the north and west, as a locomotive manufacturing facility. This was a fully integrated facility that included foundries; metal working, painting, and finishing shops; offices, and a coal burning power plant. American Locomotive also produced military equipment during World War II, including artillery guns, gun cartridges, fragmentation bombs, thrust shafts, missile housings, nozzles, boosters, and other components. Plans from the 1950s and 1960s indicate that American Locomotive manufactured boilers and heat exchangers. Non-destructive testing was performed, including the use of x-ray equipment. The Atomic Energy Commission contracted American Locomotive after World War II to manufacture nuclear reactor components and packaged reactor units. A radiological survey was performed on the property during the Phase II ESA indicating levels consistent with background. American Locomotive also manufactured components of the crawler for the Apollo/Saturn V Space Rocket. Few site plans are readily available and site operations pertaining to hazardous materials storage and handling are not well documented for the time frame during which American Locomotive operated the property.

The subject property (i.e., former Alumax facility) was listed during the early stages of its operation by American Locomotive as a foundry, pattern shop, wood kiln, finishing shop, and coal storage area. A later plan showing American Locomotive Thermal Products Division indicated that the subject property was used for the manufacture of heat exchanger parts, fin tubes, prefabricated refinery and other high pressure tubing, fin tubing and fin tubing bundles.

Properties adjacent to the former Alumax facility during the American Locomotive Company operations included the following:

- coal-fueled power plant,
- paint shop,
- pipe dipping and boiler shop,
- oil cellar,
- maintenance shop,
- pickling,
- sheet metal fabrication,
- tube bundle manufacturing,
- assembly and testing of heat exchangers,
- general machining,
- shot blast,
- application of corrosion preventative coating,
- missile fabrication and heat treating,
- light machining and paint shop,
- non-radioactive equipment fabrication for the nuclear industry ,
- pipe fabrication, and
- fuel oil storage.

Progress Park (1963-1969)

Volunteer's relationship - None

Progress Park purchased the former American Locomotive property for redevelopment. Progress Park leased portions of the former American Locomotive property to (Figure 2):

- **Roblin Steel** (adjacent and to the north of the former Alumax property);
- **Plymouth Tube** (adjacent to the northwest of former Alumax property);
- **Cendella Wood Products** (adjacent to the west of the former Alumax property);
- **Meissa Laboratories** (occupied an unknown portion of Progress Park).

Allegheny Ludlum (1969-1972)

Volunteer's relationship - None

Records concerning Allegheny Ludlum's activities at the site are not well documented. Allegheny Ludlum is known as a specialty steel manufacturer.

Aluminum Extrusion, Small Business (1972-1976)

Volunteer's relationship - None

A small aluminum extrusion company purchased the property in 1972 for the purposes of starting an aluminum extrusion business. According to the owner of this business, a Mr. Sam Avny, only one batch of aluminum molding was extruded due to an aluminum shortage. In 1975 the business was sold to Alumax Extrusion, Inc.; this sale included the aluminum extruder.

This business had an oil sump associated with the hydraulic press and the owner indicated that he had used transformer oil as dust suppressant. Soil sampling has been performed in this area and PCBs were not detected above NYSDEC TAGM soil clean-up objectives. No other information on chemicals and wastes produced is available.

Alumax Extrusion Inc. (1976-present)

Volunteer's relationship – Current Owner

Alumax Extrusion Inc. (acquired by Alcoa Inc. in July 1998) manufactured extruded aluminum window moldings at the facility until closing in November 1993. A paint line was added during the 1980s. The office building located near South Roberts Road was built in the early 1990s.

Chemicals used and wastes generated on-site include non-PCB hydraulic oil for presses, paint, non-chlorinated paint solvents, sodium hydroxide, ammonia, chlorine, thermofil insulation, calcium chloride, methylene chloride, detergent, sodium metabisulfate, sulfuric acid, muriatic acid, polymer, butyl carbitol, diacetone alcohol, xylene, diesel fuel, isopropyl alcohol, and chrome-containing solution. Chlorinated solvents were not used as part of the process.

Decommissioning activities have been performed since 1998 and have included removal of most of the plant equipment. Environmental assessment activities were initiated in concert with a proposed sale of the property. Remedial activities have included removal of swale soils, cleaning out oil sumps and catch basins, removal of the paint line, decommissioning of the wastewater treatment facilities, closing-in the onsite gas well, and soil and groundwater testing. These activities are more fully detailed in the Phase III Environmental Site Assessment (October 2000).

1.1.2 Neighboring Property Investigations

Investigations are ongoing at the adjacent former Roblin Steel and Edgewood Warehouse facilities. Chautauqua County Department of Public Facilities has submitted a "Draft Site Investigation/Remedial Alternatives Report Work Plan" for the former Roblin Steel facility. The following investigation reports have been completed for neighboring properties and provide testimony to the heavy industrial land use history for the area:

- **Environmental Site Review of Roblin Steel Plant Site, Dunkirk, New York**, Acres International Corporation, January, 1989.
- **Phase II Environmental Site Assessment, Roblin Steel Plant**, Dunn Geoscience Corporation, October 1990.
- **Groundwater Asssessment, Roblin Steel Plant, Dunkirk, New York**, Harrison Hydrosciences, May 1991.
- **Analysis of Soil and Slag Piles for Lead, Roblin Steel Site**, Roy F. Weston, Inc., January 1994.
- **Groundwater Investigation Report, Common Boundary of the Former Roblin Steel and Alumax Extrusion Sites**, Clough Harbour and Associates, 1999.
- **Draft Site Investigation/Remedial Alternatives Report (SI/RAR) Work Plan for the Former Roblin Steel Site (NYSDEC Site No. B00173-9), 320 South Roberts Road, City of Dunkirk, Chautauqua County, New York**, TVGA Engineering, Surveying, P.C., April 2002.
- **Phase I Environmental Site Assessment Report, Edgewood Warehouse**, Clough Harbour and Associates, October 1997.
- **Phase II Environmental Site Assessment Report, Edgewood Warehouse**, Clough Harbour and Associates, May 1999. (was unavailable for review, but referred to in the SI/RAR Workplan for Roblin Steel)

These reports indicate that a number of hazardous materials and wastes were associated with these neighboring facilities, including chlorinated solvents, pickle liquor, oil and greases, electric arc furnace dust, PCB oil, and pesticides. The current VCP anticipates an investigation only of the former Alumax facility; it is Alcoa's understanding that the investigation of the Roblin Steel site by Chautauqua County will proceed along a parallel, but independent, track with the NYSDEC.

1.2 Contemplated Use

The site use is expected to remain "Restricted Industrial" or potentially "Restricted Commercial," as defined by "Draft - Voluntary Cleanup Program Guide" (NYSDEC, 2002).

> **Restricted Commercial** – Residential Uses are not allowed in this category. Commercial uses are allowed but require engineering controls and/or institutional controls. Some types of "commercial" uses that could create "residential" types of exposures are excluded, such as day-care and health care facilities. Retail stores, warehouse/distribution centers, service facilities, and office complexes would be included in the commercial definition.
>
> **Restricted Industrial** – Residential and commercial uses are not allowed. Industrial uses are allowed but they require the use of engineering controls and/or institutional controls. Metalworking, manufacturing, and other industrial uses are included in this category.

2.0 Field Activities Plan/Scope of Work

The field activities plan/scope of work described below includes a description of potential areas of concern, current conditions, data gaps, and proposed investigation/actions. Many of the potential areas of concern identified in the Phase I Environmental Site Assessment have been addressed in subsequent investigation and remedial activities, which are included in the discussion. Areas identified for additional site work are discussed in Section 2.1 and areas that do not warrant further site work at this time are discussed in Section 2.2. Although areas identified in previous work are discussed separately in Sections 2.1 and 2.2 to provide a more comprehensive understanding of the site, additional work under the VCP concerning soils issues will be included in a sitewide soils investigation section. The only exception to this is the chlorinated hydrocarbon residual source area, which Alcoa believes is sufficiently characterized at this time to permit implementation of an interim remedial measure (IRM). The IRM Work Plan for this area will be submitted under separate cover. Areas discussed in Section 2.1 and 2.1 are shown on Figure 2. The following areas are included in Section 2.1:

- Sitewide groundwater;
- Chlorinated solvent area (Soils);
- Storm water Swale
- Sitewide Soils
- Oil Residue in the equipment pits.

The following potential areas of concern identified in the previous reports are discussed in section 2.2, as areas that do not warrant further site work:

- The sewer catch basins;

- Fill materials near the southern property line;
- Surface scars noted on historical aerial photographs (1938 and 1956);
- Paint overspray coating the walls of the paint booth exhaust tower;
- A gas well and associated equipment;
- A twelve-inch diameter bedrock well ;
- A soil pile (estimated to be several cubic yards in volume) found in a pit located in the southwest corner of the building adjacent to a waste storage area;
- Spreading of potentially PCB-containing, transformer oil in the northwest corner of the Site by a former owner as a dust control method;
- Former oil containing transformers located on north side of building;
- Potential issues related to a historical notation describing the building as a containing nuclear shop and manufacturer of nuclear components. The Nuclear Regulatory Commission and New York State Radiological Health Unit did not have the Site or any facility in the Site area listed as a radiation source. A radiological survey was performed on the property during the Phase II ESA indicating levels consistent with background;
- Niagara Mohawk, Substation – This facility was located adjacent to the Site on the south.

The following areas are not discussed in detail in Section 2.2, but will be addressed during routine final decommissioning of the facility in preparation for any upcoming divestiture, and will not be included in the areas for which Alcoa will request a release of liabilities pursuant to the VCP:

- Miscellaneous small quantities of chemical containers present on Site;
- Chemical Residues (limited amounts of paint pretreatment chemicals and caustic used for pretreatment of process water in accordance with the industrial discharge permit);

Items associated with asbestos and lead paint are not included in this scope of work. However, asbestos and lead paint surveys have been performed at the site and the results are presented in the Phase II ESA, previously presented to the NYSDEC as part of the VCP application. Although asbestos containing building materials and lead paint are not included in the VCP, remediation of these materials may be covered under other local, State, and Federal regulations.

2.1 Proposed Site Characterization Work

This section addresses each of the potential areas of soil and ground water contamination that have been identified and evaluated in previous investigations, and documents the additional characterization proposed under the VCP and deemed necessary to more fully characterize each of these areas, consistent with VCP requirements. In certain instances, Alcoa believes that the studies to date have fully characterized areas of contamination and no further investigation is contemplated; these areas are discussed in Section 2.2. Each of the areas is shown on Figure 2. All site work will be in accordance with the Site Health and Safety Plan (Appendix A), the Field Sampling Plan (Appendix B), and the QA/QC Plan (Appendix A). Data usability summary reports will be prepared and provided upon completion for data presented in the Phase I, II, and

III ESAs and the Chlorinated Hydrocarbon Investigation Report to further support this work plan.

2.1.1 Sitewide Groundwater

Current Conditions

The groundwater investigation on the subject property has consisted of the sampling of three wells, one bedrock well (PW1) on the south side of the property and two bedrock/soil interface wells (AL-1 and AL-2) on the north side of the property. One round of samples has been collected from each of the wells. The groundwater from the bedrock well was sampled for TCL volatile organic compounds and semi-volatile organic compounds, TAL Metals, radiological parameters (gross alpha, gross beta, and gamma), and PCBs. The sample from this well met the Federal Drinking Water Standards and the NYSDEC TAGM clean-up levels for the parameters analyzed. Monitoring Wells AL-1 and AL-2 were installed to evaluate the presence of chlorinated hydrocarbons on the subject property. These wells were only tested for chlorinated volatile organic compounds. AL-2 did not detect any compounds above the detection limits. One sample and duplicate were collected and analyzed from AL-1, both analysis indicated the presence of trichloroethylene, 1,2-dichloroethylene, and vinyl chloride exceeding the TAGM clean-up levels.

Data from wells located on the former Roblin Steel property, located to the north of the site, are provided on Figure 3. The water quality data generally show that the extent of the chlorinated hydrocarbon impact is limited. However, some of the data were collected in 1991 and may not represent current conditions. The former Roblin Steel Property is subject of an independent investigation and further offsite (relative to the Former Alumax facility) investigation is not proposed as part of this scope of work.

Data Gaps

Information from the phased site assessments indicates a localized plume of CVOCs and no site impacts in groundwater in PW-1, located in the central portion of the site. However, further on-site groundwater investigation is recommended to better understand the sitewide hydraulic gradient and to identify the extent of potential impacts on groundwater quality from historical on-site and off-site operations.

Supplemental Investigation

An additional 4 shallow wells and three deeper bedrock wells are proposed (Figure 5). The shallow wells will be installed in a similar manner as AL-1 and AL-2 to provide hydraulic gradient information in the shallow groundwater. The deeper wells will be screened in bedrock, approximately at a depth of 40-60 feet below ground surface with a maximum screened interval of 10 feet. The bedrock wells will be used in conjunction with PW-1 to determine water quality. Three newly installed bedrock wells will be used to define the groundwater flow gradient in bedrock. PW-1 will not be used to determine flow gradient because the new wells will be constructed differently.

The shallow wells will be located near the east and west corners of the northern property line and at locations toward the east and west ends of the southern property line. Based on the known information on the depth to bedrock, it is believed that three wells will be screened entirely in bedrock and only the well to be installed in the northwest corner of the property will be screened across the bedrock/soil interface. The wells will be developed until a turbidity of less than 10 NTUs is obtained or a minimum of 5 well volumes has been removed.

One of the bedrock wells will be located near AL-1 and the second will be located to the northwest of the building, near the location of the one of the new shallow wells. These wells will be used in conjunction with PW-1 to evaluate groundwater quality in the bedrock and to determine whether any vertical hydraulic gradients exist between the shallow and deeper (PW-1) ground water zones.

The on-site wells (AL-1, AL-2, Al-3, AL-4, AL-5, AL-6, PW-1, AL-1D, AL-3D, and AL-4D will be sampled for TCL VOCs and SVOCs, and TAL metals. A duplicate sample, a field (equipment) rinsate blank, and a trip blank (one per shipment of samples for VOC analysis) will be collected for QA/QC purposes. QA/QC plan, provided as Appendix C provides full discussion of the QA/QC requirements.

The top of casing and ground surface elevations will be surveyed within 0.01 foot by a NYS licensed surveyor.

Slug tests will be performed on each of the wells in accordance with standard protocols.

2.1.2 Chlorinated solvent area (Soils)

Current Conditions

The investigation on the subject property to date has consisted of installation and sampling of two wells located on the north property line, a ground penetrating radar survey for underground utilities and other structures, a passive soil gas survey, and the completion and sampling of 9 geoprobe soil borings in the vicinity of a suspected aboveground storage tank. One round of samples has been collected from each of the wells. Monitoring Wells AL-1 and AL-2 were installed to evaluate the presence of chlorinated hydrocarbons on the subject property. These wells were tested for chlorinated volatile organic compounds. There were no detections in the sample from AL-2. One sample and a duplicate sample were collected and analyzed from AL-1; both analyses indicated the presence of trichloroethylene (TCE), 1,2-dichloroethylene (DCE), and vinyl chloride (VC) exceeding the TAGM clean-up levels. The relative proportions of TCE:DCE suggest that significant anaerobic dechlorination has occurred and that the incidence of initial contaminant release to soils occurred some time ago, perhaps as much as 20 – 30 years ago. AL-1 is located in the immediate vicinity of the suspected location of the former above ground storage tank.

A seven–foot diameter iron ring was noted in the concrete floor of the main plant building during the ground penetrating radar survey. This area also indicated the highest concentrations of chlorinated hydrocarbons during the passive soil gas analysis. The soil sampling also indicated the highest concentrations of chlorinated hydrocarbons (TCE – 1,500 mg/kg) in proximity of the suspected former AST location. Delineation of the chlorinated hydrocarbons in soils has been completed to TAGM levels to the east and north and is delineated to 10 times TAGM to the north, east, south, and west.

Data Gaps

Based on the above described delineation, it is believed that the residual source area has been delineated sufficiently to propose an appropriate remedial action, and no further soil characterization prior to remedial action is planned.

Although additional characterization of this area will ultimately be performed in this area, Alcoa anticipates proceeding with remedial activities to address the currently defined body of soils containing CVOCs exceeding TAGM levels. An IRM or Remedial Action Work Plan for an *in situ* treatment method (ISCO) will be prepared and sealed by a Professional Engineer and submitted to address the residual source area. This is seen as an aggressive first action to address a known concern, which will ultimately lead to the final remedy. Absent any known ground water receptors, Alcoa believes that once the source control IRM has been implemented, the appropriate course of action would then be long-term monitored natural attenuation (MNA), coupled with institutional controls to preclude impact to any future potential receptors. Alcoa will submit the approach to NYSDEC for review, and will then coordinate the remediation of these soils with a plan for further characterization. Because it is Alcoa's desire to divest the property, addressing the residual source area remediation in a proactive manner will aid in the meeting the clean-up goals for both soil and groundwater and also allow for the property to be returned to productive industrial use as quickly as possible. NYSDEC will be consulted on the remedial activities as they progress.

To satisfy VCP groundwater characterization requirements and provide consistency in the approach, groundwater issues will be approached via the sitewide evaluation as indicated in Section 2.1.1.

Supplemental Investigation

Subsequent to implementing the interim remedial measures, perform confirmation and delineation sampling for chlorinated hydrocarbons via additional soil borings. These samples will be analyzed for TCL VOCs to determine the effectiveness of the treatment and if additional treatments or remediation is needed.

2.1.3 Stormwater Swale

Current Conditions

The soils in the southern swale were removed to bedrock. In May 2000, approximately 15 cubic yards of soil were removed from this area and properly disposed at a regulated facility, Chemical Waste Management, Model City, New York. Sampling performed in May 1999 during the Phase II ESA indicated the presence of PCBs and PAHs exceeding the TAGM soil clean-up objectives. Arsenic exceeded the statewide background concentration. Based on the site history, the elevated arsenic concentrations are most likely associated with the coal storage on the property. Background arsenic concentrations in the site area are relatively high, close to the statewide background concentration. Therefore, even limited contribution from the historical site activities may result in an exceedance of the statewide background concentrations.

Data Gaps

Post remediation confirmation samples were not collected.

Additional Activities

Collect three confirmation samples (Figure 5). Samples should be analyzed for PCBs, TCL SVOCs, and arsenic. Based on the results of the confirmatory sampling, a portion of this area may be included in soil management plan and paving/cover program.

2.1.4 Oil Residue in the equipment pits

Current Conditions

The oil residue in the two equipment pits, one in the central portion of the north bay and the other located in the east portion of the central bay of the main building, has been removed and containerized. The oil consisted of non-PCB containing oil used in the hydraulic presses of the aluminum extruders. After removing the contents, the pits were backfilled with clean fill to grade, thus eliminating the hazard of the open pits.

Data Gaps

No sampling has been performed in the vicinity of these sumps.

Supplemental Investigation

Two borings are proposed in the vicinity of each of the sumps to characterize subsurface conditions (See Figure 6). The zone exhibiting the highest organic vapor readings on a field photo ionization detector (PID) and degree of staining will be sampled for analysis from each boring. Absent any visual staining or elevated organic vapor readings, two soil samples will be submitted for analysis (one from the top 2 inches of soil and one from the interval just above bedrock. These samples will be analyzed for TCL VOCs, TPH, and SVOCs.

2.1.5 Sitewide Soils

Current Conditions

The sitewide soils investigation to date has been biased to include areas that are most likely to have been impacted by past operations. This investigation has included the collection and analyses of 27 soil samples. These samples were analyzed for constituents which, based on the site's history, were most likely to have been associated with past operations. Eleven of these samples were analyzed for TCL VOCs, TCL SVOCs, PCBs and TAL metals, which is considered to be a fairly comprehensive suite of analyses. Pesticides and herbicides were not analyzed because historical site use did not indicate a concern. The individual areas investigated are discussed in Sections 2.2 and 2.3. Figure 6 shows the sampling locations and the parameters collected at each location.

Data Gaps

Because sample locations were biased towards certain areas of interest, samples were not collected over the entire site. Additional samples should be collected in the unpaved areas of the site to assess potential exposure risks and provide a basis for an ultimate Soils Management Plan or plan to cover/pave certain of these areas. The unpaved areas are located in the southeast and southwest portions of the site. NYSDEC has also requested that additional samples be collected from beneath the pavement.

Supplemental Investigation

Four surface samples [0-2 inches, in accordance with NYS Department of Health (NYSDOH) Guidelines] will be collected from the unpaved areas, as shown on Figure 6. These samples will be analyzed for TCL VOCs, TCL SVOCs, TAL metals, and TCL pesticides/herbicides.

Five near surface samples will be collected from the top 2 inches of soil beneath the pavement at locations shown on Figure 6. The samples collected from beneath the pavement will be analyzed for TCL VOCs, TCL SVOCs, and TAL metals.

Additionally, all soil samples collected at specific units during the VCP process will be incorporated into and evaluated in the context of the sitewide soils evaluation.

2.1.6 Sewers and Sewer Catch Basins

Current Conditions

The sewer catch basin sediments were cleaned and scraped using hand tools and the materials were removed into a vacuum truck. All catch basins outside the north, east, and west sides of the building showing visually impacted sediments were cleaned. Based on visual inspection, the catch basins on the south side of the building did not appear impacted and were not remediated.

During plant decommissioning, Alumax vacuumed the drainage tunnel that predominantly trends east-west within the building. This work is not documented in any report. This area was inspected during the Phase I ESA and did not appear to contain any sediment.

Data Gaps

Sediment was removed and disposed offsite at a regulated facility. NYSDEC requested that the sewers be evaluated further to determine if there is a potential that contaminated sediments remain in the sewers. NYSDEC also requested that the potential for the sewers to act as a route for the offsite migration of contamination be evaluated. Alcoa discussed the offsite migration via sewer lines with NYSDEC and indicated that the sewers leading offsite are not present in the vicinity of the known TCE contamination. However, a former fire water line and an unknown ground penetrating radar (GPR) anomaly are present in the area and would be investigated.

Supplemental Investigation

Accumulation points, such as the catch basins will be inspected to determine if a remaining source of sediment is likely within the on-site sewers. Based on this inspection, a determination will be made as to the need for additional cleaning of the sewers.

To determine if the sewers are a migration route for offsite contamination, the sediment and water from the offsite sewer, accessed MW-12 on the former Roblin property, will be sampled and analyzed for TCL VOCs and SVOCs (assuming access is granted). This should provide an indication if this sewer is a significant route of contaminant migration; however, other sources also contribute to the sewers and contamination, if identified, is not necessarily associated with the subject site.

To determine if potential migration routes exist from the known TCE impacted area to offsite sewers, three soil borings will be placed at five feet spacing perpendicular to the former fire water line and the GPR anomaly (Figure 7). One sample will be collected from each boring and analyzed for TCL VOCs. The samples will be collected from the base of the backfill material, if a trench is identified, or the highest organic vapor reading. If the trench is not identified and organic vapors are not identified the sample will be collected from the interval two feet above bedrock or groundwater, whichever is encountered first.

2.2 Areas Not Selected for Additional Site Characterization Work

This section describes areas that are not identified for further characterization or are incorporated into the site-wide groundwater and/or soils evaluation. These areas are discussed separately in this section in order to 1) describe these areas, 2) provide the current status, and 3) provide a summary of sampling and clean-up activities in these areas.

2.2.1 Fill materials near the southern property line (along railroad retaining wall)

Current Conditions

Three soil samples were collected from fill material located along the railroad retaining wall on the southern property line. This fill material primarily consists of shale rock fragments and is believed to have originated on-site, potentially during construction of the stormwater swale. The samples indicated the presence of metals and PAHs. In addition to total metal and PAH concentrations TCLP PAHs and TCLP metals were analyzed to determine the potential for leaching and for comparison to the NYSDEC alternative clean-up standards. The TCLP analyses did not indicate that PAHs would leach from this material (i.e., no PAHs were detected at concentrations exceeding the method detection limit in the TCLP leachate.) The analytical concentrations were compared to human health risk criteria for industrial soils and found to be within acceptable standards. This evaluation is documented in the Phase III Environmental Site Assessment Report (IT Corporation, October 2000).

In summary, the retaining wall fill material exceeds some NYSDEC TAGM criteria. However, Spill Technology and Remediation Series (STARS) Memo #1 Petroleum-Contaminated Soil Guidance Policy (NYSDEC, 1992) criteria and risk based human health criteria (USEPA Region III Risk-Based Concentrations [RBCs]) were not exceeded for industrial land use. Therefore, this material is not believed to present a health risk for the proposed site use. In addition, as this material may be acting as support for the railroad retaining wall, caution would be advised in the event that any of these materials were to be disturbed and specific approval would need to be obtained from the railroad prior to any earthmoving activities in this area.

Data Gaps

None.

Supplemental Investigation

The area should be included in the soil management plan for the site.

2.2.2 Disturbed Soil Area

Current Conditions

Two soil samples were collected from an apparent area of disturbance noted as a ground scar on an historical aerial photograph. Fill material containing coal and slag was identified in one boring in this area. Site plans reviewed indicate that this was a coal storage area for the power plant located on the adjacent property. Ten (10) SVOCs exceeded NYS recommended soil clean-up objectives. Nine (9) metals were detected exceeding default statewide background concentrations. The SVOCs detected are generally associated with coal and coal tar derivatives. This is consistent with historical site use as a coal storage area. The metal results are generally consistent with sitewide analytical results. This area is paved.

Data Gaps

None.

Supplemental Investigation

A data usability summary report should be prepared. The area is to be included in the soil management plan and the existing paving will be required to be maintained; therefore, no additional characterization is deemed necessary..

2.2.3 Paint Overspray

Current Conditions

Paint Booths have been removed and relocated for use at another facility.

Data Gaps

None.

Supplemental Investigation

None.

2.2.4 Gas Well and Associated Equipment

Current Conditions

Equipment associated with a gas well is located outside of the south side of the building. This equipment includes the following:

- Gas Metering Equipment;
- Gas Pressure Regulator; and
- AST for condensate.

None of this equipment has been in use since approximately 1995. No staining was noted in site soils; the AST was empty when inspected during the Phase 1 ESA and the well is temporarily closed. The well is still capable of producing gas and is seen as an asset to the property.

Data Gaps

None.

Supplemental Investigation

No further actions planned.

2.2.5 Twelve-inch Diameter Bedrock Well (PW-1)

Current Conditions

A 74 feet deep bedrock well is located southwest of the main building. This well was reportedly drilled as a production well for an on-site water supply. However, based on observed drawdown during purging and sampling, the well is capable of producing only a limited amount of water. One sample has been collected from this well. This well was sampled in 1999 as part of the Phase II ESA and analyzed for TCL VOCs, SVOCs, TAL metals, PCBs, TPH, and radiological parameters. Only naturally occurring metals were detected above the detection limits. All analytical results met drinking water standards.

Data Gaps

None.

Supplemental Investigation

Prepare data usability summary report for analytical data. May wish to include in site wide groundwater program or abandon properly.

2.2.6 Miscellaneous Small Quantities of Chemicals

Current Conditions

Small containers of chemicals were identified, primarily in the former maintenance shop. These containers primarily contain paint; however, small quantities of other products (such as, ink, oil, muriatic acid) are present. A full inventory is provided in the Phase I ESA Report.

Data Gaps

None.

Supplemental Investigation

Lab pack and dispose of properly offsite in conjunction with final facility decommissioning.

2.2.7 Soil in the Southwest Corner of Building

Current Conditions

The Phase II sample results for the fill material located in the southwest corner of the building evidenced levels that were generally within the range of background soil samples or below NYSDEC TAGM Soil Clean-up Objectives. Background nickel concentrations were not analyzed; however, the nickel concentration for this fill material (115 mg/kg) is well below the USEPA Region III industrial RBC (41,000 mg/kg). Considering that this material is located in a vaulted area (i.e, is located in a concrete-lined pit preventing a direct pathway to the environment) within a building, soil criteria do not apply and reference to soil values is for comparison purposes only. Based on this evaluation, no further action is recommended for the fill material located within the southwest corner of the building.

Data Gaps

None.

Supplemental Investigation

Prepare data usability summary report for analytical data.

2.2.8 Potential PCB-containing, Transformer Oil Used as Dust Control

Current Conditions

A former property owner (Sam Avny) indicated that spent transformer oil (PCB content unknown) was used as a dust suppressant at the site. He specifically identified an area in the northwest portion of the site, inclusive of portions of the former Edgewood Warehouse and Roblin Steel properties as the area in which he had spread oil. The area is currently paved with brick. Four soil samples were collected in this area, one during the Phase II ESA and three during the Phase III ESA. The samples were biased toward a depression which could serve as a depositional area for finer-grained sediments and thereby concentrate levels of PCBs remaining in this area. The sample collected during the Phase II investigation indicated total PCBs of 1,700 ug/kg and the samples collected during Phase III indicated results below detection levels in two of the three samples. The result for the remaining sample was 216 ug/kg. These results were below the TAGM level of 10,000 ug/kg for subsurface soils. One sample was above the TAGM level of 1,000 ug/kg in surface soils; however, this sample was located beneath the brick pavement and is appropriately treated as a subsurface soil with respect to TAGM criteria.

Data Gaps

None, PCB levels met TAGM concentrations in area identified by former site owner.

Supplemental Investigation

Prepare data usability summary report for analytical data.

2.2.9 Former Oil Containing Transformers Located On North Side Of Building

Current Conditions

The transformer was removed at least 25 years ago. There were no indications of leaks on pavement observed during the site assessment activities and no known impact on the environment has been documented. One soil sample was collected in the vicinity of a former transformer (this transformer is the source of the oil discussed in Section 2.2.10) and analyzed for PCBs, with none detected. No stained soil was noted during sample collection. One soil sample was analyzed for PCBs, with none detected.

Data Gaps

None, no staining was noted and soil sample did not indicate the presence of PCBs.

Supplemental Investigation

Prepare data usability summary report for analytical data.

2.2.10 Potential Issues Related to Manufacturing of Nuclear Components

Current Conditions

The Nuclear Regulatory Commission (NRC) and New York State Radiological Health Unit did not have the Site or any facility in the Site area listed as a radiation source. An on-site radiation survey only indicated radioactivity levels indicative of background. Samples for gross alpha, beta, and gamma radiation for the on-site well (PW-1) were below detection levels.

Data Gaps

None. Information to date does not suggest that radioactive materials were ever present at the site. Real-time sampling and laboratory groundwater analysis did not indicate a concern.

Supplemental Investigation

Prepare data usability summary report for groundwater data.

2.2.11 Niagara Mohawk, Substation (adjacent to the south)

Current Conditions

A Niagara Mohawk substation is located to the south and off site of the subject property. Former transformers have been removed. No staining was noted on the subject site (Alumax). One soil sample was collected near the property line and analyzed for PCBs. No PCBs were detected

Data Gaps

None, no evidence of impact to subject site.

Supplemental Investigation

Prepare data usability summary report for analytical data.

2.2.12 Former Waste Oil Tanks

Current Conditions

Two near surface soil samples were collected in the vicinity of the decommissioned, above ground waste oil storage tank located near the northeast corner of the Main Building. The sample results indicated up to 3,600 mg/kg of total petroleum hydrocarbons (diesel range organic compounds). Benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(ghi)perylene exceeded the NYS recommended soil clean-up objectives. Arsenic, beryllium, chromium, copper, mercury, nickel, and zinc exceeded the default statewide soil background values. This was also in close proximity to an area on the Roblin Steel property where an oil spill was noted in a previous report, "Environmental Site Review of Roblin Steel Plant Site Dunkirk, New York" prepared by Acres International Corporation (1989). Metals in soils were elevated compared to sitewide analytical results. The elevated chromium and nickel concentrations may be related to electric arc furnaces formerly operated by Roblin Steel. Soils in the vicinity of the decommissioned waste oil tank were excavated and disposed offsite at a regulated facility, Chemical Waste Management, Model City, New York. A trackhoe bucket width of material, approximately 4 feet wide, was removed from the north and east side of the tank pad. The pad extends to the building on the south and to a concrete structure on the west; therefore soils were not excavated in these areas. The soil was removed down to a concrete slab that slopes back to the tank foundation. No staining was observed in the soil or on the concrete slab. The extent of characterization and remedial action already performed is fully documented in the Phase II and Phase II Environmental Site Assessment documents.

Data Gaps

No confirmation samples collected. Gravel and soil removed to concrete, no staining noted.

Supplemental Investigation

Area to be included in a soils management plan.

3.0 Laboratory Analysis

A New York State Department of Health Environmental Laboratory Analysis Program (ELAP) certified laboratory will perform all laboratory analysis used for final characterization and confirmation of remediation. Severn Trent Laboratories (STL) has been selected as the analytical laboratory for the VCP scope of work, STL (Quanterra Environmental Services, Inc which performed the analytical work for the Phase II ESA was acquired by STL) also performed the soil and groundwater analysis presented in the previous ESA reports for the site. All analysis will be performed in accordance with New York State (NYS) Department of Environmental Conservation (DEC) Analytical Services Protocol (ASP). The laboratory deliverable packages shall be consistent with NYSDEC ASP Category B deliverable requirements. DUSRs will be completed for all analytical data used for characterization or confirmation. If deficiencies are identified, they will be appropriately addressed. The following analytical methods will be used.

Analytical Methodology

Analysis	Matrix	NYSDEC ASP	Number Of Analyses
TCL VOCs	Soil	OLM04.2	24
TCL SVOCs	Soil	OLM04.2	21
TCL Pesticides/Hebicides	Soil	OLM04.2	4
TAL Metals	Soil	ILM04.1	3
PCBs	Soil	OLM04.2	3
Arsenic	Soil	ILM04.1	4
TPH	Soil	Modified 418.1	8
TCL VOCs	Groundwater	OLM04.2	11
TCL SVOCs	Groundwater	OLM04.2	11
TAL Metals	Groundwater	ILM04.1	10

4.0 Schedule and Reporting

4.1 Schedule

Preparation to begin fieldwork will be initiated upon approval of this Work Plan scope of work by NYSDEC. It is anticipated that fieldwork will be initiated within 1 month, or sooner pending availability of drilling subcontractors, of receiving NYSDEC approval.

4.2 Reporting

A final report will be issued to NYSDEC within six weeks of receiving the final laboratory data package.

The final report will include field procedures, sample analytical results, soil boring and well logs, laboratory data packages, data usability summary reports, aquifer characteristics, groundwater potentiometric surface maps, analytical procedures for derived data (such as, hydraulic conductivity and groundwater flow velocity), field measurements, and a human health exposure assessment. The exposure assessment will consist of characterizing the exposure setting, identifying exposure pathways, evaluating contaminant fate and transport.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from the site. As defined in the Draft VCP Program Guide (May 2002) an exposure pathway has five elements: 1) a contaminant source, 2) contaminant release and transport mechanisms, 3) a point of exposure, 4) a route of exposure, and 5) a receptor population.

The source of contamination is the source of contaminant release to the environment. If the original source is unknown, it is the environmental medium (soil, air, biota, water) that serves as a repository of contaminants capable of providing a continuing release to other media or directly to a receptor. Contaminant release and transport mechanisms carry contaminants from the source to points where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (i.e., ingestion, inhalation, dermal adsorption). The receptor population is the people who are or may be exposed to contaminants at the point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway are documented to exist. A potential exposure pathway exists when one or more of the five elements comprising an exposure pathway is not documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future.

To perform a qualitative risk exposure assessment, site conditions are characterized to evaluate whether a site or contaminant source poses an existing or potential hazard to the exposed or potentially exposed population. Site characterization involves a review of sampling data for environmental media (e.g. soil, surface water, groundwater, air), both on-site and off-site, and an evaluation of the physical conditions of the contaminant sources or physical hazards near the site which may pose an additional health risk to the community. Site contaminants are reviewed, and those selected for further evaluation are identified based upon consideration of the following factors:

- Concentrations of contaminants in environmental media both on-site and off-site;
- Field Data quality, laboratory data quality, and sampling design; and,
- Comparison of on-site and off-site contaminant concentrations in environmental media with typical background levels.

Based on the analytical results and the qualitative human health assessment, areas of potential concern will be identified for no further action, institutional controls/soils management plans, and/or remedial action, including IRM(s), as appropriate. The appropriate required work plans will be prepared and certified by a Professional Engineer as required under the VCP and submitted to the department for approval, once the Investigation Work Plan –final report has been approved. The Remedial Action Implementation Report will also be prepared and certified by a Professional Engineer, as required by the VCP.

4.3 Closing

This work plan is designed to identify and characterize the potential areas of concern at the site, building upon the fairly comprehensive environmental site assessment activities previously performed at the site. In addition to addressing the known areas of concern, it provides a sitewide characterization approach to address the issues that may be associated with the site as a whole. This approach is believed to identify and characterize the concerns associated with the site to the degree required to protect potential receptors and also identify potential concerns associated with known processes at the facility to the degree necessary to assess the appropriate actions for the protection of potential receptors in accordance with NYSDEC risk assessment protocols.

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CHECKED BY	
DRAWN BY	B. Snyder 7/12/00
OFFICE	Pittsburgh, PA

SCALE

0 2000 4000 FEET

REFERENCE:

U.S.G.S. 7.5 MIN TOPOGRAPHIC MAP OF DUNKIRK, N.Y., DATED 1954, PHOTOREVISED 1979, SCALE: 1" = 2000'.

URS

THE CLOSED ALUMAX–DUNKIRK FACILITY
DUNKIRK, CHATAUQUA CO., N.Y.

FIGURE 1

SITE LOCATION MAP

THE CLOSED ALUMAX–DUNKIRK FACILITY
DUNKIRK, CHATAUQUA CO., N.Y.

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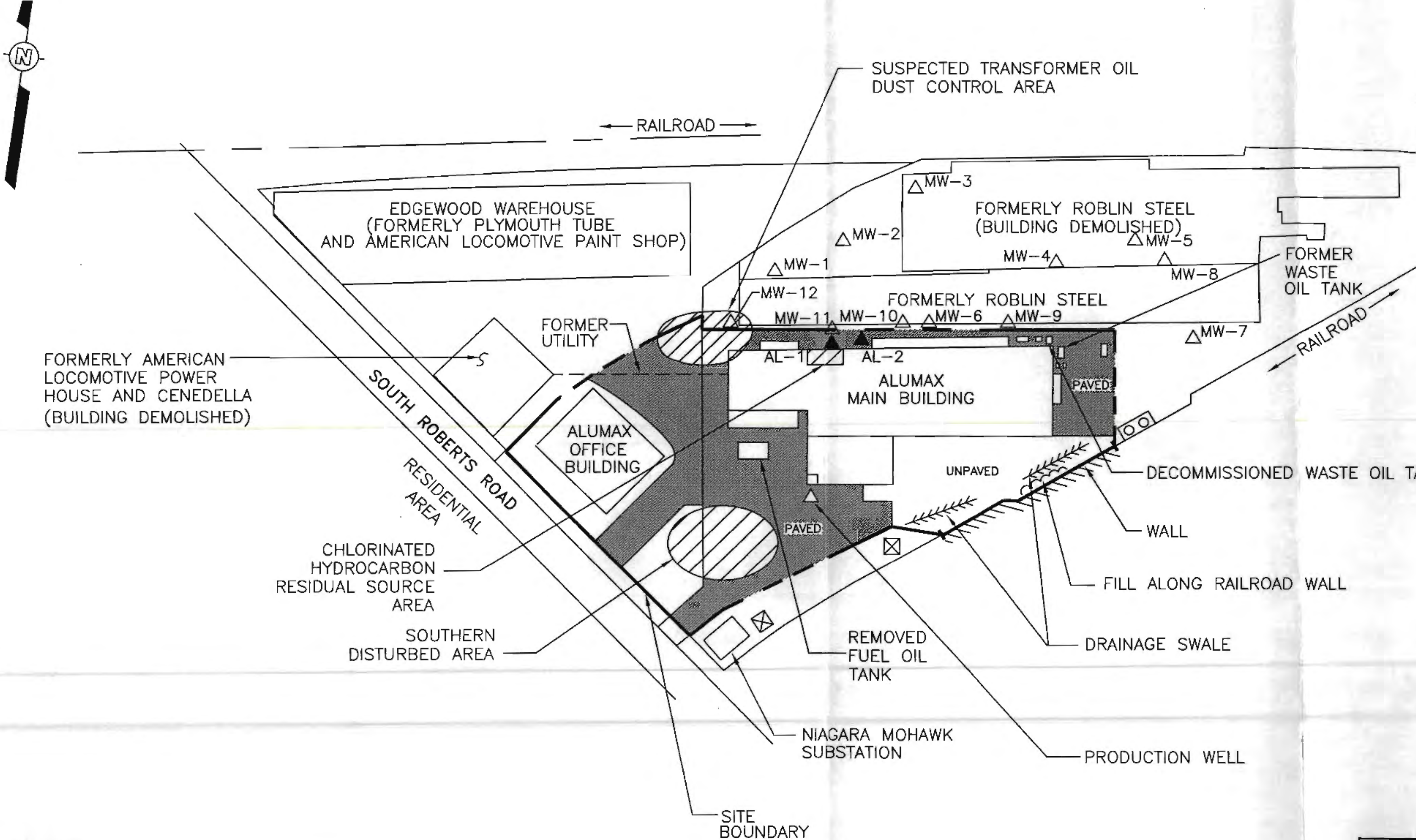
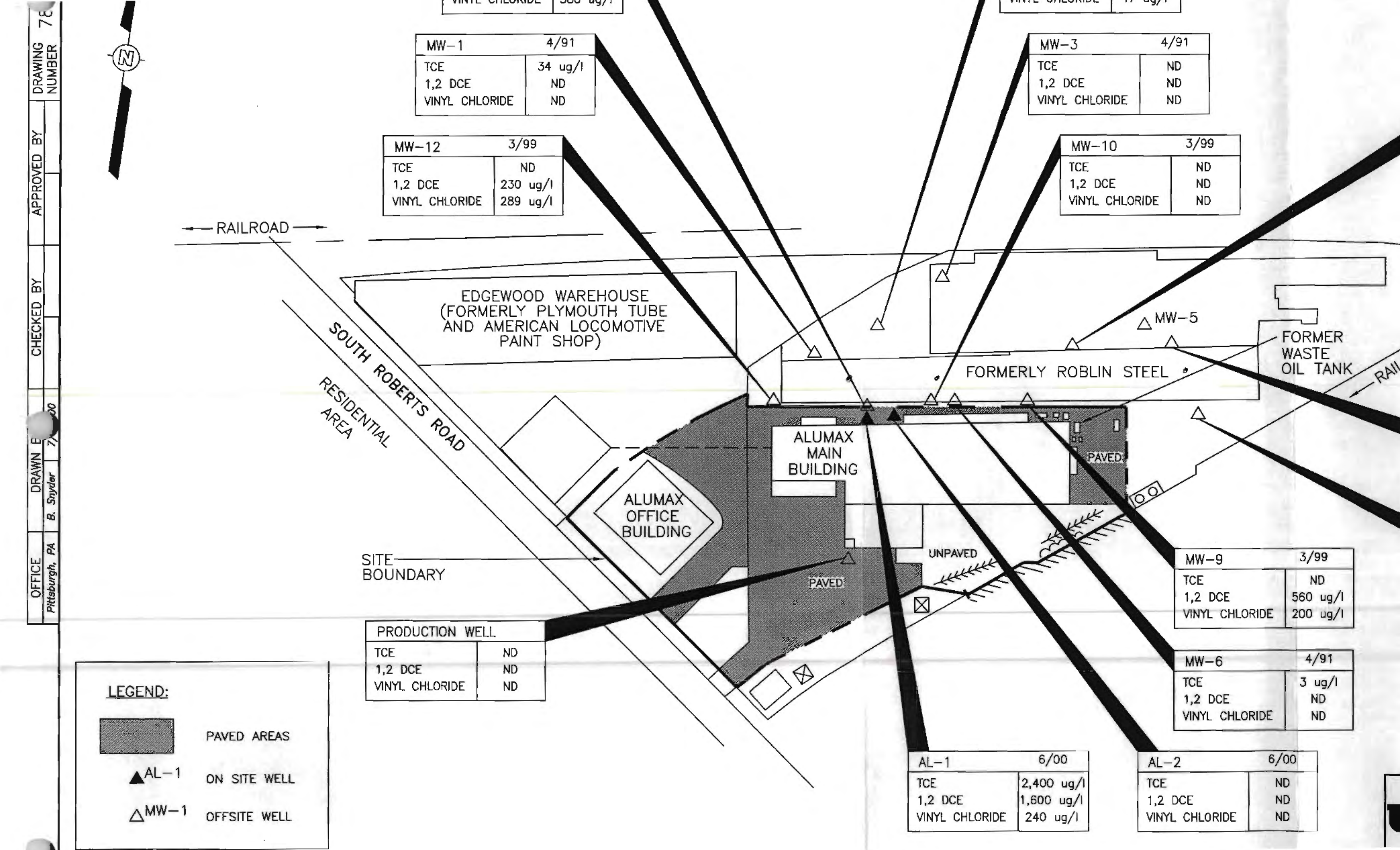
Pittsburgh, PA	B. Snyder 7/ /00			78



LEGEND:

PAVED AREAS



MW-1 4/91
TCE 34 ug/l
1,2 DCE ND
VINYL CHLORIDE ND
MW-3 4/91
TCE ND
1,2 DCE ND
VINYL CHLORIDE ND
MW-12 3/99
TCE ND
1,2 DCE 230 ug/l
VINYL CHLORIDE 289 ug/l
MW-10 3/99
TCE ND
1,2 DCE ND
VINYL CHLORIDE ND
RAILROAD
EDGEWOOD WAREHOUSE (FORMERLY PLYMOUTH TUBE AND AMERICAN LOCOMOTIVE PAINT SHOP)
SOUTH ROBERTS ROAD
RESIDENTIAL AREA
MW-5
FORMER WASTE OIL TANK
FORMERLY ROBLIN STEEL
ALUMAX MAIN BUILDING
ALUMAX OFFICE BUILDING
PAVED
UNPAVED
SITE BOUNDARY
MW-9 3/99
TCE ND
1,2 DCE 560 ug/l
VINYL CHLORIDE 200 ug/l
MW-6 4/91
TCE 3 ug/l
1,2 DCE ND
VINYL CHLORIDE ND
PRODUCTION WELL
TCE ND
1,2 DCE ND
VINYL CHLORIDE ND
AL-1 6/00
TCE 2,400 ug/l
1,2 DCE 1,600 ug/l
VINYL CHLORIDE 240 ug/l
AL-2 6/00
TCE ND
1,2 DCE ND
VINYL CHLORIDE ND
LEGEND:
PAVED AREAS
AL-1 ON SITE WELL
MW-1 OFFSITE WELL
OFFICE Pittsburgh, PA
DRAWN BY B. Snyder
CHECKED BY
APPROVED BY
DRAWING NUMBER

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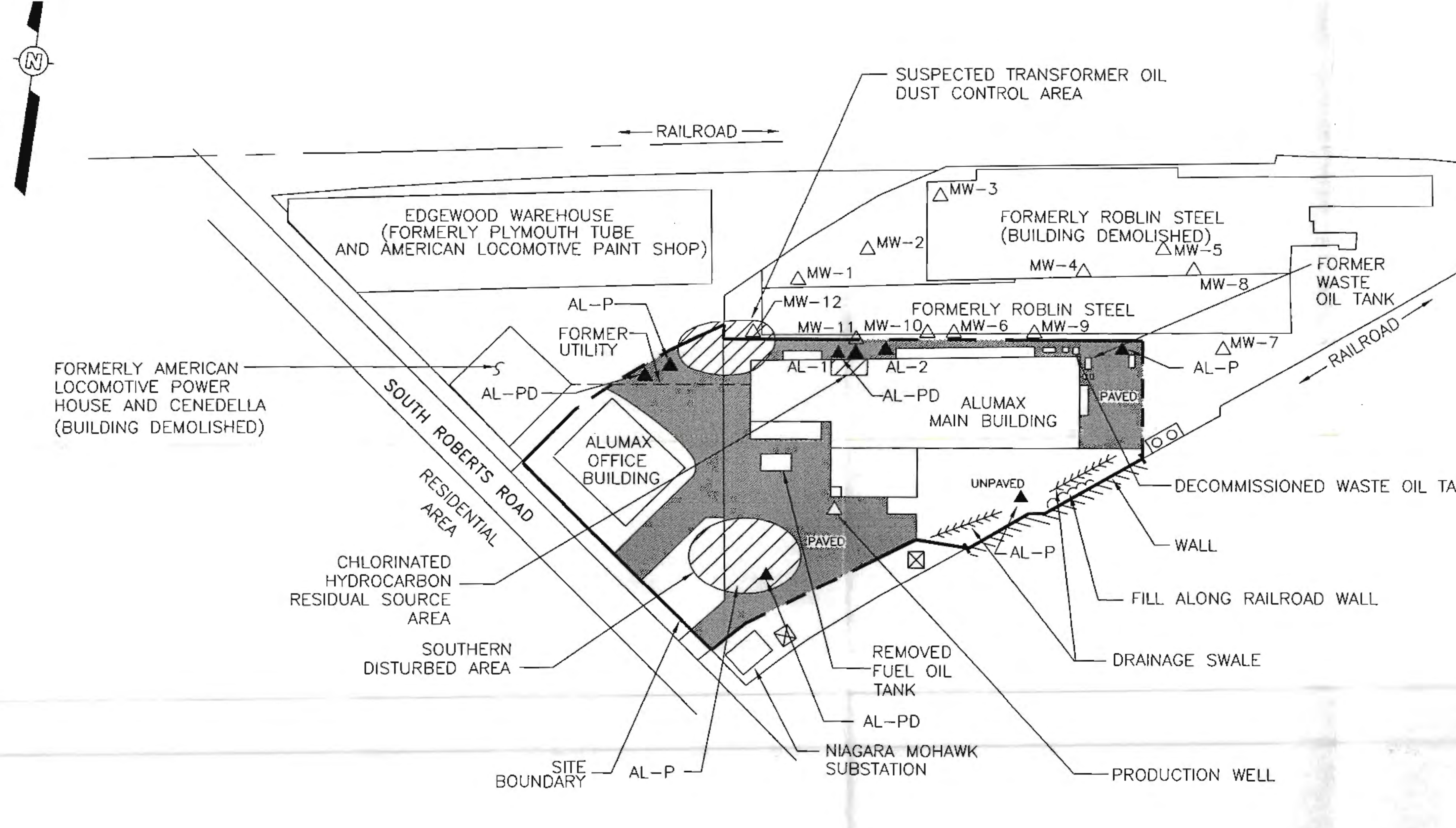
Pittsburgh, PA	B. Snyder 7/10/00			78:



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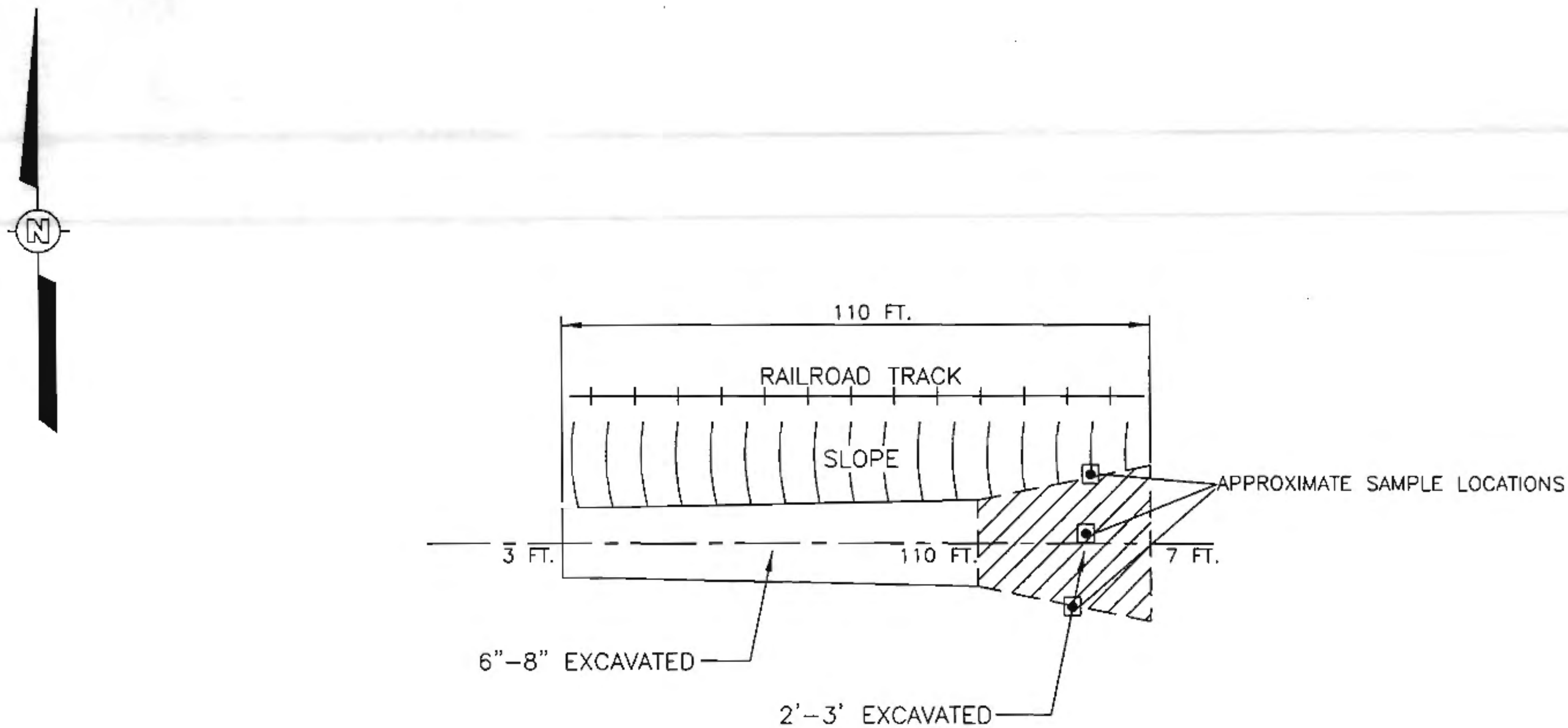


NOTE:

SCALE IS EXAGERATED TO SHOW DETAIL

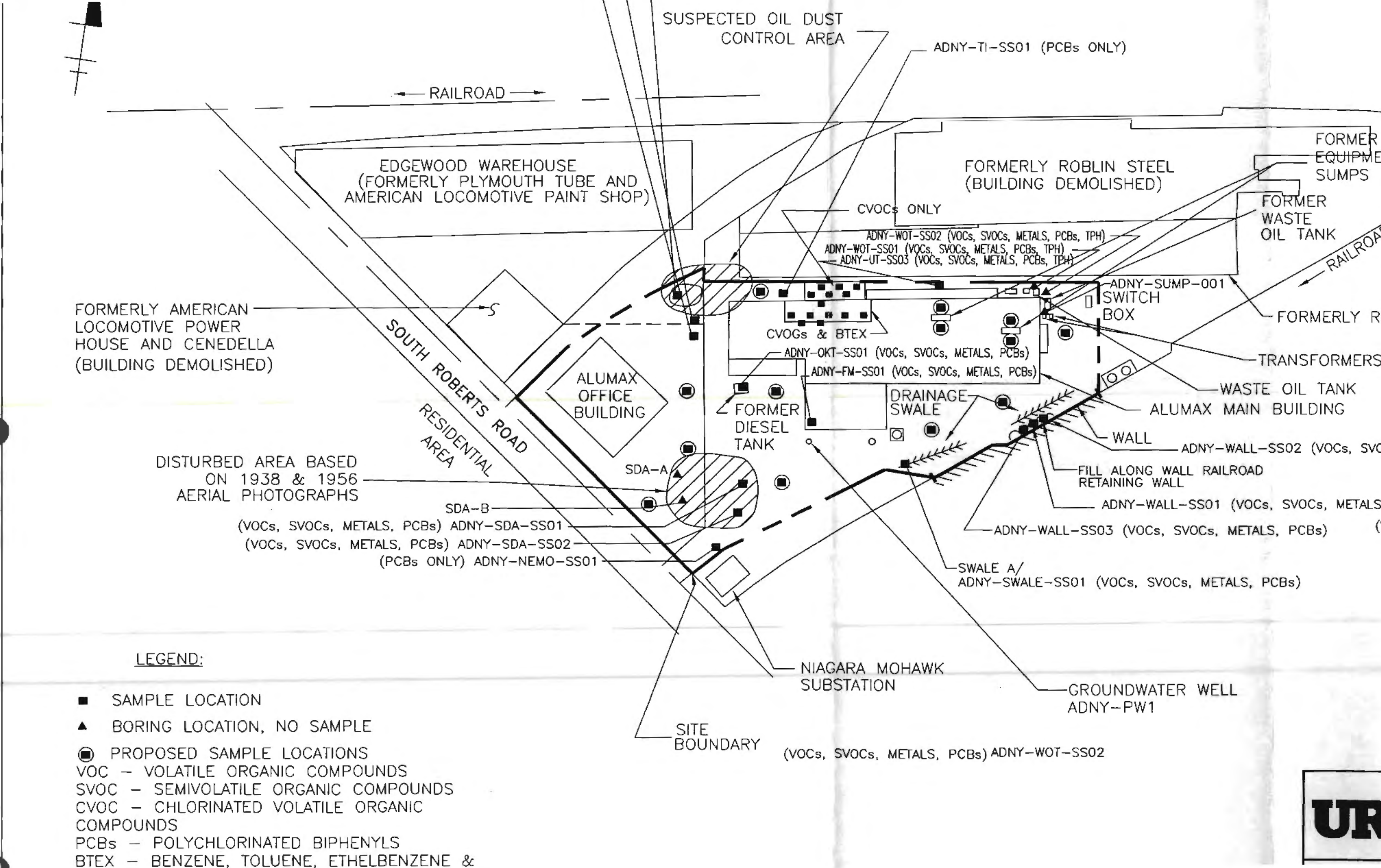
URS

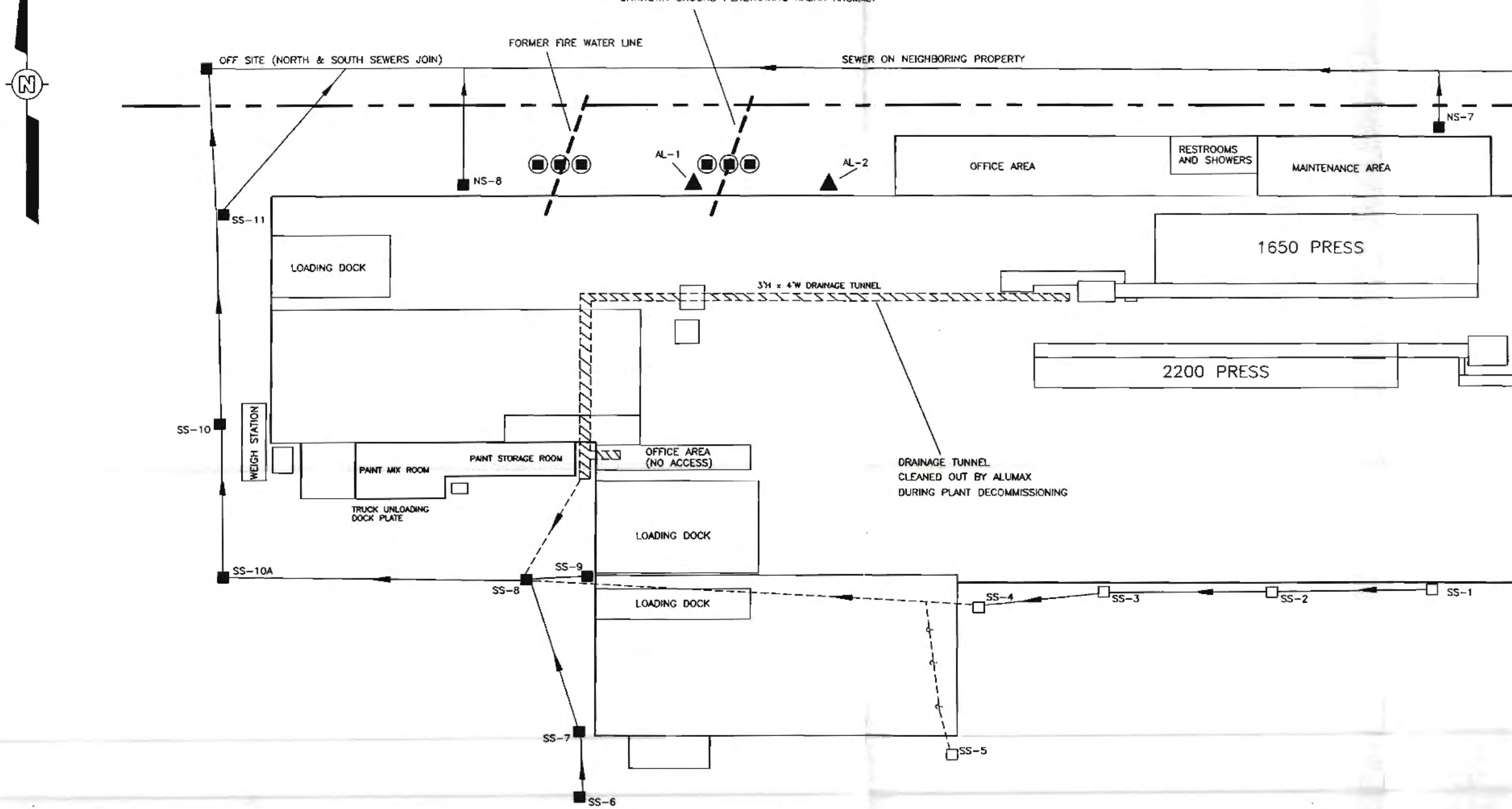
THE CLOSED
ALUMAX-DUNKIRK FACILITY
DUNKIRK, CHATAUQUA CO., N.Y.

FIGURE 5

SWALE-PROPOSED SAMPLE LOCATIONS

THE CLOSED ALUMAX-DUNKIRK FACILITY
DUNKIRK, CHATAUQUA CO., N.Y.


SUSPECTED OIL DUST CONTROL AREA
ADNY-TI-SS01 (PCBs ONLY)
RAILROAD
EDGEWOOD WAREHOUSE (FORMERLY PLYMOUTH TUBE AND AMERICAN LOCOMOTIVE PAINT SHOP)
FORMERLY ROBLIN STEEL (BUILDING DEMOLISHED)
FORMER EQUIPME
SUMPS
FORMER WASTE OIL TANK
CVOCs ONLY
ADNY-WOT-SS02 (VOCs, SVOCs, METALS, PCBs, TPH)
ADNY-WOT-SS01 (VOCs, SVOCs, METALS, PCBs, TPH)
ADNY-UT-SS03 (VOCs, SVOCs, METALS, PCBs, TPH)
RAILROA
ADNY-SUMP-001
SWITCH BOX
FORMERLY R
FORMERLY AMERICAN LOCOMOTIVE POWER HOUSE AND CENEDELLA (BUILDING DEMOLISHED)
CVOCs & BTEX
ADNY-OKT-SS01 (VOCs, SVOCs, METALS, PCBs)
ADNY-FM-SS01 (VOCs, SVOCs, METALS, PCBs)
TRANSFORMERS
WASTE OIL TANK
ALUMAX MAIN BUILDING
SOUTH ROBERTS ROAD
RESIDENTIAL AREA
ALUMAX OFFICE BUILDING
FORMER DIESEL TANK
DRAINAGE SWALE
WALL
ADNY-WALL-SS02 (VOCs, SVC
DISTURBED AREA BASED ON 1938 & 1956 AERIAL PHOTOGRAPHS
SDA-A
SDA-B
FILL ALONG WALL RAILROAD RETAINING WALL
ADNY-WALL-SS01 (VOCs, SVOCs, METALS
(VOCs, SVOCs, METALS, PCBs) ADNY-SDA-SS01
(VOCs, SVOCs, METALS, PCBs) ADNY-SDA-SS02
(PCBs ONLY) ADNY-NEMO-SS01
ADNY-WALL-SS03 (VOCs, SVOCs, METALS, PCBs)
SWALE A/
ADNY-SWALE-SS01 (VOCs, SVOCs, METALS, PCBs)
NIAGARA MOHAWK SUBSTATION
GROUNDWATER WELL ADNY-PW1
SITE BOUNDARY
(VOCs, SVOCs, METALS, PCBs) ADNY-WOT-SS02
LEGEND:
■ SAMPLE LOCATION
▲ BORING LOCATION, NO SAMPLE
PROPOSED SAMPLE LOCATIONS
VOC – VOLATILE ORGANIC COMPOUNDS
SVOC – SEMIVOLATILE ORGANIC COMPOUNDS
CVOC – CHLORINATED VOLATILE ORGANIC COMPOUNDS
PCBs – POLYCHLORINATED BIPHENYLS
BTEX – BENZENE, TOLUENE, ETHELBENZENE &
UR



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□ NS-1 – NORTH SEWER CATCH BASIN #1

□ SS-2 – SOUTH SEWER CATCH BASIN #2

■ SEWER CATCH BASINS CLEANED OUT DURING

DRAFT
HEALTH AND SAFETY PLAN

The Closed Alumax Extrusions Facility
320 South Roberts Road
Dunkirk, New York

Job No.: 21975-381-029
Prepared by: Dean Gerber
Date: 7/10/02

HEALTH AND SAFETY PLAN
(*)

		PHONE
Project Number:		
URS Project Manager:	William Randall	(412) 351-2006
Site Manager:	TBD	
Site Safety Officer:	TBD	
Plan Preparer:	Dean Gerber	(412) 351-2006
Preparation Date:	7/10/02	
Expiration Date:	7/10/03	

APPROVALS

Health and Safety Representative:

____
(DATE)

Regional Health and Safety Manager:

____
CIH/CSP (DATE)

Project Manager:

____
(DATE)

This Health and Safety Plan is valid only for this specific project as described in Section 3.0. It is not to be used for other projects or subsequent phases of this project without the written approval of the Regional Health and Safety Manager. **A copy of this plan is to be maintained at the site at all times.**

HEALTH AND SAFETY PLAN
(*)

TABLE OF CONTENTS

GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
analyzer	refers to the field instrument described in Section 6.1
atm	atmosphere
EC	centigrade
Carcinogen	a substance that can cause cancer
cc	cubic centimeter
CGI	Combustible Gas Indicator
CNS	Central Nervous System
eV	Electron Volts
EF	Fahrenheit
HSP	Health and Safety Plan
kg	kilogram
LEL	Lower Explosive Limit
Lpm	liters per minute
MSDS	Material Safety Data Sheet
m	meter
mg	milligram
mg/M^3	milligrams per cubic meter
ml	milliliter
mm	millimeter
ND	not detected
NIOSH	National Institute for Occupational Safety and Health
OBZ	operator's breathing zone
OEL	occupational exposure limit
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PM	project manager
ppb	parts per billion
ppm	parts per million
REL	Recommended Exposure Limit
RHSM	Regional Health and Safety Manager
SMS	Safety Management Standard
SSO	Site Safety Officer
SSR	Subcontractor's Safety Representative
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
UEL	Upper Explosive Limit
URS	URS Corporation and Subsidiaries
VOC	Volatile Organic Compound

(*)

1.0 PLAN-AT-A-GLANCE
HSP SUMMARY SHEET

THIS SUMMARY SHEET IS PROVIDED AS A QUICK-REFERENCE/OVERVIEW ONLY. THE REMAINDER OF THIS SITE-SPECIFIC HSP IS INTEGRAL TO THE SAFE CONDUCT OF SITE OPERATIONS AND MUST BE APPLIED IN ITS ENTIRETY.

EMERGENCY INFORMATION

Ambulance -	911
Fire -	911
Police -	911
Hospital -	Brooks Memorial Hospital 529 Central Ave. Dunkirk, NY 14048 (716) 366-1111

NYSDEC Spill Response Unit: (716) 851-7220
NYSDEC Spill Response Hotline (800) 457-7362
NYSDOH Div. Of Env. Health Assessment (716)847-4502

Project Manager: William Randall
Health and Safety Representative: Dean Gerber
Regional Health and Safety Manager: Steve Sherman

National Response Center (800) 424-8802

HOSPITAL DIRECTIONS:

To reach the hospital from the site, leave site traveling on South Roberts Road.
turn left onto E.Talcott St./Talcott St., travel 0.3 miles.
continue straight on W. Talcott St., travel 0.2 miles.
turn right onto Maple Ave., travel 0.1 miles.
turn left onto E. 6th St., travel 0.3 miles.
turn right onto Central Ave, travel 0.1 miles to site.

Additional information concerning emergency procedures is located in Section 11.0 and the hospital route map is located in Attachment A. A copy of the hospital route map must be readily available in each site vehicle that may be used to transport accident victims to the hospital.

CONSTITUENTS OF POTENTIAL CONCERN

1. Chlorinated hydrocarbons
2. PCBs
3. PAHs
4. Metals

Additional information regarding site history, constituents of concern, and scope of work activities is located in sections 2.0 and 5.0.

PROJECT HAZARD ANALYSIS

Task	Chem. Hzds.	Heat/Cold Stress	Noise	Slip/Trip/ Fall	Lifting Hzds.	Mech'l. Hzds.	Electro-cution	Explosion	Excav-ation
1.Groundwater monitoring well installation and development	Low	Low	High	High	Low	High	n/a	n/a	Low
2. Monitoring well sampling	Med.	Low	n/a	Low	Low	n/a	n/a	n/a	n/a
3. Aquifer testing (slug tests)	Low	n/a	n/a	Low	Low	n/a	n/a	n/a	n/a
4. Soil sampling	Med.	Low	n/a	Low	Low	n/a	n/a	n/a	n/a
5. Soil borings	Med.	Low	Med.	Low	Low	Med.	n/a	n/a	Low

High - Exposure likely more than 50% of the time
Low - Exposure likely less than 10% of the time
Med - Exposure likely 10-50% of the time
n/a – Exposure not anticipated

Additional information concerning Project Hazards and their control can be found in Section 5.0.

TASK	MINIMUM PROTECTIVE CLOTHING/EQUIPMENT REQUIREMENTS
1	Steel-toed boots, hard hat, safety glasses, hearing protection, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples.
2	Steel-toed boots, hard hat, safety glasses, hearing protection, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples.
3	Steel-toed boots, hard hat, safety glasses, hearing protection, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples.
4	Steel-toed boots, hard hat, safety glasses, hearing protection, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples.
5	Steel-toed boots, hard hat, safety glasses, hearing protection, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples.

PROTECTIVE CLOTHING (First Action Level)

Chemical Protective Clothing
Outer Coveralls: Kleenguard® or Tyvek® ‡
Outer Gloves: Nitrile
Inner Gloves: Surgical Nitriles
Chemical protective steel-toed boots or chemical-resistant boot covers over steel-toed boots

‡ Substitute poly-Coated Tyvek® if there is a potential for contact with liquids (groundwater, mud, etc.)

The HSP Preparer has conducted a Hazard Assessment for this project based upon information provided by the Project Manager, in accordance with 29 CFR 1910.132(d).

For more information on PPE and respiratory protection requirements, see the Action Levels table (Page 4) and Section 7.0.

ENGINEERING CONTROLS TO BE USED (as applicable)

- Water spray for dust suppression
- Natural wind forces to reduce exposure to airborne contaminants
- Forced air ventilation (fans) to reduce potential airborne exposures
- Light colored PPE to reduce solar load for heat stress control
- Dining canopy to provide shaded work/rest area for heat stress control

For more information, see Section 5.0

INSTRUMENTATION TO BE USED

__ HNu PID w/ 10.2 eV probe
X OVM PID w/ 10.2 eV lamp
__ Photovac Microtip PID w/ __ eV lamp
__ MiniRAE PID w/ ___ eV lamp
__ Combustible Gas/O_2 Indicator
__ Foxboro OVA (FID)
__ Miniram Real-time Dust Monitor
__ Other ______________

For more information, see Section 6.0

PERSONAL EXPOSURE SAMPLING

__ Will be conducted
__ Will be conducted if PID readings require the use of respiratory protection as described in the Action Level Table (page 4) and in Section 6.1.1
X Is not anticipated

For more information on Monitoring, see Section 6.0

HAZ-COM MATERIALS INVENTORY

- TSP or Alconox (decontamination)
- Methane (calibration gas)
- Sulfuric Acid (sample preservative)
- Gasoline (equipment fuel)
- Isobutylene (calibration gas)
- Nitric Acid (sample preservative)
- Hydrochloric Acid (sample preservative)

ACTION LEVELS (for Organic Vapor Meter)

Analyzer Reading*	Location	Duration	Action	Personal Protective Equipment
< 15 ppm	Point of Operations/ Release Source point	-----	Continue periodic monitoring.	Minimum Site Ensemble (Hardhat, Steel-toed boots, eye protection, hearing protection)
> 15 ppm	Point of Operations/ Release Source point	>1 minute	Monitor OBZ; don protective clothing; establish work zones	Minimum Site Ensemble, PLUS: Tyvek coveralls . Nitrile Outer Gloves, and Nitrile Inner (surgical) Gloves
< 15 ppm	OBZ	-----	No respirators required.	Same as above
> 15 ppm	OBZ	>1 minute	Provide respiratory protection; establish decon area	Add Half-face respirators with organic vapor cartridges
> 75 ppm	OBZ	>1 minute	Increase respiratory protection.	Replace 1/2-face respirators with Full-face respirators with organic vapor cartridges.
> 150 ppm OR > 300 ppm	OBZ OBZ	>1 minute instantaneous	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover boring and cuttings, evacuate upwind and notify RHSM or PM.	As specified by RHSM

(OBZ - Operator's Breathing Zone)

For additional information on Action Levels and their implementation, see Sections 6.0 and 7.0

HEALTH AND SAFETY EQUIPMENT LIST

R	A/N	
3		URS Safety Management Standards (relevant to project - see next page)
3		OSHA "Safety on the Job" Posters
3		Hardhats
3		Safety glasses
3		Ear plugs or muffs
	3	Cotton coveralls
	3	Traffic safety vest
	3	Tyvek® coveralls
	3	Polycoated Tyvek® Q-23 Coveralls
3		Steel-toed boots
	3	Chemical-resistant steel-toed boots or chemical-resistant boot covers
	3	Work gloves
3		Nitrile outer gloves
3		Surgical nitrile inner gloves
	3	Plastic sheeting (visqueen)
	3	55 gallon 17-H drums (for contaminated solids)
	3	55 gallon 17-E drums (for liquids)
	3	Drum liners
	3	Barricade tape and barricades
	3	Wash tubs and scrub brushes
	3	Decon solution (i.e., TSP)
	3	Folding chairs
	3	5 or 10 gallon portable eyewash
	3	Respirator sanitizing equipment
3		First Aid kit
3		Infection control kit
3		Drinking water
	3	Gatorade or similar drink
3		Type ABC fire extinguishers
	3	Half-face respirators (NIOSH approved)
	3	Full-face respirators (NIOSH approved)
	3	Respirator cartridges **(organic vapor)**
3		Photoionization Detector (PID) w/[10.2] lamp and calibration kit
	3	Combustible Gas Indicator and calibration kit
	3	Garden sprayer
	3	Compressed gas horn
	3	Duct tape
	3	Paper towels and hand soap
	3	Spill sorbent
3		Plastic garbage bags
	3	Broom and/or shovel

R = Required

A/S = As needed

SAFETY MANAGEMENT STANDARDS REFERENCED BY THIS HSP

SMS	TOPIC	HSP SECTION
2	Worker Right to Know	5.1.2
10	Confined Space Entry	
13	Excavation Safety	5.2.9
14	Fire Prevention	12.2
18	Heat Stress	5.2.1
19	Heavy Equipment Operations	5.2.6
23	Lock Out/Tag Out	
24	Medical Surveillance	
26	Noise and Hearing Conservation	5.2.3
29	Personal Protective Equipment	7.0
30	Sanitation	10.1
32	Traffic Control	5.2.8
34	Utility Clearances	5.2.7
40	Fall Protection	
42	Respiratory Protection	8.3/8.9
43	I.H. Monitoring	6.1.1
45	Back Injury Prevention	5.2.5
49	Incident Reporting	12.6
55	Health and Safety Training	
56	Drilling Safety Guidelines	
57	Vehicle Safety	
59	Cold Stress	5.2.1

Copies of Safety Management Standards are available on the URS Safety Intranet at healthandsafety/ or 10.1.5.21 (internal access only). Use the "Print This SMS" function on the "Safety Management Standards" page to print the complete SMS.

Copies of the SMSs referenced by this HSP are to be maintained on site. Project Managers are responsible to see that other SMSs relevant to field activities but not directly referenced by this HSP are also available on site.

2.0 FACILITY BACKGROUND/WORK PLAN

2.1 SITE HISTORY

The site has been used for heavy industry for nearly a century. The property history is as follows:

Brooks Locomotive/American Locomotive Company (1918-1962)

The Brooks Locomotive Company and American Locomotive Company (American Locomotive) initially developed the subject property, along with adjacent properties to the north and west, as a locomotive manufacturing facility. This was fully integrated facility that included foundries; metal working, painting, and finishing shops; offices, and a coal burning power plant. American Locomotive also produced military equipment during World War II, including gun cartridges, fragmentation bombs, thrust shafts, missile housings, nozzles, boosters, and other components. Plans from the 1950s and 1960s indicate that American Locomotive manufactured boilers and heat exchangers. Non-destructive testing was performed, including the use of x-ray equipment. The Atomic Energy Commission contracted American Locomotive after World War II to manufacture nuclear reactor components and packaged reactor units. A radiological survey was performed on the property during the Phase 2 ESA indicating levels consistent with background. American Locomotive also manufactured components of the crawler for the Apollo/Saturn V Space Rocket. Few site plans are readily available and site operations pertaining to hazardous materials storage and handling are not well documented for the time frame during which American Locomotive operated the property.

The subject property (i.e., former Alumax facility) was listed during the early stages of its operation by American Locomotive as a foundry, pattern shop, wood kiln, finishing shop, and coal storage area. A later plan of American Locomotive Products division indicated that the subject property was used for the manufacture of heat exchanger parts, fin tubes, prefabricated refinery and other high pressure tubing, fin tubing and fin tubing bundles.

Properties adjacent to the former Alumax facility during the American Locomotive Company operations included the following:

- coal-fueled power plant,
- paint shop,
- pipe dipping and boiler shop,
- oil cellar,
- maintenance shop,
- pickling,
- sheet metal fabrication,
- tube bundle manufacturing,
- assembly and testing of heat exchangers.
- general machining,

- shot blast,
- application of corrosion preventative coating,
- missile fabrication and heat treating,
- light machining and paint shop,
- non-radioactive equipment fabrication for the nuclear industry ,
- pipe fabrication, and
- fuel oil storage.

Progress Park (1963-1969)

Progress Park purchased the former American Locomotive property for redevelopment. Progress Park leased portions of the former American Locomotive property to (Figure 1):

- **Roblin Steel** (adjacent and to the north of the former Alumax property);
- **Plymouth Tube** (adjacent to the northwest of former Alumax property);
- **Cendella Wood Products** (adjacent to the west of the former Alumax);
- **Meissa Laboratories** (occupied a portion of Progress Park; however, it is unknown which property it occupied).

Aluminum Extrusion, Small Business (1972-1976)

A small aluminum extrusion company purchased the property in 1972 for the purposes of starting an aluminum extrusion business. According to the owner of this business, a Mr. Sam Avny, only one batch of aluminum molding was extruded due to an aluminum shortage. In 1975 the business was sold to Alumax Extrusion, Inc.; this sale included the aluminum extruder.

This business had an oil sump associated with the hydraulic press and the owner indicated that he had used transformer oil as dust suppressant. Soil sampling has been performed in this area and PCBs were not detected above NYSDEC TAGM soil clean-up objectives. No other information on chemicals and wastes produced is available.

Alumax Extrusion Inc. (a/k/a Alcoa Extrusion Inc.) (1976-present)

Alcoa Extrusion Inc. (following the acquisition of Alumax Inc. by Alcoa Inc. in July 1998, the name was changed from Alumax Extrusions Inc and Alcoa Extrusions Inc. remains a wholly-owned subsidiary of Alumax Inc., itself a wholly-owned subsidiary of Alcoa Inc.) manufactured extruded aluminum window moldings at the facility until closing in November 1993. A paint line was added during the 1980s. The office building located near South Roberts Road was built in the early 1990s.

Chemicals used and wastes produced on-site include non-PCB hydraulic oil for presses, paint, non-chlorinated paint solvents, sodium hydroxide, ammonia, chlorine, thermofil insulation, calcium chloride, methylene chloride, detergent, sodium metabisulfate, sulfuric acid, muriatic acid, polymer, butyl carbitol, diacetone alcohol, xylene, diesel fuel, isopropyl alcohol, and chrome-containing solution. Chlorinated solvents were not used as part of the process.

Decommissioning activities have been performed since 1998 and have included removal of most of the plant equipment. Environmental assessment activities were initiated in concert with a proposed sale of the property. Remedial activities have included removal of swale soils, cleaning out oil sumps and catch basins, removal of the paint line, decommissioning of the wastewater treatment facilities, closing-in the onsite gas well, and soil and groundwater testing.

2.2 PURPOSE AND SCOPE OF WORK

The scope of work is primarily associated with on-going site characterization activities. Various activities are planned for different sections of the site as detailed below.

Site-wide Groundwater

An additional 4 shallow wells and three deeper bedrock wells are proposed. The shallow wells will be installed in a similar manner as AL-1 and AL-2 in order to provide gradient information in the shallow groundwater. The deeper wells will be screened in bedrock, approximately at a depth of 40-60 feet below ground surface. The bedrock wells will be used in conjunction with PW-1 to determine water quality. Three newly installed bedrock wells will be used to define the groundwater flow gradient in bedrock. PW-1 will not be used to determine flow gradient because the new wells will be constructed differently.

The shallow wells will be located near the east and west corners of the northern line and at locations toward the east and west ends of the southern property line. Based on the known information on the depth to bedrock, it is believed that three of wells will be screened entirely in bedrock and only the well to be installed in the northwest corner of the property will be screened across the bedrock/soil interface. The wells will be developed until a turbidity of less than 10 NTUs is obtained or a minimum of 5 well volumes has been removed.

One of the bedrock wells will be located near AL-1 and the second will be located to the northwest of the building, near the location of the one of the new shallow wells. These wells will be used in conjunction with PW-1 to evaluate groundwater quality in the bedrock.

The on-site wells (AL-1, AL-2, Al-3, AL-4, AL-5, AL-6, PW-1, AL-1D, AL-3D, and AL-4D will be sampled for TCL VOCs and SVOCs, and TAL metals. A duplicate sample, a field (equipment) blank, and a trip blank will be collected for QA/QC purposes.

The top of casing and ground surface elevations will be surveyed within 0.01 foot by a NYS licensed surveyor.

Slug tests will be performed on each of the wells in accordance with standard protocols.

Chlorinated solvent area (Soils)

Subsequent to implementing the interim remedial measures, perform confirmation and delineation sampling for chlorinated hydrocarbons via additional soil borings. These samples will be analyzed for TCL VOCs to determine the effectiveness of the ISCO treatment and if additional treatments or remediation is needed.

Storm-water Swale

Collect confirmation samples. Samples should be analyzed for PCBs, TCL SVOCs, and arsenic. Based on the results of the confirmatory sampling, a portion of this area may be included in soil management plan and paving/cover program.

Oil Residue in the equipment pits

Two borings are proposed in the vicinity of each of the sumps to characterize subsurface conditions. The zone exhibiting the highest organic vapor readings and degree of staining will be sampled for analysis from each boring. Absent any visual staining or elevated organic vapor readings, two soil samples will be submitted for analysis (one from the top 6 inches of soil and one from the interval just above bedrock. These samples will be analyzed for TCL VOCs, TPH, and SVOCs.

Chemical Residues (limited amounts)

Collect two soil samples beneath the process trench and sump associated with the former paint pretreatment line. The upper six inches of soil will be sampled and analyzed for TAL metals. If indications of organic constituents are present (e.i., samples will also be analyzed for TCL VOA and SVOCs). Industrial cleaning will be performed in areas containing residue.

Site-wide Soils

Four surface samples (0-6 inches) will be collected from the unpaved areas. These samples will be analyzed for TCL VOCs, TPH, and SVOCs. Additionally, all soil samples collected during the VCP process will be incorporated into the site-wide soils evaluation.

3.0 APPLICABILITY

The purpose of this plan, which was developed specifically for operations at the **Alumax** site, Dunkirk, New York is to assign responsibilities, establish personal protection standards and mandatory safety procedures, and provide for contingencies that may arise while operations are being conducted at the site. This plan complies with, but does not replace, Federal Health and Safety Regulations as set forth in 29 CFR 1910 and 1926, and applicable state regulations. This plan is to be used by URS personnel as a supplement to such rules, regulations, and guidance. This health and safety plan is to be augmented by the URS Health and Safety Program and Management System, relevant standards from which are required to be available on site during all activities.

The provisions of the plan are mandatory for all onsite URS employees engaged in hazardous material management activities associated with this project which may involve health and safety hazards.

Changing and/or unanticipated site conditions may require modification of this site safety plan in order to maintain a safe and healthful work environment. Any proposed changes to this plan should be reviewed with an URS Health and Safety Professional prior to their implementation. If this is not feasible, the site/project manager may modify the plan and record all changes in the field log book; under no circumstances will modifications to this plan conflict with Federal, state, or other governmental health and safety regulations.

URS is providing a copy of this Health and Safety Plan to each site subcontractor in order to fulfill its obligation under 29 CFR 1910.120(b) to inform subcontractors of site hazards. Each subcontractor is to provide a health and safety plan that complies with 29 CFR 1910.120 and addresses the activities of its employees relative to this project.

4.0 RESPONSIBILITIES

URS will have site safety and health oversight and coordination responsibilities for URS personnel; each subcontractor will be held accountable for the safe and healthful performance of work by each of their employees, subcontractors, or support personnel who may enter the site.

URS will strictly adhere to the provisions of this health and safety plan, along with the applicable regulations issued by governmental entities.

4.1 PROJECT MANAGER (URS)

The Project Manager (PM) shall direct URS onsite operations. The PM may delegate all or part of these duties to a properly qualified URS employee who is designated as the Site Manager. At the site, the PM, assisted by the Site Safety Officer (SSO), has primary responsibility for:

1. Seeing that appropriate personal protective equipment and monitoring equipment is available and properly utilized by all onsite URS employees.

2. Establishing that URS personnel are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies.

3. Establishing that all URS onsite personnel have completed a minimum of 40 hours of health and safety training and have appropriate medical clearance as required by 29 CFR 1910.120, and have been fit tested for the appropriate respirators.

4. Seeing that URS personnel are aware of the potential hazards associated with site operations.

5. Monitoring the safety performance of all URS personnel to see that the required work practices are employed.

6. Correcting any URS work practices or conditions that may result in injury or exposure to hazardous substances.

7. Preparing any accident/incident reports for URS activities (see Section 12.6).

8. Seeing to the completion of Plan Compliance Agreements by URS personnel (See Attachment B).

9. Halting URS site operations, if necessary, in the even of an emergency or to correct unsafe work practices.

10. Seeing that utility clearances are obtained prior to the commencement of work (see Section **5.2.7**).

11. Seeing that the appropriate Safety Management Standards are appended to this HSP and are available on site (see "Plan at a Glance").

12. Reviewing and approving this project health and safety plan.

4.2 SITE SAFETY OFFICER (URS)

The Site Safety Officer's (SSO) duties may be carried out by the PM or other qualified URS site manager. The SSO is responsible for:

1. Implementing project Health and Safety Plans, and reporting any deviations from the anticipated conditions described in the plan to the PM, and, if necessary, the RHSM.

2. Determining that monitoring equipment is used properly by URS personnel and is calibrated in accordance with manufacturer's instructions or other standards, and that results are properly recorded and filed.

3. Check with Health and Safety Representative to assure URS personnel have current medical clearance and training.

4. Assuming any other duties as directed by the PM or RHSM.

5. Coordinating with URS Health and Safety Professional to identify URS personnel on site for whom special PPE, exposure monitoring, or work restrictions may be required.

6. Conducting safety meetings for all site personnel in accordance with Section 13.

7. Conducting daily site inspections prior to the start of each shift. All inspections must be documented (preferably in a bound field logbook).

8. Providing ongoing review of the protection level needs as project work is performed, and informing the PM of the need to upgrade/downgrade protection levels as appropriate.

9. **Contacting the RHSM to perform personal industrial hygiene monitoring for aromatic hydrocarbons if the second action level is reached (>75 ppm in the OBZ) as described in the Action Level Table (page 4) and Section 6.1.1.**

10. Seeing that decontamination procedures described in Section 10.0 are followed by URS personnel.

11. Establishing monitoring of URS personnel and recording results of exposure evaluations.

12. Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.

13. Maintaining the visitor log.

14. Posting OSHA "Safety of the Job" and other required posters at the site.

4.3 REGIONAL HEALTH AND SAFETY MANAGER (URS)

The Regional Health and Safety Manager (RHSM) is responsible for:

1. Determining the need for periodic audits of the operation to evaluate compliance with this plan.

2. Providing health and safety support as requested by the SSO and PM.

4.4 PROJECT PERSONNEL (URS)

Project personnel involved in onsite investigations and operations are responsible for:

1. Taking all reasonable precautions to prevent injury to themselves and to their fellow employees.

2. Performing only those tasks that they believe they can do safely, and immediately reporting any accidents and/or unsafe conditions to the SSO or PM.

3. Implementing the procedures set forth in the Health and Safety Plan, and reporting any deviations from the procedures described in the Plan to the SSO or PM for action.

4. Notifying the PM and SSO of any special medical problems (i.e., allergies) and seeing that all onsite URS personnel are aware of such problems.

5. Reviewing project health and safety plan and signing Safety Plan Compliance Agreement.

4.5 SUBCONTRACTOR'S SAFETY REPRESENTATIVE

Each subcontractor is requested to designate a Subcontractor's Safety Representative (SSR) who is the subcontractor supervisor. The SSR is responsible for the safe and healthful performance of work by his work force and subcontractors. During subcontractor activities onsite, the SSR will perform continuing work area inspections, and conduct safety meetings and safety orientations for all new employees. The SSR will attend periodic safety meetings with the SSO. The SSR will also investigate accidents and overexposures involving subcontractor personnel.

5.0 JOB HAZARD ANALYSIS

5.1 CHEMICAL HAZARDS

There are two categories of chemical hazards associated with site activities:

- Site Constituents
- Chemicals used to conduct the site work

Site constituents are those which exist at the site and are the cause for conducting site activities. The chemicals that are brought on site in order to conduct the work may be hazardous and subject to regulation under OSHA's Hazard Communication Standard (29 CFR 1910.1200).

5.1.1 Site Constituents

From an occupational health standpoint, given that any potential exposure to site personnel will be only for a ***short period of time (intermittent for several days),*** the levels of contaminants that have been, or could be, encountered during site activities ***should not represent a significant concern*** if the provisions of this HSP are appropriately implemented. However, ***the site is still under investigation,*** so the potential for exposure to elevated levels of these contaminants may exist. Overviews of the hazards associated with exposure to elevated levels of these contaminants may exist. Overviews of the hazards associated with exposure to the chemicals that may pose a hazard during site activities are presented below in terms of the following types of occupational exposure limits:

PEL - Permissible Exposure Limit (OSHA Standard)
TLV - Threshold Limit Value (ACGIH Guidance)
REL - Recommended Exposure Limit (NIOSH Guidance)
STEL- Short Term Exposure Limit
C - Ceiling

OSHA Permissible Exposure Limits (PELs), ACGIH Threshold Limit Values (TLVs), and NIOSH Recommended Exposure Limits (RELs) are time-weighted averages (TWAs) defined as concentrations for a normal 8-hour work day and 40-hour work week to which almost all workers can be repeatedly exposed without suffering adverse health effects

Short Term Exposure Limit (STEL) is defined as the concentration to which workers can be exposed for short time periods without irritation, tissue damage, or narcosis sufficient to likely cause impairment of self-rescue or precipitate accidental injury. The STEL is a 15-minute time-weighted average that should not be exceeded at any time during the workday. STELs are used by OSHA, ACGIH and NIOSH for chemical exposure criteria.

A ceiling value (C) is a concentration that should not be exceeded at any time in any workday. Ceiling limits are used by OSHA, ACGIH and NIOSH for chemical exposure criteria.

Summaries on the site constituents of concern follow.

CHEMICAL HAZARDS

Chemical Name	OSHA PEL	Concentration Present Soil	Concentration Present Water	Health Hazards/ Target Organs	Symptoms Of Overexposure
TCE	50 ppm	X	X	Central Nervous System, eyes, nose, liver, kidneys	irritated eyes and nose, depression,
DCE	200 ppm	X	X	respiratory system, eyes, central nervous system	irritated eyes, depression,
Benzene	1 ppm	X	X	Eye Irritant & Central Nervous System Depressant	Headache, Nausea, Tremors & Fatigue
Ethyl Benzene	100 ppm	X	X	Eye, Mucous Membrane & Skin Irritant	Irritation of eyes, Headache & Dermatitis
Toluene	100 ppm	X	X	Eye Irritant & Central Nervous System Depressant	Headache, Nausea, Dizziness & Fatigue
Xylene	100 ppm	X	X	Eye, Nose, Throat & Skin Irritant, Central Nervous System Depressant	Headache, Nausea & Fatigue
Vinyl Chloride	1 ppm	X	X	Liver, Central Nervous System, blood, respiratory system, lymphatic system	Irritated eyes, and skin, respiratory system, drowsiness
PCBs					

Skin contact with potentially contaminated materials will be minimized by the use of personal protective clothing (as described in Sections 1.0 and 7.0). Inhalation of vapors or particulates during the site activities will be minimized by air monitoring and the use of engineering controls, and respiratory protection will be used if Action Levels described in Section 1.0 are exceeded. Ingestion of contaminated materials will be minimized by the use of appropriate personal hygiene procedures during decontamination (i.e., thoroughly washing face and hands with soap and water after leaving the work area and prior to eating or drinking).

5.1.2 Hazard Communication Materials

Materials which are considered hazardous materials under the OSHA Hazard Communication Standard (29 CFR 1910.1200) may be used during this project. In accordance with the URS Hazard Communication Program, the MSDSs for the hazardous materials listed in Section 1.0 are included in Attachment E. The SSO will make copies of these MSDSs available to any subcontractors (i.e. drillers, excavators) on this project.

URS written Hazard Communication program is located in Safety Management Standard 2, a copy of which shall be maintained on site.

5.2 PHYSICAL HAZARDS

Physical hazards at this work site include:

- Heat stress and cold stress;
- Noise from the operation of site equipment;
- Slip-trip-fall type of accidents;
- Back injuries due to improper lifting;
- Being caught in or struck by moving equipment;
- ***Electrocution or explosion*** hazards associated with ***drilling or excavation activities*** such as contact with overhead or underground power lines or pipelines
- Excavation hazards; and
- Muscle strains from hand auger work.

5.2.1 Heat Stress Recognition and Control

Heat stress monitoring shall commence when personnel are wearing PPE, including Tyvek®-type coveralls, and the ambient temperature exceeds 70°F. If standard work garments (cotton coveralls) are worn, monitoring shall commence at 85°F. Additional information regarding Heat Stress is located Safety Management Standard 18, a copy of which shall be maintained on site.

5.2.2 Cold Stress Recognition and Control

Protection against cold stress should be initiated when temperatures drop below 45°F. Cold stress guidance is provided below.

Exposure to cold working conditions can result in cold stress (hypothermia) and/or injury (frostbite) to hands, feet, and head. Hypothermia can result when the core body temperature drops below 36°C (96.8°F). Lower body temperature will likely result in dizziness, drowsiness, disorientation, slurred speech, or loss of consciousness, with possible fatal consequences. Pain the extremities may be the first warning of danger to cold stress. Shivering develops when the body temperature has fallen to 35°C (95°F).

Hypothermia can be brought on by exposure to cold air, immersion in cold water, or a combination of both. Wind chill factor, the cooling power of moving air, is a critical factor in cold stress.

Workers must wear adequate insulating clothing if work is performed in temperatures below 4°C (40°F). At temperatures of 2°C (35.6°F or less), workers whose clothing becomes wet should be immediately provided with a change of clothing, and if necessary, treated for hypothermia. Treatment includes warming the victim with skin-to-skin contact, or by providing warm blankets or other coverings, and drinking warm liquids. Skin exposure should not be permitted at temperatures of -32°C (-25°F) or below.

If fine work is to be performed with bare hands for more than 10-20 minutes at temperatures below 16°C (60°F), provisions should be made for keeping the workers' hands warm. If equivalent chill temperatures fall below 40°F and fine manual dexterity is not required, then gloves should be worn. Metal handles of tools should be covered with insulating material at air temperatures below -1°C (30°F).

If work is to be performed continuously in the cold when the wind chill factor is at or below -7°C (19°F), heated warming shelters (tents, trailers, vehicle cabs) should be made available nearby.

5.2.3 Noise Hazards

Previous surveys indicate that heavy equipment such as ***drilling or excavation*** equipment may produce continuous and impact noise at or above the action level of 85 dBA. All URS personnel within 25 feet of operating equipment, or near an operation that creates noise levels high enough to impair conversation, shall wear hearing protective devices (either muffs or plugs). URS personnel who are in the Medical Surveillance program are automatically enrolled in the URS Hearing Conservation Program and have had baseline and, where appropriate, annual audiograms. Personnel will wash their hands with soap and water prior to inserting earplugs to avoid initiating ear infections. Additional information regarding the URS Hearing Conservation Program is located in Safety Management Standard 26, a copy of which shall be maintained on site.

5.2.4 Slip/Trip/Fall Hazards

Workers should exercise caution when walking around the site to avoid fall and trip hazards. If there are holes or uneven terrain in the work area that could cause site personnel to fall or trip, they must be covered, flagged or marked to warn workers.

Workers should exercise caution around open excavations, such as test pits, and avoid getting closer than two feet to the edge of an un-sloped excavation unless guardrails or fall protection is provided. If conditions become slippery, workers should take small steps with their feet pointed slightly outward to decrease the probability of slipping. Gravel or sand should be spread in muddy areas to reduce slipperiness. Workers should watch where they are walking and walk only in areas of good stability.

5.2.5 Lifting Hazards

The following guidelines will be followed whenever lifting equipment such as portable generators, coolers filled with samples, any other objects that are of odd size or shape, or that weigh over 40 pounds. Safe lifting procedures are described in Safety Management Standard 45, a copy of which is to be available on site.

- Get help when lifting heavy loads. Portable generators will only be lifted using a two-person lift.

- When moving heavy objects such as drums or containers, use a dolly or other means of assistance.

- Plan the lift. If lifting a heavy object, plan the route and where to place the object. In addition, plan communication signals to be used (i.e., "1,2,3, lift," etc.)

- Wear sturdy shoes in good conditions that supply traction when performing lifts.

- Keep your back straight and head aligned during the lift and use your legs to lift the load – do not twist or bend from the waist. Keep the load in front of you – do not lift or carry objects from the side.

- Keeping the heavy part of the load close to your body will help maintain your balance.

5.2.6 Heavy Equipment

Operation of heavy equipment during site activities presents potential physical hazards to personnel. Issues associated with heavy equipment operations are addressed in Safety Management Standard 19, a copy of which is to be maintained on site.

The following precautions must be observed whenever heavy equipment is in use:

- Personal protective equipment (PPE) such as steel-toed shoes, safety glasses or goggles, and hard hats must be worn whenever such equipment is present.

- Personnel must at all times be aware of the location and operation of heavy equipment, and take precautions to avoid getting the way of its operation. Never assume that the equipment operator sees you; make eye contact and use hand signals to inform the operator of your intent, particularly if you intend to work near or approach the equipment.

- Traffic safety vests **ARE REQUIRED** for URS personnel working near mobile heavy equipment, such as backhoes and other excavators.

- Never walk directly in back of or to the side of, heavy equipment without the operator's acknowledgment.

- When an equipment operator must operate in tight quarters, the equipment subcontractor should provide a person to assist in guiding the operator's movements.

- Keep all non-essential personnel out of the work area.

- Any heavy equipment that is used in the exclusion zone should remain in that zone until its task is completed. The equipment subcontractor should completely decontaminate such equipment in the designated equipment decontamination area as required prior to moving the equipment outside of the EZ/CRC.

5.2.7 Underground and Aboveground Utilities

The Site Manager or SSO is responsible locating that underground utilities prior to the commencement of any subsurface (> 0.3 meters - 1 ft.) activities. Resources include site plans, utility companies, and regional utility locating services. The proper utility company personnel shall certify in writing to the Site Manager or SSO the deactivation of underground utilities, and the certification retained in the project files.

Procedures for activities proximal to utility locations are located in Safety Management Standard 34, a copy of which is to be maintained on site.

Excavation, drilling, crane, or similar operations adjacent to overhead lines shall not be initiated until operations are coordinated with the utility officials. Operations adjacent to overhead lines are prohibited unless one of the following conditions is satisfied:

- Power has been shut off and positive means (e.g. lock out/tag out) have been taken to prevent lines from being energized. Wherever possible, the URS SSO will observe power shut off and place a lock and tag on the switch. In all cases utility company personnel shall certify in writing to the Site Manager or SSO the deactivation of overhead utilities, and the certification retained in the project files. The Site Manager or SSO must also attempt to verify power shut off by checking that power is no longer available to the affected building or equipment.

- Equipment, or any part of the equipment, cannot come within the following minimum clearance from energized overhead lines:

Power Lines Nominal System (kv)	Minimum Required Clearance
0-50	10 feet
51- 200	15 feet
201-300	20 feet
301-500	25 feet
501-750	35 feet
751-1000	45 feet

5.2.8 Work Area Protection

As the project operations may be undertaken in a roadway or parking lot, motor vehicles may be a hazard. Guidance on properly coning and flagging the work area is located in Attachment G. Consideration should be given to parking a work vehicle within the coned area between the work area and oncoming traffic. Procedures for work zone traffic control are located in Safety Management Standard 32, a copy of which is to be maintained on site.

5.2.9 Trenching and Excavation

All URS personnel are prohibited from entering a trench or excavation until it has been inspected by a competent person in accordance with 29 CFR 1926.650-651. If personnel are required to enter a trench or excavation that is deeper than ***five*** feet, the following provisions must be provided prior to entry by the contractor who created the excavation:

- If hazardous atmospheres are suspected, any trench or excavation more than four feet deep must be monitored.
- Adequate shoring, sloping, or benching techniques must be employed.
- Adequate means of employee access and egress must be utilized.
- The contractor's trained, competent person must inspect the trench or excavation on a daily basis, before work commences and on an as-needed basis throughout the day.

A copy of the Fed-OSHA Excavation Standard can be obtained from the Regional Health and Safety Manager. All provisions of this regulation must be complied with when working in a trench or excavation. Additional information regarding URS procedures for excavation activities are located in Safety Management Standard 13, a copy of which is to be maintained on site.

5.2.10 Hand Augering

Muscle strains can occur with hand augering. To minimize the occurrence of injury, the following should be observed:

- Keep augers sharp – a dull auger requires more work to advance through the soil.
- Before beginning work, stretch or warm up the body as you would prior to exercising.
- Try to avoid excessive twisting or wrenching motions when using the auger.

6.0 EXPOSURE MONITORING PLAN

Heat stress, noise, and chemical exposures may be encountered at this site. Heat stress monitoring and prevention is addressed in Section 5.2.1. Noise levels will not be monitored; URS personnel will wear hearing protection as described in Section [5.2.3].

6.1 CHEMICAL EXPOSURE MONITORING

The field instrumentation described in this health and safety plan has been specifically selected for the contaminants that may be reasonably anticipated to be encountered during this course of this project. Selection factors include anticipated airborne concentrations, potential interference, ionization potentials, instrument sensitivity, and occupational exposure limits. The Action Levels specified in Section 1.0 were established with the expectation that specific instruments will be used. **DO NOT SUBSTITUTE INSTRUMENTS WITHOUT THE CONSENT OF THE HSP PREPARER OR THE REGIONAL HEALTH AND SAFETY MANAGER.**

The monitoring equipment specified in Section 1.0 will be used on a regular basis to evaluate the potential for exposure to airborne contaminants, typically every five to ten minutes. Monitoring will be conducted in the immediate vicinity of the contaminant source point or work area (e.g., at the borehole and cuttings adjacent to the borehole). If readings exceed the first Action Level (>15 ppm one minute), monitoring in the operator's breathing zone (OBZ) of the person working nearest the point of operations/contaminant source will start immediately, and site personnel will don protective clothing.

A reading in the OBZ above the second Action Level (15 ppm > one minute) will require the use of half-face respirators with appropriate cartridges. An OBZ reading above the third Action Level (75 ppm > one minute) will require the use of full-face respirators with appropriate cartridges. If the monitoring instrument reads more than the fourth Action Level (150 ppm > one minute), or 300 ppm instantaneously), work will stop, and workers will move upwind while the airborne contaminants dissipate. If elevated levels remain for more than five minutes, the source of the airborne contamination will be covered with clean soil, plastic sheeting, or foam, (or controlled in an appropriate manner) and the Health and Safety Representative or PM will be contacted for further guidance.

6.1.1 Personal Exposure Monitoring

Due to the relatively low known contaminant concentration at the site, personal exposure monitoring is not anticipated. However, the procedures for monitoring are outlined below.

In accordance with 29 CFR 1910.120(h), a URS industrial hygienist will perform quantitative personal monitoring on personnel at greatest risk of exposure (i.e., those working in the exclusion zone). The industrial hygienist will determine who to sample based upon site conditions at the time of the sampling; monitoring will commence when the Second Action Level is exceeded.

Personnel will be monitored for VOCs in accordance with National Institutes for Occupational Safety and Health (NIOSH). A laboratory accredited by the American Industrial Hygiene Association will perform analyses, and results will be reported and records maintained in accordance with OSHA criteria.

Procedures for personal monitoring are located in Safety Management Standard 43, a copy of which is to be maintained on site.

6.1.2 Community Air Monitoring Plan

A community air monitoring plan (CAMP) will be implemented. The CAMP will consist of real time air monitoring for volatile organic compounds (VOCs) and particulates at the downwind perimeter of each designated work area when intrusive activities are in progress. The intent of the plan is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from the potential airborne contaminant releases as direct result of investigative and remedial work activities.

<u>VOC Monitoring, Response Levels, and Actions</u>

VOCs will be monitored using an organic vapor meter (PID or FID) at the downwind perimeter of the immediate work area while intrusive work is actively performed. Upwind concentrations will also be measured periodically.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total orgaic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

If the total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at the levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of the vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less than 20 feet, is below 5 ppm over background for the 15 minute average.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown

Fifteen minute readings will be recorded and available for review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, Actions

Particulate concentrations will be monitored at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations while intrusive work is actively being performed. The particulate monitoring will be performed with real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level.

If the downwind PM-10 particulate level is 100 micrograms per cubic meter greater than background for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that the downwind PM-10 particulate levels do not exceed 150 micrograms per cubic meter above the up wind level and provided that no visible dust is migrating from the work area.

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

Readings are to be recorded and available for review.

6.2 BACKGROUND READINGS

All direct-reading instrument readings will be evaluated relative to background reading, not "meter zero". Prior to the start of work at each shift, and whenever there is a significant shift in wind direction, instrument readings will be obtained upwind of the site work zone in order to determine the level of "background" readings from local vehicle traffic, emissions from nearby operations unrelated to the site, etc. Site readings will be evaluated against these background readings (i.e., if an action level is listed as 20 ppm, it is evaluated as 20 ppm above background). The SSO should consult with the industrial hygienist regarding the potential health hazards associated with background readings above 5 ppm.

6.3 DATA LOGGING

All monitoring data, including background readings, will be logged in the field logbook. The results of daily instrument calibrations can either be logged on the form provided in Attachment C or in the field logbook. All monitoring instruments will be calibrated in accordance with the manufacturer's instructions prior to the start of each shift. Calibration should also be performed when inconsistent or erratic readings are obtained. **IF AN INSTRUMENT CANNOT BE CALIBRATED TO SPECIFICATION, OR BECOMES OTHERWISE INOPERABLE, ALL INVASIVE SITE WORK (I.E., DRILLING, EXCAVATING) WILL CEASE UNTIL THE INSTRUMENT IS APPROPRIATELY REPAIRED**

OR REPLACED; the PM or Regional Health and Safety Manager should be contacted for further guidance.

6.4 DUST CONTROL

High winds and site operations can cause airborne dust hazards. If site operations generate sustained visible dust, a water mist will be applied to reduce dust generation. If the mist is not effective in reducing dust generation, personnel will don respirators (half-face or full-face as appropriate for analyzer readings) with combination organic vapor-HEPA cartridges (such as MSA's GMC-H cartridges).

Sand and Portland cement that may be used in groundwater monitoring well construction may contain free silica (quartz). Airborne exposure to silica dust may occur during handling of these materials. Half-face respirators with HEPA cartridges should be worn for those sand and cement handling operations where there is a reasonable possibility for exposure to sustained airborne dust from the pouring and mixing of dry sand or cement.

6.5 EXPLOSIVE ATMOSPHERES

Due to the presence of elevated concentrations of site constituents that have a low flash point, the potential exists for explosive atmospheres at the site. Therefore, a Combustible Gas Indicator/O_2 (CGI/O_2) meter will be used to monitor ambient conditions. Decisions will be based on the levels measured using a CGI/O_2 meter (measurements are in % of the Lower Explosive Limit) as determined by the Action Level Table located on **page 5.**

For excavation operations, a CGI with a remote sensing head should be used. The sensing head should be attached to the excavator arm near the bucket, and the cable run back along the arm to the CGI located in the excavator cab. This will permit the operator to be alerted to hazardous situations without requiring monitoring personnel to stand at the working face.

Fire suppression equipment (Two 2A10B:C fire extinguishers or fire hoses) is to be present at all times during site operations in areas where a fire potential exists.

6.6 OXYGEN DEFICIENT ATMOSPHERES

Oxygen deficient atmospheres may be encountered in excavations. An excavation with an oxygen deficient atmosphere is not to be entered unless absolutely necessary and then only after following appropriate confined space entry procedures. These procedures are available by contacting the Regional Health and Safety Manager to obtain a confined space entry permit. Any confined space entry must be approved by the Regional Health and Safety Manager.

Prior to entering any space where an oxygen deficiency may exist, an oxygen meter will be used to test for adequate oxygen levels. Decisions will be based on oxygen concentrations as follows:

20.8%	Continue Operations
<20.8%	Continuous Monitoring
<19.5%	Do not enter, ventilate and determine if supplied air equipment is required

7.0 PERSONAL PROTECTIVE EQUIPMENT

The minimum Personal Protective Equipment (PPE) for site personnel includes:

- Hardhat
- Safety glasses with side shields (or impact resistant goggles)
- Steel-toed boots or Chemical-resistant steel-toed boots
- Ear protection in vicinity of noisy equipment
- Work gloves and/or chemical-resistant gloves
- Traffic safety vest in the vicinity of heavy equipment

As the various monitoring Action Levels are reached, additional PPE is required. Section 1.0 provides the description of the incremental PPE requirements relative to specific Action Levels, as well as the specific kinds of PPE to be use. Procedures for use and selection of personal protective equipment are located in Safety Management Standard 29, a copy of which is to be maintained on site.

7.1 LIMITATIONS OF PROTECTIVE CLOTHING

The protective equipment ensembles selected for this project are anticipated to provide protection against the types and concentrations of hazardous materials that may potentially be encountered during field operations. However, no protective garment, glove or boot is resistant to all chemicals at any concentration; in fact, chemicals may continue to permeate or degrade a garment even after the source of the contamination is removed.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all URS personnel:

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift

- Inspect all clothing, gloves and boots both prior to and during use for:
    - Imperfect seams
    - Non-uniform coatings
    - Tears
    - Poorly functioning closures

- Inspect reusable garments, boots and gloves both prior to and during use for:
    - Visible signs of chemical permeation such as swelling, discoloration, stiffness or brittleness
    - Cracks or any signs of puncture or abrasion

  Any reusable garments exhibiting any such characteristics will be discarded.

7.2 DURATION OF WORK TASKS

The duration of work tasks in which personnel use PPE ensembles that include chemical protective clothing (including uncoated Tyvek®) will be established by the SSO. Variables to be considered include ambient temperature and other weather conditions, the capacity of individual personnel to work in the required level of PPE in heat and cold, and the limitations of specific PPE ensembles. The recommended rest breaks are as follows:

- Fifteen minutes midway between shift startup and lunch
- Lunch break (30-60 minutes)
- Fifteen minutes midway between lunch and shift end

Rest breaks are to be taken in the support zone or other clean area after personnel have completed the decontamination process, including soap and water wash of hands and face. ***[Additional rest breaks will be scheduled according to heat stress monitoring protocols as described in SMS 18.]***

8.0 RESPIRATORY PROTECTION

8.1 RESPIRATOR SELECTION

Engineering controls and safe work practices (e.g. elimination of the source of contamination, ventilation equipment, working upwind, limiting exposure time, etc). must always be the primary control for air contaminants. Respirators will be used if engineering or work practice controls are not feasible for controlling airborne exposures below acceptable concentrations and as an interim control measure while engineering or work practice controls are implemented.

Once the need for respirators has been established, the respirators will be selected on the basis of the hazards to which the worker is exposed. Only NIOSH-approved respirators will be issued. Selection criteria established in 29 CFR 1910.134 has been used by the HSP Preparer in determining respirator requirements for this project.

> *CAUTION: Full-face piece or half-face piece air-purifying respirators are not to be used where there is an oxygen deficiency. Only air-supplied respirators with an emergency escape cylinder or self-contained breathing apparatus will be worn when an oxygen deficiency exists.*

> *CAUTION: A respirator does not protect against excessive heat or against hazardous substance that can attack the body through the skin.*

The forms of the airborne contaminants have been evaluated based upon the suspected contaminants of concern. Evaluation of the concentration of the airborne chemical hazard will be performed using direct reading instruments to determine what type respirator will be used. Airborne readings will be compared to Action Levels in the table in Section 1.0. See action level/respirator requirements in Section 6.1.

8.2 **MEDICAL SCREENING**

Project employees are enrolled in the URS Medical Surveillance Program and are medically evaluated in compliance with the requirements of 29 CFR 1910.134(a)(10). Employees not medically cleared to wear respirators will not be assigned to this project.

The medical status of each employee is reviewed annually and as may be deemed necessary by the examining physician if the physical status of the employee changes.

8.3 **FIT TESTING**

A person wearing a respirator must be clean-shaven in the area of the face piece seal. Long hair, sideburns, and skullcaps that extend under the seal are not allowed. Glasses with temple pieces extending under the seal are not allowed for full-face respirators. Persons with facial conditions that prevent a proper seal are not allowed to wear a respirator until the condition is corrected.

Facial conditions that may cause a seal problem include missing dentures, scars, severe acne, etc. Contact lenses may be worn with respiratory protection.

No individual will enter an area where the use of respiratory protective equipment is required unless the person has been fit tested within the last year. Fit testing will be performed in accordance with accepted fit test procedures defined in Safety Management Standard 42, a copy of which is maintained at the site.

Records of fit testing will be maintained on site or by the employee's office and/or corporate medical surveillance program.

Respirator wearers will perform a user seal check each time the respirator is put on. For air purifying respirators, the positive user seal check is performed by first removing the exhalation valve cover, then placing the palm over the respirator exhalation valve and exhaling gently. The respirator mask should puff out without noticeable leakage. The negative user seal check is performed by placing the palms over both of the respirator cartridges, inhaling gently, and holding the breath for 10 seconds. The respirator mask should remain collapsed on the face without noticeable leakage.

8.4 RESPIRATOR USE INSTRUCTIONS

Only those employees who have been properly trained and qualified on the specific type of respirator to be worn may use respirators. No individual will enter an area where the use of respiratory protective equipment is required unless the person has been trained.

All employees whose job assignment requires the use of respirators are given training in accordance with 29 CFR 1910.134 during initial 40-hour and annual Refresher training for hazardous waste operations.

Hands-on training on inspecting and donning a respirator, including user seal checks, was also provided at the time of fit testing. Retraining is performed annually on each type of respirator worn by the individual. In addition, site-specific respirator training is provided during Site Safety Briefings conducted by the SSO. Training records are kept in the employee's training file.

Particulate respirator cartridges should be changed out when the wearer has difficulty breathing through the cartridges. Chemical gas or vapor respirator cartridges will be ***changed out at least daily (**or according to the following schedule):***

Contaminant of Concern	Instrument Reading (ppm)	Change-out Time (hours)

The fit of a chemical gas or vapor respirator should be rechecked and the cartridges changed if the wearer detects chemical odor or feels chemical irritation on the skin, both indicators of leakage or cartridge breakthrough. Where available, an ESLI will be used on chemical respirator cartridges. Cartridges will be changed as soon as the ESLI indicates that the cartridge is saturated and no longer effective in absorbing airborne chemicals.

8.5 RESPIRATOR INSPECTION

The user will inspect respirators before and after each day's use.

Inspection procedure, air purifying respirators (full-face piece and half-face piece cartridge respirators):

Examine the face piece for:

- Excessive dirt
- Cracks, tears, holes, or distortion from improper storage
- Inflexibility
- Cracked or badly scratched lenses (full-face only)
- Incorrectly mounted eyeglass lenses or broken or missing mounting clips (full-face only)
- Cracked or broken air purifying element holder, badly worn threads, or missing gaskets

Examine the head straps or head harness for:

- Breaks or cracks
- Broken or malfunctioning buckles
- Excessively worn serration on the headstraps, which may permit slippage

Examine the inhalation valves (2) and exhalation valve for:

- Foreign material (e.g. hairs, particles, etc.)
- Improper insertion of the valve body in the face piece
- Cracks, tears, or chips in the valve body, particularly in the sealing surface
- Missing or defective exhalation valve covers

Examine the air-purifying cartridge for:

- Missing or worn cartridge holder gasket
- Incorrect cartridge/canister for the hazard
- Incorrect cartridge installation, loose connections, or cross threading in the holder
- Cracks or dents in the outside case or threads of filter or cartridge/canister

8.6 CLEANING OF RESPIRATORS

Respirators assigned and worn by one individual must be dismantled and thoroughly cleaned and disinfected after each day's use. Visitor's or multi-assigned respirators must be cleaned and disinfected after each use. A disinfectant spray or wipe is approved as a disinfectant between uses during the day but not for cleaning and sanitizing after each day's use. Care must be taken to prevent damage from rough handling during the cleaning procedure. After cleaning, respirators must be reassembled.

Respirator Cleaning Procedure

Washing:	Disassemble and wash with a mild liquid detergent in warm water (not to exceed 110EF). A stiff bristle (not wire) brush may be used.
Rinsing:	Rinse in clean water (110EF maximum) to remove all traces of detergent. This is very important to prevent dermatitis.
Disinfecting:	Thoroughly rinse or immerse in a sanitizer provided by the manufacturer. Alternatively, a weak chlorine bleach solution (1 milliliter liquid bleach/liter of water) may be used.
Final Rinsing:	Rinse thoroughly in clean water (110EF maximum) to remove all traces of disinfectant. This is very important to prevent dermatitis.
Drying:	Drain and dry hanging by the straps from racks (take care to prevent damage) or towel drying with clean soft clothes or paper towels.

8.7 MAINTENANCE OF RESPIRATORS

Routine respirator maintenance such as replacing missing valves, gaskets, nosecups etc., must only be performed by trained respirator users or a respirator manufacturer's representative. Only approved replacement parts must be used. Substitution of parts from a different brand or type of respirator is generally not possible, invalidates the technical approval of the respirator, and is not permitted. Any respirator suspected of being defective must be removed from service and replaced.

8.8 STORAGE OF RESPIRATORS

When not in use, respirators must be stored to protect them from dust, sunlight, heat, extreme cold, excessive moisture, damaging chemicals, and physical damage. Respirators must be stored in sealable (e.g. Ziplock® or twist-tie) reusable plastic bags between shifts.

The respirator storage environment must be clean, dry, and away from direct sunlight. Onsite cabinets or cases are suggested. Storing bagged respirators in vehicles is discouraged due to the potential for damage from other material or equipment.

8.9 ADDITIONAL INFORMATION

Additional information on the URS Respiratory Protection Program is located in Safety Management Standard 42, a copy of which is to be available on site.

9.0 SITE CONTROL

9.1 GENERAL

Barricade tape and/or barricades shall be used to delineate a work zone for safety purposes around the work area. The barriers should be set in a 25-foot radius (as practical) around the work area to provide sufficient maneuvering space for personnel and equipment. A short piece of barricade tape can be affixed to a secure upright (e.g., drill rig mast or vehicle antenna) to serve as a wind direction telltale. A five-foot opening in the barricades at the support zone (upwind of the work area) will serve as the personnel and equipment entry and exit point. The personnel decontamination station will be established at this point if formal decontamination procedures are required (see Section 9.0). All entry and exit from the work area will be made at this opening in order to control potential sources of contamination and leave contaminated soil and debris in the work area.

At the end of the shift, all boring/sampling holes and excavations must be covered or otherwise secured. All cuttings and decontamination fluids are to be handled in accordance with relevant regulations and instructions from the PM.

The PM or SSO ***(with the assistance of the facility representative)*** will determine an upwind evacuation area prior to each shift, and all personnel will be notified of its location. A horn or other signaling device will be used to signal an evacuation in the event of an emergency. Three blasts of the horn will be the signal to immediately stop work and proceed to the evacuation area.

The SSO will verify that all site visitors sign the visitors' log. In addition, all URS personnel and site visitors entering the work area must present evidence of their participation in a medical surveillance program and completion of health and safety training programs that fulfill the requirements of this plan.

The SSO will provide site hazard and emergency action information to all site visitors before they enter the site. This can be done by providing a copy of this HSP to the visitor.

9.2 WORK ZONES

If monitoring instrument readings exceed the first Action Level (>15 ppm > one minute), requiring the use of chemical protective equipment, work zones must be established as described below.

- Exclusion Zone – a 25 foot (as practical) circle around the work area will be defined before work starts. The encircled area will constitute the "Exclusion Zone". This zone is where potentially hazardous contaminants and physical hazards to the workers will be contained. Appropriate personal protection as described in Section 1.0 will be required in this area. Plastic sheeting (visqueen) and/or tarps may be used as necessary to control contaminated materials spilled to the ground during site operations. The size of the Exclusion Zone may be altered to accommodate site conditions and to ensure contaminant containment.

- Contamination Reduction Zone (CRZ) – a corridor leading from the Exclusion Zone will be defined, and will lead from the work area to a break area. All decontamination activities will occur in the CRZ. A waste container will be placed at the end of the corridor so contaminated disposable equipment can be placed inside and covered. Surface/soil contamination in this area should be controlled using plastic sheeting. No one will be permitted into the Contamination Reduction Zone or Exclusion Zone unless they are in full compliance with the requirements of this Plan.

- Support Zone – a Support Zone, the outermost part of the site, must be defined for each field activity. Support equipment is located in this uncontaminated or clean area. Normal work clothes are appropriate within this zone. The location of this zone depends on factors such as accessibility, wind direction (upwind of work area), and resources (i.e., roads, shelter, utilities).

10.0 DECONTAMINATION PROCEDURES

If the monitoring instrument readings indicate respirator use (the Second Action Level >15 ppm > one minute]) in the Operator's Breathing Zone, the following steps will be followed whenever personnel leave the exclusion zone/work area:

1. Remove all equipment, sample containers, and notes to the CRZ. Obtain decontamination solutions and decon tools (shovels, auger flights, etc.) by brushing them under a water rinse. A high-pressure steam cleaner may also be used for decon. All waste and spent decon solutions will be properly contained.

2. Scrub boots with a stiff bristle brush and water. Washtubs and chairs will be provided.

3. Remove outer gloves (and boot covers, if used).

4. Remove Tyvek® coverall; discard in provided container.

5. Remove hardhat and eye protection.

6. Remove respirator.

7. Remove inner gloves.

8. Wash hands and face.

The decontamination area will be covered with plastic sheeting, which will be replaced when torn or heavily soiled, and at the end of each shift.

Each worker will be responsible for cleaning, sanitizing and storing their own respirator in accordance with manufacturer's guidance (i.e., washing in warm water and detergent or sanitizing solution, air drying, and storing in a plastic storage bag; see Sections 8.6 - 8.8). Cartridges will be changed in accordance with the procedures described in Section 8.4.

All spent decontamination fluids (rinse waters, etc.) shall be handled as directed by the PM and in accordance with relevant regulations.

10.1 SANITATION

Potable water will be made available at the site, either from a pressurized source or commercially available bottled water. Drinking cups will be supplied so personnel will neither drink directly from the source of water nor have to share drinking cups. Sources of non-potable water shall be clearly labeled as such.

Unless toilet facilities are available on site or transportation is readily available to transport personnel to nearby (within five minutes) toilet facilities, portable toilet facilities, such as chemical toilets, will be provided on site.

Washing facilities will be provided on site, and will be located in the decontamination area or the support area. Soap, clean water, wash basins and single-use towels will be available for personnel use.

URS procedures for site sanitation are located in Safety Management Standard 30, a copy of which is to be maintained on site.

10.2 DECONTAMINATION – MEDICAL EMERGENCIES

In the event of physical injury or other serious medical concerns, immediate first aid is to be administered in lieu of further decontamination efforts.

See Emergency Decontamination chart for a decision tree for emergency decontamination.

10.3 DECONTAMINATION OF TOOLS

When all work activities have been completed, contaminated tools used by URS personnel will be either appropriately decontaminated or properly disposed of as hazardous waste.

It is expected that all tools will be constructed of non-porous, non-absorbent materials. This will aid the decontamination process. Any tool, or part of a tool, which is made of a porous/absorbent material will be discarded and disposed of as a hazardous waste if it cannot be properly decontaminated.

Tools will be placed on a decontamination pad or into a bucket and thoroughly washed using a soap solution and brushing, followed by a fresh water rinse. All visible particles are to be removed before the tool is considered clean.

11.0 SAFE WORK PRACTICES

11.1 GENERAL

1. Eating, drinking, chewing gum or tobacco, and smoking are prohibited in the contaminated or potentially contaminated area or where the possibility for the transfer of contamination exists.

2. All personnel will enter designated work areas only through the contamination reduction zone (CRZ). All personnel leaving an exclusion/work zone must exit through the CRZ and pass through the decontamination station as described in Section 10.0.

3. Personnel will wash their hands and face thoroughly with soap and water prior to eating, drinking or smoking.

4. Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling, leaning or sitting on contaminated surfaces. Do not place monitoring equipment on potentially contaminated surfaces (i.e., ground, etc.)

5. All field crew members should make use of their senses to alert them to potentially dangerous situations in which they should not become involved (i.e., presence of strong, irritating or nauseating odors).

6. Only those vehicles and equipment required to complete work tasks should be permitted within the exclusion/work zone (drill rigs, excavators, and similar items). All non-essential vehicles should remain within the support zone.

7. Containers, such as drums, will be moved only with the proper equipment and will be secured to prevent dropping or loss of control during transport.

8. Field survey instruments, such as PIDs, should be covered with plastic or similar covering to minimize the potential for contamination.

9. No matches or lighters will be permitted in the work area/exclusion zone or contamination reduction zone.

10. Contaminated protective equipment, such as respirators, hoses, boots, and disposable protective clothing, will not be removed from the work area/exclusion zone or decontamination area until it has been cleaned, or properly packaged and labeled.

11. Prevent, to the extent possible, spills. In the event that a spill occurs, contain liquid if possible.

12. Prevent splashing of the contaminated materials.

13. Field crewmembers shall be familiar with the physical characteristics of the site operations including:

    - Wind direction in relation to the contaminated area;
    - Accessibility to equipment and vehicles;
    - Areas of known or suspected contamination;
    - Site access; and
    - Nearest water sources.

14. The number of personnel and equipment in the exclusion zone should be minimized but only to the extent consistent with workforce requirements of safe site operations.

15. All wastes generated by URS activities at the site will be disposed of as directed by the PM.

16. All personal protective equipment will be used as specified and required.

17. The buddy system will be used at all times when performing sampling for hazardous material when the first action level criteria has been exceeded or when working in remote areas.

18. Personnel are to immediately notify the SSO or Site Manager if any indications of potential explosions or unusual conditions are observed.

11.2 SAMPLING PRACTICES

For all sampling activities, the following standard safety procedures shall be employed:

1. All sampling equipment should be cleaned before proceeding to the site.

2. At the sampling site, sampling equipment should be cleaned after each use.

3. Work in "cleaner" areas should be conducted first where practical.

4. All unauthorized personnel will remain outside exclusion zones at all times.

11.3 SAMPLE SHIPMENT/HAZARDOUS MATERIALS SHIPMENT

If samples to be collected during the course of this project fall under the criteria that defines them as hazardous materials under DOT regulations 49 CFR Parts 171-177 (see URS guidelines for determination), then they <u>must</u> be shipped in accordance with those regulations by an individual who is certified as having been Function-Specific trained as required under the DOT regulations.

12.0 EMERGENCY RESPONSE PLAN

It is URS policy to evacuate personnel from areas involved in hazardous material emergencies and to summon outside assistance from agencies with personnel trained to respond to the specific emergency. This section outlines the procedures to be followed by URS personnel in the event of a site emergency. These procedures are to be reviewed during the onsite safety briefings conducted by the SSO.

In the event of a fire or medical emergency, the emergency numbers identified in Section 1.0 (page 1) can be called for assistance.

12.1 PLACES OF REFUGE

In the event of a site emergency requiring evacuation, all personnel will evacuate to a pre-designated area located a safe distance from any health or safety hazard (typically the URS field office, unless conditions dictate otherwise). The SSO ***(in cooperation with a facility representative)*** will designate a primary assembly area prior to the start of work each day. The daily pre-designated assembly area may have to be re-designated by the SSO in the event of an emergency where the area of influence affects the primary assembly area. Once assembled, the SSO shall take a head count. The SSO will evaluate the assembly area to determine if the area is outside the influence of the situation; if not, the SSO will redirect the group to a new assembly area where a new head count will be taken.

During any site evacuation, all employees shall be instructed to observe wind direction indicators. During evacuation, employees will be instructed to travel upwind or crosswind of the area of influence. The SSO will provide specific evacuation instructions, via the site emergency radio if necessary, to site personnel regarding the actual site conditions.

12.2 FIRE

Fire prevention procedures are described in Safety Management Standard 14, a copy of which is to be maintained on site. To protect against fires, the following special precautions must be taken:

- Before any flame-producing devices, i.e., cutting torches or welding irons, are used in the exclusion zone, the SSO must be contacted. In some cases, the client may require to be contacted as well to determine if a hot work permit is required. A detailed inspection of the work area will be conducted to determine if potential fire sources exist. The fire sources must be removed to at least 35 feet away before work can commence.

- Two full 2A10B:C fire extinguishers must be located at the work area when cutting/welding is being conducted, and a fire watch will be posted.

- Upon completion of the cutting/welding activities the area will be inspected for hot metal, slag, etc. The fire watch will remain on station for at least 15 minutes after the hot work is completed.

Type ABC fire extinguishers will be available on site to contain and extinguish small fires. The local or facility fire department shall be summoned in the event of any fire on site.

12.3 COMMUNICATION

A communication network must be set up to alert site personnel of emergencies and to summon outside emergency assistance. Where voice communication is not feasible an alarm system (i.e., sirens, horns, etc.) should be set up to alert employees of emergencies. Radio communication may also be used to communicate with personnel in the exclusion zone. Where phone service is not readily available, radios or portable phones should be used to communicate with outside agencies. Site personnel should be trained on the use of the site emergency communication network. Emergency phone numbers shall be posted at the phone or radio used for outside communication. The SSO is responsible for establishing the communication network prior to the start of work, and for explaining it to all site personnel during the site safety briefing.

In the event of an emergency, personnel will use the following hand signals where voice communications are not feasible:

Signal	Definition
Hands clutching throat	Out of air/can't breathe
Hands on top of head	Need assistance
Thumbs up	OK/I'm alright/I understand
Thumbs down	No/negative
Arms waving upright	Send back support
Grip partner's wrist	Exit area immediately

12.4 EMERGENCY RESPONSE PROCEDURES

12.4.1 Emergency Response Team

The emergency response team will consist of employees who assume the following roles:

- Emergency Care Provider(s)

  Provide first aid/CPR as needed.

- Communicator

  The role of the communicator is to maintain contact with appropriate emergency services, providing as much information as possible, such as the number injured, the type and extent of injuries, and the exact location of the accident scene. The communicator should be located as close to the scene as possible in order to transmit to the emergency care providers any additional instructions that may be given by emergency services personnel in route.

- Site Supervisor

  The site supervisor (usually the SSO) should survey and assess existing and potential hazards, evacuate personnel as needed, and contain the hazard. Follow up responsibilities include replacing or repairing damaged equipment, documenting the incident, and notifying appropriate personnel/agencies described under incident reporting. It also includes reviewing and revising site safety and contingency plans as necessary.

In the event of an emergency, follow the procedure outlined in Figure 12-1. Notify site personnel of the situation. Survey the scene to determine if the situation is safe, to determine what happened, and to search for other victims. The Emergency Response Checklist can be used to help remember the things to do in an emergency.

EMERGENCY RESPONSE CHECKLIST

In an Emergency	Yes	No
Confirm the reported incident	____	____
Evacuate and secure the area	____	____
Render first aid/emergency medical care	____	____
Notify promptly:		
Project Manager	____	____
Fire Department	____	____
Police Department	____	____
Nearest Hospital or Medical Care Facility	____	____
Start Documentation	____	____
If spill or leak occurs:		
Don the proper PPE	____	____
Stop the source	____	____
Contain the spill	____	____
Clean up the spill	____	____
Upon evacuating, take attendance at the assembly area	____	____
Authority given:		
Leave the site	____	____
Restart the operations	____	____
Debrief and document the incident	____	____
A copy of the document submitted to the HSM	____	____

12.5 MEDICAL EMERGENCY RESPONSE PLAN

At least one URS employee on site will hold a current certificate in American Red Cross Standard First Aid. This training provides six and one-half hours of Adult CPR and Basic First Aid. If a medical emergency exists, consult the emergency phone number list and request an ambulance immediately. Perform First Aid/CPR as necessary, stabilize the injured, decontaminate if necessary, and extricate only if the environment they are in is dangerous or unsafe and ONLY if the rescuers are appropriately protected for potential hazards they may encounter during the rescue. When emergency services personnel arrive, communicate all first aid activities that have occurred. Transfer responsibility for care of the injured/ill to the emergency services personnel.

The following items and emergency response equipment will be located within easy access at all times:

- First Aid Kit and Infection Control Kit;
- Eyewash – A 15 minute eyewash (required if corrosives are present) or an appropriate amount of portable sterile eyewash bottles will be available on site for flushing foreign particles or contaminants out of eyes. T he SSO will demonstrate the proper operation of the unit(s) prior to the start of work;
- Emergency Phone Numbers List; and
- Portable radios for emergency communications in remote areas.

Drugs, inhalants, or medications shall not be included in the First Aid Kit.

Supplies should be re-ordered as they are used. A monthly inventory must be done on the first aid kit and infection control kit contents and supplies re-ordered that have been used and not reported.

12.6 INCIDENT REPORT

ALL site injuries and illnesses must be reported to the SSO and PM immediately following first-aid treatment. The SSO will notify the Regional Health and Safety Manager (215-542-3800). Work is to be stopped until the PM or SSO have determined the cause of the incident and have taken the appropriate action to prevent a re-occurrence. Any injury or illness, regardless of severity, is to be reported. (see SMS #49).

12.7 OPERATION SHUTDOWN

Under certain extreme hazardous situations the SSO or SSR may request that site operations be temporarily suspended while the underlying hazard is corrected or controlled. During operation shutdown, all personnel will be required to stand upwind to prevent exposure to fugitive emissions. The SSO, with concurrence from the Regional Health and Safety Manager, will have ultimate authority for operations shutdown and restart.

12.8 SPILL OR HAZARDOUS MATERIALS RELEASE

Small spills are immediately reported to the SSO and are dealt with according to the chemical manufacturer's recommended procedures found on the MSDS. Steps will be taken to contain and/or collect small spills for approved storage and disposal.

In the unlikely event of a larger release of hazardous materials as a result of site activities, site personnel will evacuate to the predesignated assembly area. The local Designated Emergency Response Authority (DERA) will be notified by the SSO immediately and appropriate actions will be taken to protect the public health and mitigate the contaminant release. The DERA can be reached through the local police or fire department. The Site Manager will make the following emergency contacts:

Regional Health and Safety Manager --	Rodney Petri / (215) 542-3800
Health and Safety Representative –	Dean Gerber / (412) 351-2006
Project Manager	William Randall / (412) 351-2006

EPA Response Center (depending if RQ is exceeded) (800) 424-8802

13.0 TRAINING, MEDICAL SURVEILLANCE, SITE INSPECTIONS

13.1 TRAINING AND MEDICAL SURVEILLANCE

All URS site personnel will have met the requirements of 29 CFR 1910.120(e), including:

- Forty hours of initial off-site training or its recognized equivalent
- Eight hours of annual refresher training for all personnel (as required);
- Eight hours of supervisor training for personnel serving as Site Safety Officers
- Three days of work activity under the supervision of a trained and experienced supervisor

All URS site personnel are participating in medical surveillance programs that meet the requirements of 29 CFR 1910.120(f). Current copies of training certificates and statements of medical program participation for all URS personnel are maintained by the local office.

In addition, all URS site personnel will review this HSP and sign a copy of the Safety Plan Compliance Agreement, which is found in Attachment B. The PM will maintain these agreements at the site, and place them in the project file at the conclusion of the operation.

Prior to the start of operations at the site, the SSO will conduct a site safety briefing, which will include all personnel involved in site operations. At this meeting, the SSO will discuss:

- Contents of this HSP
- Types of hazards at the site and means for minimizing exposure to them
- The type of monitoring that will be performed
- Action levels for upgrade and downgrade of personal protective equipment
- Personal protective equipment that will be used
- Site-specific respiratory protection requirements
- Decontamination protocol
- Site control measures, including safe operating practices and communication
- Location and use of emergency equipment
- Evacuation signals and procedures

All site personnel, including subcontractor personnel, are to attend the briefings and sign the briefing form.

Subsequent site safety briefings will be conducted at least weekly, or whenever there is a change in task or significant change in task location. Briefings will also be conducted whenever new personnel report to the site.

13.2 SITE INSPECTIONS

The URS Site Manager or Site Safety Officer is to conduct a daily site inspection prior to the start of each shift. It is the responsibility of the Project Manager or Site Manager to resolve discrepancies immediately, contacting the Regional Health and Safety Manager if necessary for assistance. Inspections are to be documented and maintained on site until the completion of the project, at which time they are placed in the project files.

14.0 RECORDKEEPING

The PM and SSO are responsible for site recordkeeping. Prior to the start of work, they will review this plan; if there are no changes to be made, they will sign the approval form (PM) or acceptance form (SSO) and forward a copy to the Regional Health and Safety Manager.

All URS personnel will review the HSP and sign the Safety Plan Compliance Agreement in Attachment B; copies of these forms will be maintained in the project file as noted in Section 12.

The SSO will conduct a Site Safety Briefing in accordance with Section 13 and have all attendees sign the form in Attachment B; copies will be maintained in the project file.

Any incident or exposure incident will be investigated and the Incident Report form (SMS 049) will be completed and forwarded to the Office Human Resources Representative and the Regional Health and Safety Manager.

All instrument readings and calibrations, PPE use and changes, health and safety-related issues, and deviations from or problems with this HSP will be recorded in the field log.

ATTACHMENT 1

HOSPITAL ROUTE MAP

YAHOO! Maps Yahoo! - Yellow Pages

type job here Find job

Welcome, Guest User Create My Locations - S

Yahoo! Maps - Driving Directions

Starting from: 320 S Roberts Rd, Dunkirk, NY 14048-2810

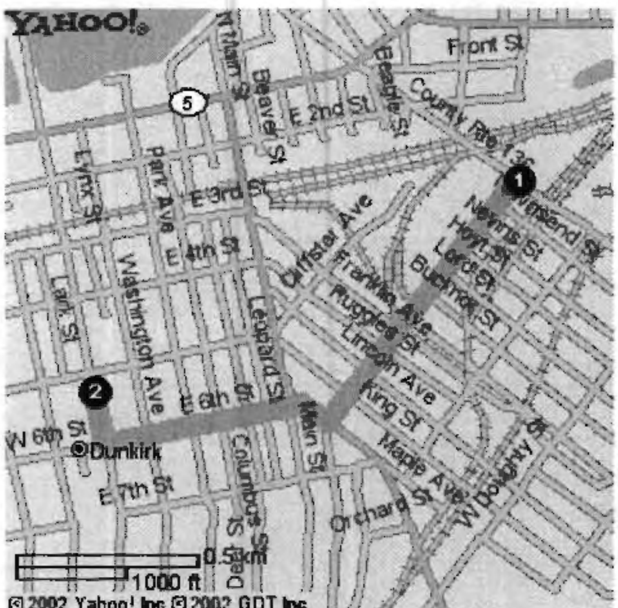
Arriving at: ★ 529 Central Avenue, Dunkirk, NY 14048-2514

Distance: 1.0 miles **Approximate Travel Time:** 2 mins

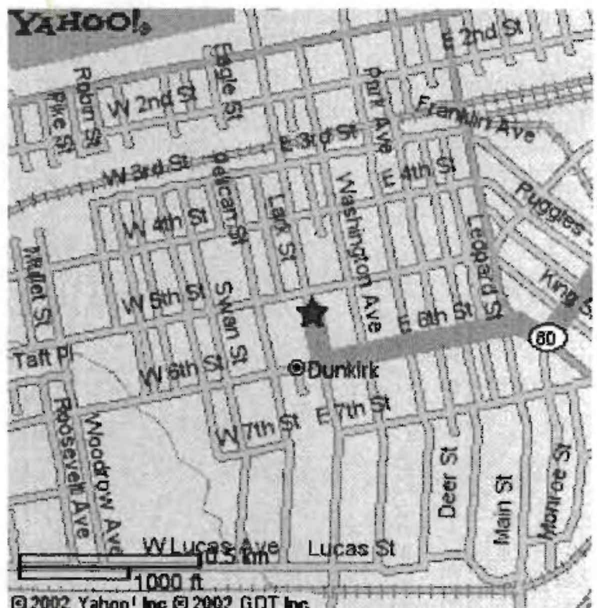
Email Directions

Get Reverse Directions

Text Only Driving Directi



Full Route



Destination

	Directions	**Miles**
1.	Start on **COUNTY RTE 136/S ROBERTS RD**	0.0
2.	Turn Left on **E TALCOTT ST/TALCOTT ST**	0.3
3.	Continue on **W TALCOTT ST**	0.2
4.	Turn Right on **MAPLE AVE**	0.1
5.	Turn Left on **E 6TH ST**	0.3
6.	Turn Right on **CENTRAL AVE**	0.1

When using any driving directions or map, it's a good idea to do a reality check and make sure the road exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an in planning.

Driving Directions **New Loca**

1 **Enter a starting address**
or select from My Locations

My Locations -- My Locations -- Sign In

(Address, Intersection or Airport Code)

Address 320 S Roberts Rd

City, State or Zip Dunkirk, NY 14048-2810

Country United States

2 **Enter a destination address**
or select from My Locations

My Locations -- My Locations -- Sign In

(Address, Intersection or Airport Code)

Address 529 Central Avenue

City, State or Zip Dunkirk, NY 14048-2514

Country United States

Get Directions

ATTACHMENT 2

SAFETY PLAN COMPLIANCE AGREEMENT AND MEDICAL EMERGENCY CONTACT SHEET

I, ____, have received a copy of the Health and Safety Plan for this Project. I have reviewed the plan, understand it, and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the health and safety requirements specified in the plan.

SIGNED: ________________________________ ____________________________

Signature Date

Firm: URS Corp.

This brief Medical Emergency Contact Sheet will be kept in the Support Zone during site operations. It is in no way a substitute for the Medical Surveillance Program requirements of the URS Health and Safety Program. This data sheet will accompany injured personnel when medical assistance or transport to hospital facilities is necessary.

Emergency Contact: ____________________________ Phone #: ____________________________

Relationship: ____

Do you wear contact lenses? ______________

ATTACHMENT 3

MATERIAL SAFETY DATA SHEETS

ATTACHMENT 4

SCOPE OF WORK

ATTACHMENT 5

SAFETY MANAGEMENT STANDARDS

URS SAFETY MANAGEMENT STANDARD
Worker Right-to-Know (Hazard Communication)

1. Applicability

This procedure applies to URS office and field operations.

2. Purpose and Scope

The worker right-to-know program provides URS personnel with information and training about safety and health hazards associated with the chemicals they might encounter in the workplace. This procedure describes how chemical safety hazards are communicated to URS personnel working in offices and at field site locations, and how information is to be provided to employees of other employers working at the location. The requirements include steps to acquire this information, maintain it, and train everyone to use it.

3. Implementation

Office Locations: Implementation of this program is the responsibility of the Office Manager.

Field Activities: Implementation of this program is the responsibility of the Project Manager.

4. Requirements

A. Hazardous Material Inventory

1. Maintain a hazardous material inventory that lists all of the hazardous materials used at this workplace. Use chemical names consistent with the applicable MSDS's.

2. File a copy of the chemical inventory in the Safety Filing System.

B. Material Safety Data Sheets (MSDS's)

1. Obtain a MSDS for each chemical before it is used.

2. Review each MSDS when it is received to evaluate whether the information is complete and to determine if existing protective measures are adequate.

3. Maintain a collection of all MSDS's where they are accessible at all times.

4. Replace MSDS sheets when updated sheets are received. Communicate any significant changes to those who work with the chemical.

5. MSDS's are required for all hazardous materials used on site by project personnel.

C. Labels

Label all chemical containers with:

1. Identity of the hazardous chemical(s),

2. Appropriate hazard warnings, and

3. Name and address of the chemical manufacturer, importer, or other responsible party.

D. Hazardous Nonroutine Tasks

Periodically, employees are required to perform hazardous non-routine tasks. Prior to starting work on such projects, provide each employee with information about hazards to which they may be exposed during such an activity.

This information will include:

1. Specific chemical hazards.

2. Protective/safety measures which must be utilized.

3. Measures that have been taken to lessen the hazards including ventilation, respirators, presence of another employee and emergency procedures.

E. Informing Contractors/Subcontractors

Provide contractors/subcontractors the following information on chemicals used by or provided to URS personnel:

1. Names of hazardous chemicals to which they may be exposed while on the jobsite.

2. Precautions the employees may take to lessen the possibility of exposure by usage of appropriate protective measures.

3. Location of URS MSDS's and written chemical inventory.

F. Training

1. Conduct training of all employees potentially exposed to hazardous materials on the following schedule:

   a. Before new employees begin their jobs.

   b. Whenever new chemicals are introduced into the workplace, or

   c. Annually thereafter.

2. This training will include:

   a. Applicable regulatory requirements.

   b. Names of those responsible for implementing this program.

   c. Location of the program, inventory and MSDS 's.

   d. Chemicals used, and their hazards (chemical, physical and health).

   e. How to detect the presence or release of chemicals.

   f. Safe work practices.

   g. How to read an MSDS.

3. Document the training.

5. Documentation Summary

A. File these records in the Office Safety Filing System

1. Chemical Inventory.

2. Location of the MSDS inventory.

3. Training records.

4. Contractor/Subcontractor notifications.

B. File these records in the Project Safety File.

1. Chemical Inventory.
2. Location of the MSDS inventory.
3. Training records.
4. Contractor/Subcontractor notifications.

6. Resources

A. U.S. OSHA Technical Links - Hazard Communication (http://www.osha-slc.gov/SLTC/hazardcommunications/index.html)

B. U.K. - Control of Substance Hazardous to Health - Regulations

URS SAFETY MANAGEMENT STANDARD
Confined Space Entry

1. Applicability

This procedure applies to URS projects involving confined space entry operations.

2. Purpose and Scope

This procedure is intended to protect personnel from the hazards associated with confined space entry.

A confined space is:

1. Large enough for personnel entry, and
2. Has limited or restricted means for entry or exit, and
3. Is not designed for continuous occupancy.

A Non-Permit space is a confined space that does not present any potential hazards, nor will the work performed therein create a hazardous condition.

A Permit-Required space is a confined space that may present one or more potential hazards including hazardous atmospheres, fire/explosion, engulfment, entrapment, electrical, mechanical, or any other serious hazard. (Note for Australian operations - all confined space entries require a permit)

Permit required confined space hazards include risks of asphyxiation, fire or explosion, chemical exposure, engulfment or drowning, electrocution, or dismemberment. Examples include, but are not limited to, sewers, utility vaults, tanks, sump pits, and excavations where there is the potential for atmospheric hazards.

This procedure applies to all permit required confined space entry activities performed by URS or any contractor and/or subcontractor.

Entry occurs whenever any body part crosses the plane of entry of the space.

3. Implementation

Field Operations - Implementation of this program is the responsibility of the Project Manager and Entry Supervisor.

4. Requirements

A. Appoint an Entry Supervisor who:

1. Determines whether a space is a "permit required" or non permit space.

2. Is responsible for onsite verification of acceptable entry conditions prior to entry.

3. Is responsible for assigning appropriately trained and medically qualified personnel to the project.

4. Has knowledge of required confined space entry equipment.

5. Has the ability to recognize and test hazardous atmospheres.

6. Is capable of performing a thorough hazard evaluation of the space and of the work that will be performed therein.

7. Understands how to execute a Confined Space Permit as well as any other required permit, such as a Hot Work permit.

8. Has authority to stop work and take corrective actions when conditions change.

9. Has had formal, documented training as a confined space Entry Supervisor.

B. Permit System

1. Utilize the "Confined Space Entry Permit and Procedures" form, Attachment 10-1, for permit space entry evaluation and establishment of required entry parameters.

2. Require confined space entry permits to be issued at least each shift by the Entry Supervisor.

C. Planning for Confined Space Entry

1. The Entry Supervisor:

   a. Contacts the facility representative to gather information about the confined space and to determine if the facility has any entry requirements that must be followed.

b. Performs a Hazard Evaluation using the Confined Space Permit and Procedures for Entry Form, Attachment 10-1.

c. Determines whether the space is a "permit required confined space" or a non-permit required confined space.

d. Assesses whether those hazards that create the "permit required confined space" can be eliminated without employee entry into the space. By eliminating hazards that are immediately dangerous to life or health, administrative and rescue requirements are lessened and risk to workers is reduced.

e. Determines rescue requirements for the space - if so designated as a "permit required confined space".

f. Arranges for qualified Entrants and Attendants.

g. Obtains blank Confined Space Entry and Hot Work (if applicable) permit forms.

h. Identifies all equipment, including personal protective equipment, needed for the job.

i. Obtains all equipment and verifies that it is functional.

j. Coordinates confined space entry activities with other site employers on site that may be affected by the entry. Will provide contractors with a copy of this written program.

D. Site Confined Space Preparation

1. Space Isolation

a. Verify the confined space is drained and cleaned.

b. Isolate the confined space as described on the Hazard Evaluation form or other applicable written procedures.

c. Isolate all forms of potential energy inside the confined space, including:

1. Electrical

2. Mechanical

3. Thermal
4. Pneumatic
5. Hydraulic

d. Isolate all lines carrying fuels, liquids or gases into the space.

e. Develop alternate procedures for protection of entrants for lines, which may not be controlled such as lines through stormwater or sewer vaults.

f. Open the entry point to the confined space.

g. Provide barricades and post the entrance of the space with a sign stating "Danger Confined Space Do Not Enter" or equivalent wording.

2. Electrical Equipment

a. Provide electrical equipment that meets the electrical classification of the area. See SMS 12, "Electrical Safety".

b. Route all portable electrical equipment through ground fault circuit interruption (GFCI) devices.

3. Atmospheric Tests

a. Calibrate monitoring equipment and record information on the Daily Instrument Calibration Form.

b. Make initial atmospheric tests of the space.

c. Attach extension probes to the monitoring equipment, or lengths of silicone or similarly inert tubing material, to reach the bottom of the space. For horizontal spaces, the probe may need to be attached to a pole.

d. Take atmospheric measurements in several locations (bottom, middle, top, corners) allowing extra response time from the instrumentation to register, especially if a tubing extension is used.

e. Obtain reading for oxygen first, followed by %LEL, then for other contaminants of concern (if applicable).

f. Record all results on the permit and sign and initial where indicated.

g. Determine if acceptable entry conditions exist with respect to oxygen, %LEL, other hazardous atmospheres.

h. If unacceptable entry conditions are indicated, correct the limiting condition.

i. If acceptable entry conditions exist, determine times that the monitoring will be repeated or if continuous monitoring will be needed.

j. Monitor continuously for oxygen and %LEL if hot work will be performed in the space.

4. Ventilation

   a. Mechanical ventilation is required for **all** Permit entries.

   b. Open as many openings as possible in the space to aid in cross ventilation.

   c. Never ventilate confined spaces with oxygen.

   d. Provide five (5) air changes per hour, or at least 10,000 cfm for large spaces.

   e. If a generator is used to provide power, be sure that the exhaust does not enter the space. Carbon monoxide monitoring may be required.

   f. Place blower ductwork such that it does not create a hazard by impairing the line of vision of attendants to observe space entrants, or by blowing contaminants to other workers.

   g. Provide at least 2,000 cfm of active exhaust ventilation for each welder or torch operating under a Hot Work Permit within the space.

h. Use fire/explosive proof ventilating equipment that is properly grounded when exhausting flammable gases, vapors and dusts from confined spaces.

5. Authorizing the Permit

a. The Entry Supervisor personally inspects the work area and signs the permit after confirming that all necessary precautions have been taken and all relevant information concerning the entry parameters are documented on the permit.

b. Conduct a briefing informing all entrants and attendants of space conditions.

c. Require entrant(s) and attendant(s) to each print their names and sign the permit.

d. Affix the permit to a location near the space entrance.

E. Entry Operations

1. Prohibit entry when oxygen deficient or flammable atmospheres are present in the space.

2. Limit entry to qualified entrants listed on the permit and only for the purpose stated on the permit.

3. Require entrants to follow all requirements listed on permit.

4. Attach body harness, if required, to a lifeline, and the other end of the life line is attached to a fixed point or to a mechanical lifting device outside the space at all times the entrant(s) are in the space.

5. Require that the attendant(s) remain at the entrance whenever an entrant is inside the confined space. The attendant may not be assigned other duties that may distract him/her from maintaining uninterrupted contact with the entrant(s). The attendant may only attend to one confined space entry at any one time. Each space must have its own attendant.

F. Exiting the Confined Space

1. Attendant will order entrant(s) out of space whenever:

a. A prohibited condition on the entry permit develops.

b. The surrounding work area becomes unsafe.

c. Any monitoring instrumentation, rescue equipment, ventilation, etc. becomes compromised.

d. Possible symptoms of exposure are noted in the entrant(s).

e. Entrant(s) express any type of concern regarding the safety of the entry.

G. Rescue

1. Require non-entry rescue procedures to be used for every entry. Typically, non-entry rescue will require the use of a tripod and winch, lanyard, and full body harness.

2. Contract for qualified entry rescue services when non-entry rescue is not feasible in permit required confined spaces. Entry rescue must staged on site adjacent to the space for the duration of the entry.

H. When the Entry Work is Complete

Cancel the permit by obtaining the signature of the entry supervisor and recording the time and date on the permit. This should be accomplished after the space is resealed and signs and barricades removed. If the space cannot be closed until a later time, provisions must be maintained (barricades, warning signs) to discourage persons from entering the space.

I. Audits of the Confined Space Entry Program

Annual audits of this Safety Management Standard will be conducted in accordance with the procedures set forth in the URS HSMS.

The Project Manager will require compliance with this SMS by reviewing Entry Permits on a weekly basis and document this review by notation on the permits.

J. Training

Require Entry Supervisors, Entrants, and Attendants to be trained to adequately address all health and safety aspects associated with entry.

K. Medical Surveillance

All Entry Supervisors, Entrants, and Attendants will be participants in the Regional medical surveillance program and medically qualified for confined space entry work.

5. Documentation Summary

Records required in the Project Safety File

A. Entry supervisor, Entrant and Attendant qualifications.

B. Confined Space Entry Permits plus Hot Work Permits (if issued).

C. Monitoring equipment calibration logs.

D. Lock-out/Tag-out records (if used).

E. Daily worker briefing documentation.

F. Medical clearance documentation.

6. Resources

A. U.S. OSHA Standard - Permit Required Confined Spaces - 29 CFR 1910.146 (http://www.osha-slc.gov/OshStd_data/1910_0146.html)

B. U.S. OSHA Technical Links - Confined Spaces (http://www.osha-slc.gov/SLTC/confinedspaces/index.html)

C. U.K. - Factories Act

D. Australian Standards AS 2865-1995. Safeworking in a Confined Space

E. US Army Corp of Engineers - EM 385-1-1, Section 06.I. (http://www.usace.army.mil/inet/usace-docs/eng-manuals/em385-1-1/toc.htm)

F. Attachment 10-1 - Confined Space Permit and Procedures for Entry

URS Corporation

CONFINED SPACE PERMIT & PROCEDURES FOR ENTRY

Confined Space Name:		**No.**
Confined Space Location:		**Date:**
Entry Authorized By:	**Time Issued:**	**Time expires:**

Reason(s) for Entry	Hazards

ISOLATION

Equipment to Lock/Tag/Test (including blocking, blanking, and/or disconnecting electrical, hydraulic, pneumatic, kinetic, thermal, steam, chemical, springs):

Equipment Name:	Isolated by:	Location:	Done

ENTRY REQUIREMENTS:	Required	Checked		Required	Checked
Eye Protection			Hot Work Permit		
- Safety Glasses			Communications		
- Goggles			Air Mover(s)		
- Face Shield			Rescue Hoist and Other Related Equipment		
Hearing Protection			Rescue Lanyard		
Fall Protection			GFCI Protected Electrical		
Respiratory Protection			Explosion Proof Lighting/Electrical		
- 1/2 Face Disposable			Non-sparking Tools		
- 1/2 Face Cartridge			Ladders		
- Full Face			Blocking/Blanking Equipment		
- Powered Air Purifying			Air Monitoring		
- Supplied Air			- Oxygen		
Gloves Type			- Combustibles		
Boots Type			- Carbon monoxide		
Clothing Type			- Hydrogen sulfide		
Hard Hat			- Dust		
Other			- Other		

Comments:

	Pre-Entry		Continuous	Record readings every 30 minutes (minimum)				
Atmospheric Testing	**Needed**	**Time: Results/Initials**	**Needed**	**Time: Results/Initials**	**Time: Results/Initials**	**Time: Results/Initials**	**Time: Results/Initials**	**Time: Results/Initials**
Oxygen (19.5-23.5%)								
Combustibles(<10%LEL)								
Carbon Monoxide (<35 ppm)								
Hydrogen Sulfide (<2 ppm)								
dust (visibility > 10')								
other								
other								

Note: Sign the permit and authorize entry only when the atmospheric conditions meet the permissible entry levels shown for a minimum period of 30 minutes prior to entry.

Name of Tester: Signature:

Testing Equipment Used Type	Model	I.D. Number

Emergency Action Plan:

Authorization	Signature	Time/Date
Entry Supervisor: (print) I Certify that the requirement of this confined space entry permit have been met and I authorize entry into the confined space to which this permit applies.		
Relief Entry Supervisor: (print) I Certify that the requirement of this confined space entry permit have been met and I authorize entry into the confined space to which this permit applies.		
Entrants(s): (print)		
Attendant(s): (print)		

Permit Canceled by:____________________ Date: ____________________ Time: ____________________

Permit was cancelled because (check one): (i) Work has been completed ____ (ii) The permit has expired _____ (iii) Emergency (specify) ____________________

URS SAFETY MANAGEMENT STANDARD
Excavation Safety

1. Applicability

This procedure applies to projects where URS controls trenching and excavation activities, and/or where URS employees are exposed to hazards associated with trenching and excavation activities.

2. Purpose and Scope

This procedure is intended to protect personnel from the hazards associated with excavation entry activities.

3. Implementation

Field Operations - Implementation of this program is the responsibility of the Project Manager.

4. Requirements

A. Competent Person

Appoint an Excavation Competent Person when URS controls excavation activities. The Excavation Competent Person:

1. Is responsible for conducting daily inspections of excavation, adjacent areas, and protective systems prior to each shift.
2. Is responsible for inspection after every rainstorm or other hazard.
3. Must have knowledge of soils and soil classification.
4. Understands design and use of protective systems.
5. Has authority to stop work and take corrective actions when conditions change.
6. Has the ability to recognize and test hazardous atmospheres.
7. Has formal documentation of training as an Excavation Competent Person.
8. Is physically located at the excavation while work is in progress.

B. Access/Egress

1. Trench excavations will have ramps or ladders within 25 feet (8 meters) of the entrants.

C. Soil Classification

Soil classifications must be conducted in accordance with Attachment 13-1. For the purposes of this standard all soils will be classified by a person meeting the qualifications of a competent person as described in 29 CFR 1929 subpart P. The competent person shall consult with a Registered Professional Engineer in the event the soil classification requires additional technical expertise.

D. Protective Systems

Protect employees in excavations deeper than 4 feet (1.2 meters) by means of properly designed protective systems. All protective systems must comply with 29 CFR 1926 Subpart P Appendices B, D, and E.

1. Sloping and Benching

   See Attachment 13-2

2. Timber Shoring for Trenches

   Timber shoring for trenches must be designed and stamped by a Registered Professional Engineer in accordance with 29CFR Subpart P, Appendix C.

3. Aluminum Hydraulic Shoring for Trenches

   Aluminum hydraulic shoring for trenches must be approved by a Registered Professional Engineer in accordance with 29CFR 1926 Subpart P, Appendix D.

4. Alternatives to Timber Shoring

   Trench shields and boxes must be either premanufactured with listed load ratings or designed, stamped and constructed under the direction of a Registered Professional Engineer.

5. Protective systems designed to protect employees in excavations deeper than 20 feet (6.1 meters) must be designed and stamped by a Registered Professional Engineer.

6. Excavations will be clearly identified and barricaded to keep unauthorized individuals out.

E. Permit Authorization and Inspections

1. Use the Excavation Authorization Form (Attachment 13-3) of this procedure that requires the following issues to be addressed:

    a. Employee training/briefings.

    b. Electrical safety.

    c. Surface encumbrances.

    d. Underground installations and utilities.

    e. Protective systems.

    f. Access and egress.

    g. Exposure to vehicular traffic.

    h. Exposure to falling loads.

    i. Warning systems for mobile equipment.

    j. Testing for hazardous atmospheres.

    k. Emergency rescue equipment.

    l. Protection from hazards associated with water accumulation.

    m. Stability of adjacent structures.

    n. Protection of employees from loose rock.

    o. Inspections.

    p. Fall protection.

2. Require daily inspections of excavations to be conducted by Competent Person using Attachment 13-4.

F. Training/Briefings

Conduct daily safety briefings for all employees associated with excavation activities and document on Attachment 13-3. Discuss excavation hazards, protective measures, and work practices that will be applicable to the day's activities.

5. Documentation Summary

Records required for the Project Safety File:

A. Competent person qualifications.

B. Excavation Authorization Form.

C. Daily Competent Person inspections.

D. Daily worker briefing documentation.

E. Daily inspection records.

6. Resources

A. U.S. OSHA Standard - Excavations - 29 CFR 1926, Subpart P

1. Appendix B, Sloping and Benching

2. Appendix C, Timber Shoring

3. Appendix D, Aluminum Hydraulic Shoring

B. U.S. OSHA Technical Links - Trenching and Excavation

The following documents are PDF files requiring the use of Adobe Acrobat reader.

C. US Army Corp of Engineers projects, the requirements of EM 385-1-1, Section 25 (PDF file)

D. Attachment 13-1 - Soils Classification

E. Attachment 13-2 - Simple Slopes

F. Attachment 13-3 - Excavation Authorization Form

G. Attachment 13-4 - Daily Excavation/Trench Inspection Form

SOILS CLASSIFICATION

"Type A" soils

Are cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144kPa) or greater.

Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A.

However, no soil is Type A if:

i. The soil is fissured; or
ii. The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
iii. The soil has been previously disturbed; or
iv. The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V)or greater; or
v. The material is subject to other factors that would require it to be classified as a less stable material.

"Type B" soils are:

i. Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or
ii. Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
iii. Previously disturbed soils except those which would otherwise be classed as Type C soil.
iv. Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
v. Dry rock that is not stable; or
vi. Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

"Type C" soils are:

i. Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or
ii. Granular soils including gravel, sand, and loamy sand; or
iii. Submerged soil or soil from which water is freely seeping; or
iv. Submerged rock that is not stable, or
v. Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

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SIMPLE SLOPES

MAXIMUM ALLOWABLE SLOPES
SOIL OR ROCK TYPE
MAXIMUM ALLOWABLE SLOPES (H:V)[1]
FOR
EXCAVATIONS LESS THAN 20 FEET DEEP[3]

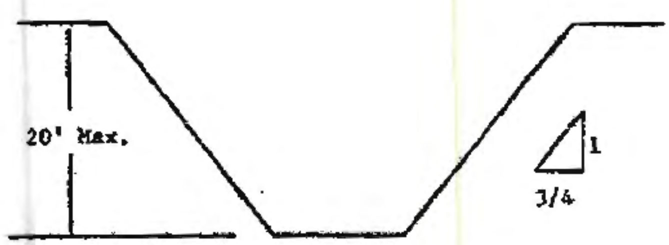
STABLE ROCK	VERTICAL (90 Deg.)
TYPE A[2]	3/4:1 (53 Deg.)
TYPE B	1:1 (45 Deg.)
TYPE C	1 1/2:1 (34 Deg.)

[1] *Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.*
[2] *A short-term maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than12 feet (3.67 m) in depth shall be 3/4H:1V (53 degrees).*
[3] *Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.*

Slope Configurations (All slopes stated below are in the horizontal to vertical ratio)

Excavations made in Type A soil.

All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of 3/4:1.

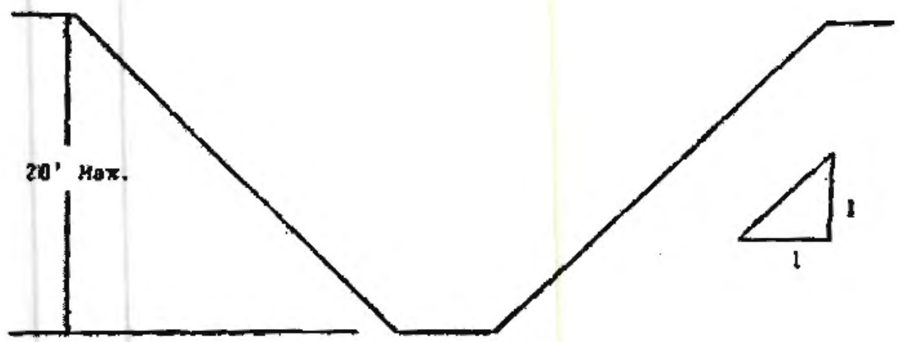


SIMPLE SLOPE - GENERAL

Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of 1/2:1.

Excavations Made in Type B Soil

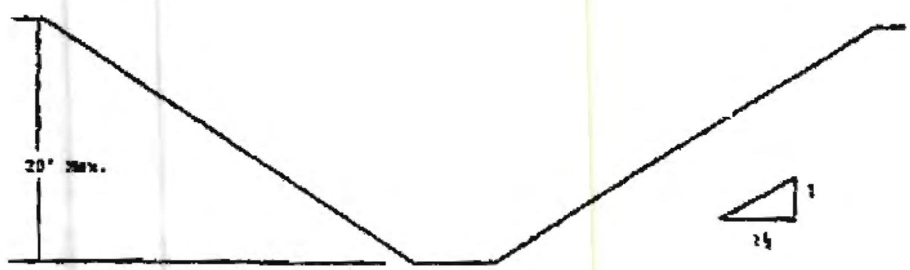
All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.



SIMPLE SLOPE

Excavations Made in Type C Soil

All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1.



SIMPLE SLOPE

URS	Health and Safety Program **EXCAVATION / TRENCHING AUTHORIZATION**	Attachment 13-3

POST AT LOCATION
(GOOD FOR ONE WEEK ONLY)

Authorization No. ______________________ Authorization From ____________ To __________

Competent Person: ______________________________________

Project Name: ______________________ Project Location: ______________________

Description of Job or Special procedures:

Check Yes, No, or N/A for Not Applicable

EMPLOYEE TRAINING AND PRE-EXCAVATION BRIEFING

1. Safe Excavation and Rescue Training Conducted on:	Date:			
2. Mandatory pre-excavation briefing conducted on:	Date:			
		Yes	No	N/A
3. Does this job require special training?		O	O	O

ELECTRICAL SAFETY

	Yes	No	N/A
1. Are all electrical devices grounded, double insulated, or GFCI protected?	O	O	O
2. Have all power cords and tools been visually inspected?	O	O	O

SURFACE ENCUMBRANCES

1. Have all surface encumbrances that are located so as to create a hazard to employees been removed or supported, as necessary, to safeguard employees?	O	O	O

UNDERGROUND INSTALLATIONS

1. Have the estimated locations of all underground installation been determined prior to excavation?	O	O	O
2. Have utility companies been contacted and advised of proposed work?	O	O	O
3. Are underground installations protected, supported or removed while excavations are open?	O	O	O

PROTECTIVE SYSTEMS

1. Excavation slopes comply with Type C Soil Classification?	O	O	O
2. If no to question 1, has soil been examined and been determined to be other than Type C soil by a Competent Person?	O	O	O
3. If protective measures beyond sloping are required, do they meet OSHA Appendix standards?	O	O	O

EXCAVATION / TRENCHING AUTHORIZATION

	Yes	No	N/A
4. If no to question 3, has the protective system been designed and stamped by a Registered Professional Engineer?	O	O	O

MEANS OF EGRESS FOR TRENCHES DEEPER THAN 4 FEET

1. Are stairways, ladders, or ramps provided every 25 feet?	O	O	O

ACCESS AND EGRESS

1. Are structural ramps that are used solely by personnel as a means of access or egress from excavations designed by a competent person?	O	O	O
2. Are ramps and runways constructed so structural members are connected to prevent displacement?	O	O	O
3. Are structural ramps that are used for access and egress of equipment designed by a competent person qualified in structural design and constructed in accordance with the design?	O	O	O
4. Are structural members used for ramps and runways of uniform thickness?	O	O	O
5. Are cleats used in connecting runway structural members attached in a manner to prevent tripping?	O	O	O
6. Are structural ramps used in lieu of steps provided with cleats or other surface treatment to prevent slipping?	O	O	O

EXPOSURE TO VEHICULAR TRAFFIC

1. Are personnel exposed to public vehicular traffic wearing reflectorized or high visibility vests?	O	O	O

EXPOSURE TO FALLING LOADS

1. Are employees prohibited from standing underneath loads handled by lifting or digging equipment?	O	O	O
2. Are employees prohibited from standing next to vehicles being loaded or unloaded?	O	O	O

WARNING SYSTEMS FOR MOBILE EQUIPMENT

1. Are warning systems such as barricades, hand or mechanical signals, or stop logs utilized when mobile equipment is operated adjacent to or at the edge of an excavation?	O	O	O

TESTING FOR HAZARDOUS ATMOSPHERES

1. Are the atmospheric hazards that can be reasonably expected to exist in excavations greater then 4 feet deep tested and controlled?	O	O	O

	READING:		TIME:	INITIAL:
2. Test of Oxygen Content:	________	% 02 (19.5% Minimum)	________	________
3. Test for Flammable Concentrations:	________	% LEL (10% Maximum)	________	________
4. Test for Toxic Concentration:	________	%PPM of ________	________	________

	Yes	No	N/A
5. Is testing conducted as often as necessary to ensure safety personnel?	O	O	O

EMERGENCY RESCUE EQUIPMENT

1. Is emergency rescue equipment such as SCBA, safety harness and line, or basket stretcher readily available and attended when hazardous atmospheric conditions exist?	O	O	O
2. Are employees who enter bell-bottom pier holes or other similar deep and confining excavations wearing a body harness with a life-line?	O	O	O

PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

1. Are employees prohibited from entering excavations that have accumulated water?	O	O	O
2. Is water being controlled or prevented from accumulating in excavation by the use of water removal equipment?	O	O	O
3. Is water control equipment operation being monitored by a competent person?	O	O	O
4. Are diversion ditches, dikes, or other suitable means used to prevent surface water from entering excavation?	O	O	O
5. Are excavations subjected to run-off from heavy rain immediately re-inspected by a competent person?	O	O	O

PROTECTION OF EMPLOYEES FROM LOOSE ROCK OR SOIL

1. Is adequate protection provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face?	O	O	O
2. Are employees protected from excavated or other material and equipment by placing this material a minimum of two (2) feet from the edge of excavations or by the use of retraining devices?	O	O	O

STABILITY OF ADJACENT STRUCTURES

1. Are support systems such as shoring, bracing, or underpinning provided to ensure stability of adjoining structures (i.e., buildings, walls) endangered by excavation activities?	O	O	O
2. Has any excavation below the level of the base or footing of foundations or retaining walls been:			
• Provided with a support system such as under pinning to ensure the safety of employees and stability of the structure?	O	O	O
• Performed in stable rock?	O	O	O
• Determined by a registered professional engineer that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity?	O	O	O
• Determined by a registered professional that the excavation work will not pose a hazard to employees?	O	O	O
3. Is the undermining of sidewalks and pavement structures prohibited?	O	O	O

INSPECTIONS

1. Are daily inspections of excavations where employee exposure can be reasonably anticipated being done by the competent person?	O	O	O
2. Are inspections being performed by a competent person after every rainstorm or other hazard increasing occurrence?	O	O	O
3. Are employees removed from the excavation if the competent person finds evidence at any time of a situation that could result in a possible cave-in, protective system failure, hazardous atmosphere or other hazardous condition?	O	O	O

URS	Health and Safety Program **EXCAVATION / TRENCHING AUTHORIZATION**	Attachment 13-3

	Yes	No	N/A

FALL PROTECTION

		Yes	No	N/A
1.	Are standard guardrails provided on walkways and bridges that cross over excavations?	O	O	O
2.	Are all remotely located excavations adequately barricaded or covered?	O	O	O
3.	Are temporary wells, pits, shafts and similar exploratory operations backfilled upon completion?	O	O	O

I have inspected the excavation described in this authorization:

Signature of Competent Person   Date

URS	Health and Safety Program **DAILY EXCAVATION / TRENCH INSPECTION REPORT**	Attachment 13-4

Comments: Place question number in front of applicable comment.

URS	Health and Safety Program **DAILY EXCAVATION / TRENCH INSPECTION REPORT**	Attachment 13-4

Competent Person: ______________________ Date: ______________

Project Name: ______________________ Weather Conditions: ______________

Project Location: ______________________ Rainfall Amounts 24 hours Previous: ______________

"I hereby attest that the following conditions existed and that the following items were checked or reviewed during this inspection".

Check Yes, No or N/A for Not Applicable. If comment is required, circle the number and see Page 2.

		Yes	No	N/A
1.	Are barricades or covers in place and in good condition?	O	O	O
2.	Have any tension cracks observed along top on any slopes?	O	O	O
3.	Is excavated material at least 2' from the edge of the excavation.	O	O	O
4.	Are slopes cut at design angle of repose?	O	O	O
5.	Is any water seepage noted in trench walls or bottom?	O	O	O
6.	Are pumps in place or available if needed?	O	O	O
7.	Is bracing system installed in accordance with design?	O	O	O
8.	Is there evidence of significant fracture planes in soil or rock?	O	O	O
9.	Is there any evidence of caving or sloughing of soil since the last inspection?	O	O	O
10.	Are there any zones of unusually weak soils or materials not anticipated?	O	O	O
11.	Are there any noted dramatic dips or bedrock?	O	O	O
12.	Are all short-term trench(s) covered within 24 hours?	O	O	O
13.	Have non-compliance items been photographed?	O	O	O
14.	Are hydraulic shores pumped to design pressure?	O	O	O
15.	Is shoring being used secure?	O	O	O
16.	Does plan include adequate safety factor for equipment being used?	O	O	O
17.	Is traffic adequately away from trenching operation?	O	O	O
18.	Are barricade up and secure?	O	O	O
19.	Are there trees, boulders or other hazards in area?	O	O	O
20.	Is vibration from equipment or traffic to close to trenching operation?	O	O	O
21.	Are trench box(s) certified?	O	O	O
22.	Are GFCI's used on ALL temporary electrical cords?	O	O	O
23.	Is access and egress located every 25 feet?	O	O	O
24.	Is hazardous testing done on a regular basis?	O	O	O
25.	Has rescue procedure been established and is equipment immediately available?	O	O	O

URS SAFETY MANAGEMENT STANDARD
Fire Prevention

1. Applicability

This procedure applies URS office and project locations.

2. Purpose and Scope

The purpose of this procedure is to reduce/eliminate potential fire hazards in the workplace and to provide for a rapid, effective response should a fire occur.

3. Implementation

Office Locations –	Implementation of this procedure is the responsibility of the Office Manager.
Field Activities –	Implementation of this procedure is the responsibility of the Project Manager.

4. Requirements

General

A. Develop an Emergency Action Plan as outlined in SMS 3, "Emergency Action Plans."

B. Maintain good housekeeping to reduce fire hazards and to provide safe routes of egress should a fire occur.

C. Provide the appropriate number and types of fire extinguishers for the operations being performed. Refer to Attachment 14-1 for guidance.

D. Inspect fire extinguishers monthly and maintain an inspection log.

E. Conduct frequent periodic inspections to identify fire hazards such as:

1. Unnecessary accumulation of combustibles.
2. Unnecessary storage of flammables.
3. Sources of ignition (e.g., faulty wiring, sparks, open flame, etc.).

F. Remove all fire hazards promptly.

G. Prohibit smoking and other ignition sources in flammable storage and other fire hazard areas.

H. Post emergency numbers near telephones and evacuation maps in appropriate locations.

I. Conduct evacuation drills.

J. Train employees in:

1. Fire hazard recognition.

2. Fire hazard prevention.

3. Fire extinguisher use.

4. Emergency and evacuation procedures.

6. Documentation Summary

File the following in the Office/Project Health and Safety File:

A. Emergency Action Plans.

B. Fire extinguisher inspection logs.

C. Employee training documentation.

D. Site audits.

E. Evacuation drills.

7. Resources

A. U.S. OSHA Standard - Means of Egress - 29 CFR 1910, Subpart E

B. U.S. OSHA Standard - Employee Emergency Plans and Fire Prevention Plans - 29 CFR 1910.38

C. U.S. OSHA Standard - Fire Protection - 29 CFR 1910, Subpart L

D. U.S. OSHA Technical Links - Fire Safety

E. U.S. OSHA Construction Standard - Fire Protection and Prevention 29 CFR 1926, Subpart F

F. U.K. - "Fire Precaution" Regulations

G. Australian Standards AS 1851.1-1995 - Maintenance of Fire Protection Equipment - Portable Fire Extinguishers and Blankets

H. Australian Standards Collection 15 - Fire Extinguishing Equipment

I. USACE EM 385-1-1 Section 9 - Fire Prevention and Protection

J. Attachment 14-1 - Fire Extinguisher Placement Guidelines

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URS Corporation Health & Safety Program
FIRE EXTINGUISHER PLACEMENT GUIDELINES

1. Fire Extinguishers – General

The following are **minimum** requirements for fire extinguisher placement in office buildings, construction facilities, support buildings, and/or buildings under construction. In some cases, client requirements may be more stringent, in which case the client's requirements supercede the guidelines below.

a. A fire extinguisher, rated at a minimum of 2A, must be provided for each 3,000 square feet of the protected building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet.

b. At least one fire extinguisher, rated at a minimum of 2A, must be provided on each floor. In multi-story buildings, at least one fire extinguisher must be located adjacent to the stairway.

c. Where more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used, a fire extinguisher, rated at least 10B, must be provided within 50 feet.

d. Portable fire extinguishing equipment, suitable for the fire hazard involved, must be provided at convenient, conspicuously accessible locations in Yard Storage areas. Portable fire extinguishers, rated at least 2A, shall be placed so that maximum travel distance to the nearest unit does not exceed 100 feet.

2. Flammable/Combustible Liquid Storage

The following are **minimum** requirements for fire extinguisher placement in flammable/combustible liquid and gas storage areas. In some cases, client requirements may be more stringent, in which case the client requirements supercede the guidelines below. Refer to SMS 15, "Flammable and Combustible Liquids and Gases, Attachment 2".

a. At least one portable fire extinguisher, rated at least 20B, must be located outside of, but not more than 10 feet from, the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids.
b. At least one portable fire extinguisher, rated at least 20B, must be located not less than 25 feet, nor more than 75 feet, from any flammable

liquid storage area located outside.

c. At least one portable fire extinguisher, rated at least 20BC, must be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable/combustible liquids.

d. At least one fire extinguisher, rated at least 20BC, must be provided within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication/service areas.

e. At least one fire extinguisher, rated at least 20BC, must be provided at each LPG container storage area.

3. Hot Work

A minimum of one fire extinguisher, rated at least 20BC, must be provided for each hot work location. The extinguisher should be conspicuously positioned no more than 10 feet from the hot work. Refer to SMS 20, "Hot Work".

URS SAFETY MANAGEMENT STANDARD
Heat Stress

1. Applicability

This procedure applies to URS field projects where ambient (not adjusted) temperatures exceed 70°F (21°C) for personnel wearing chemical protective clothing, including Tyvek coveralls, and 90°F (32°C) for personnel wearing normal work clothes.

2. Purpose and Scope

The purpose of this procedure is to protect project personnel from the effects of heat related illnesses.

3. Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager.

4. Requirements

A. Monitor ambient temperatures and conduct Heat Stress Monitoring when threshold temperatures (see Section 1) are reached.

B. Conduct initial monitoring to determine first rest break.

1. Measure the air temperature with a standard thermometer with the bulb shielded from radiant heat; this yields T (actual).

2. Estimate the fraction of sunshine by judging what percent time the sun is not shielded by clouds that are thick enough to produce a shadow. 100 percent sunshine - no cloud cover = 1.0; 50 percent sunshine - 50 percent cloud cover = 0.5; 0 percent sunshine - full cloud cover = 0.0.

3. Plug these variables into the following equation to determine the adjusted temperature:

   T (adjusted) = T (actual) + (13 x fraction sunshine)

4. Use Attachment 18-1 to determine the length of the first work shift. At the first break, initiate the heart rate monitoring or body temperature monitoring as described below.

C. Body Temperature Monitoring

1. Monitor oral body temperature to determine if employees are adequately dissipating heat buildup. Ear probe thermometers which are adjusted to oral temperature are convenient and the preferred method of measurement. Determine work/rest regimen as follows:

    a. Measure (oral adjusted) temperature at the end of the work period.

    b. If temperature exceeds 99.6 °F (37.5°C)., shorten the following work period by 1/3 without changing the rest period.

    c. If temperature still exceeds 99.6 °F (37.5°C), shorten the following work period by 1/3.

    d. Do not allow a worker to wear impermeable PPE when his/her oral temperature exceeds 100.6 °F (38.1°C).

2. Oral temperatures are to be obtained prior to the employee drinking water or other fluids.

D. Record monitoring results on Heat Stress Monitoring Form (Attachment 18-2).

E. Investigate the use of auxiliary cooling devices in extreme heat conditions.

F. Conduct briefings for employees regarding health hazards and control measures associated with heat stress whenever conditions require the implementation of heat stress monitoring. Review the information provided in Attachment 18-3.

G. Provide water and electrolyte replacement drinks fluids as described in Attachment 18-3.

H. Allow employees who are not accustomed to working in hot environments appropriate time for acclimatization (see Attachment 18-3).

I. Provide break areas as described in Attachment 18-3.

5. Documentation Summary

File these records in the Project Safety File.

A. Heat Stress Monitoring Forms.

B. Employee Safety Briefing Verification Forms.

6. Resources

A. NIOSH - "Working in Hot Environments"

B. AFL-CIO Building Trades Division - "Heat Stress in Construction"

C. Attachment 18-1 - Initial Work Monitoring Cycles

D. Attachment 18-2 - Heat Stress Monitoring Record

E. Attachment 18-3 -Informational Supplement

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INITIAL WORK/MONITORING CYCLES

ADJUSTED TEMPERATURE	NORMAL WORK CLOTHES	PROTECTIVE CLOTHING
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

URS Corporation

URS Corporation Health & Safety Program
EMPLOYEE HEAT STRESS EXPOSURE MONITORING RECORD

DATE: ____________ SAFETY REPRESENTATIVE: ____________

WORKER'S NAME: ____________ SUBCONTRACTOR: ____________

WORK ACTIVITY: ____________

Time (24 hour)	*Oral Temp (°F)*	*Pulse (BPM)*	*Comments*

DATE: ____________ SAFETY REPRESENTATIVE: ____________

WORKER'S NAME: ____________ SUBCONTRACTOR: ____________

WORK ACTIVITY: ____________

Time (24 hour)	*Oral Temp (°F)*	*Pulse (BPM)*	*Comments*

DATE: ____________ SAFETY REPRESENTATIVE: ____________

WORKER'S NAME: ____________ SUBCONTRACTOR: ____________

WORK ACTIVITY: ____________

Time (24 hour)	*Oral Temp (°F)*	*Pulse (BPM)*	*Comments*

URS Corporation

HEAT STRESS INFORMATIONAL SUPPLEMENT

SIGNS, SYMPTOMS AND FIRST AID

Heat rash (prickly heat) may result from continuous exposure to heat or humid air. It appears as red papules (elevated skin lesion), usually in areas where the clothing is restrictive, and gives rise to a prickly sensation, particularly as sweating increases. It occurs in skin that is persistently wetted by unevaporated sweat. The papules may become infected unless treated.

First Aid for Heat Rash - to prevent heat rash: shower after work, dry off thoroughly, and put on clean, dry underwear and clothes. Try to stay in a cool place after work. If, in spite of this, you develop heat rash, see your physician.

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

- Muscle spasms.
- Pain in the hands, feet and abdomen.

First Aid for Heat Cramps - leave the work area, and rest in a cool, shaded place. Drink one or two glasses of electrolyte replacement drink, and try to gently massage the cramped muscle. Once the spasms disappear, you may return to work; taking adequate breaks and drinking electrolyte replacement drink should prevent the cramps from returning.

Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale, cool, moist skin.
- Heavy sweating.
- Dizziness.
- Nausea.
- Fainting.

The key here is that the victim is still sweating, so the cooling system is still working; it's just under severe stress. The body core temperature may be elevated. It is important to recognize and treat these symptoms as soon as possible, as the transition from heat exhaustion to the very hazardous heat stroke can be quite rapid.

First Aid for Heat Exhaustion - leave the work area immediately, go through decon and remove all chemical protective clothing. Rest in a cool, shaded place and open your clothing to allow air circulation; lay flat except when taking fluids. Drink plenty of cooled electrolyte replacement drinks. Your work is over for the day; do not attempt to return. Medical assistance in severe cases may be warranted.

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 are:

- Red, hot, usually dry skin.
- Lack of or reduced perspiration (lack of perspiration may be masked for those wearing chemical protective clothing since perspiration from earlier in the day will be present).
- Nausea.
- Dizziness and confusion.
- Strong, rapid pulse.
- Coma.

First Aid for Heat Stroke - **THIS IS A MEDICAL EMERGENCY! SUMMON MEDICAL ASSISTANCE IMMEDIATELY!** Remove the victim from the work area, perform a gross decon, and remove all PPE. Have the victim lie down in a cool, shady area. Attempt to bring the victim's temperature down by increasing air movement (electric fan) or placing wetted sheets or towels on them. Place an ice bag on the victim's head. The victim must not be sent home or left unattended without a physician's specific order.

HEAT STRESS PREVENTION

The best approach to avoiding heat-related illnesses is through preventative heat stress management. The site manager and site safety officer are responsible for implementing this program.

Rest areas - a relatively cool, shaded area must be provided for breaks when ambient temperatures exceed 70°F and workers are wearing chemical protective clothing (including uncoated Tyvek), or if temperatures exceed 90°F and workers are wearing "Level D" coveralls or work clothes. A car or van is an oven, not a rest area. For Hazardous Waste Sites, the rest area should be *located in the support zone adjacent to the contamination reduction zone*, situated so that part of it is in the decon area so workers can take breaks without going through full decon. If shade is not available, build some: use a plastic "dining canopy", which can be obtained at sporting goods stores. This same type of canopy can be set up to shade personnel performing various types of work in hot weather.

Liquids - encourage employees to drink plenty of cool plain water and electrolyte replacement drinks. Supplementing water with cool electrolyte replacement drinks, such as Gatorade, Squench or Quik-kick (drink) is helpful to employees who tend to sweat a lot. Do not use "community cups"; use paper cups. Have workers drink 16 ounces of drink before beginning work, such as in the morning and after lunch. At each break, workers should take 8-16 ounces of drink. Don't wait until you are thirsty to drink.

Discourage the use of alcohol during non-working hours, and discourage the intake of coffee during work hours, as these make heat stress control more difficult.

Acclimatization - this is the process by which your body "gets used to" hot work environments. This is achieved by slowly increasing workloads. Start at 50 percent capacity on day one, and increase by 10 percent per day; on day six, you'll be at 100 percent. You don't lose acclimatization over a weekend, but it'll start to decrease after three to four days. If you don't do hot work for a week, it is gone. You don't have to do full shift hot work to achieve or retain acclimatization; a minimum of 100 minutes of continuous hot work exposure per day is adequate.

Auxiliary Cooling - auxiliary cooling is usually obtained by providing workers with a specially-designed vest, which is worn under the protective clothing, but over any underclothing. These vests typically provide cooling via one of two methods: the use of ice or other frozen media, or the use of a vortex cooler. Each method has its advantages and disadvantages.

The frozen media vest requires a means for freezing the media, and the media (usually water or "blue ice") will melt, requiring replacement.

The vortex cooler tends to cool more uniformly. Instead of frozen media, this vest uses the expansion of compressed air to cool the wearer. The drawback is the compressed air requirement, but this is negated when the wearer is already using an airline respirator supplied by a compressor. A vortex cooler should not be supplied from air cylinders, as this will draw down the cylinders rapidly.

Auxiliary cooling should be considered when the following conditions exist:

- Ambient temperature over 80°F
- Workers wearing impermeable garments (PE Tyvek, Saranex, Chemrel, etc.)
- It is desirable to have long work shifts with minimum interruption

URS SAFETY MANAGEMENT STANDARD
Heavy Equipment Operations

1. **Applicability**

   This procedure applies to URS field projects where heavy equipment is in operation.

2. **Purpose and Scope**

   The purpose of this procedure is to require that heavy equipment is operated in a safe manner, that the equipment is properly maintained and that ground personnel are protected.

3. **Implementation**

   Field Activities - Implementation of this procedure is the responsibility of the Project Manager.

4. **Requirements**

   A. Authorized Operators

      1. Evaluate operators through documentable experience (resume) and a practical evaluation of skills.
      2. Allow only qualified operators to operate equipment.
      3. Prohibit equipment from being operated by any personnel who have not been specifically authorized to operate it.
      4. Maintain a list of operators for the project and the specific equipment that they are authorized to operate.
      5. Require operators to use seat belts at all times in all equipment and trucks.
      6. Brief operators on the following rules of operation:

         a. Operators are in control of their work area.

         b. Equipment will be operated in a safe manner and within the constraints of the manufacturer's Operation Manual.

         c. Operators will stop work whenever unauthorized ground personnel or equipment enter their work area and only resume work when the area has been cleared.

B. Ground Personnel

1. Require that ground personnel on the site have received training and comply with the following rules of engagement:

    a. All ground personnel must wear orange protective vests when in work areas with any operating equipment.

    b. Ground personnel will stay outside of the swing zone or work area of any operating equipment.

    c. Ground personnel may only enter the swing or work area of any operating equipment when:

        1. They have attracted the operator's attention and made eye contact.

        2. The operator has idled the equipment down and grounded all extensions.

        3. The operator gives the ground personnel permission to approach.

    d. Ground personnel shall never walk or position themselves between any fixed object and running equipment or between two running pieces of equipment.

C. Equipment

1. Maintain operations manuals at the site for each piece of equipment that is present on the site and in use.

2. Require that operators are familiar with the manual for the equipment and operate the equipment within the parameters of the manual.

3. Require that all equipment is provided with roll-over protection systems (ROPS). Tracked excavators are exempt from ROPS requirements but must have a cab which provides protection from overhead hazards

4. Verify that seatbelts are present and functional in all equipment.

5. Prohibit the use of equipment which has cab glass which is cracked, broken or missing.

6. Require that backup alarms are functional on all trucks and equipment. Tracked excavators must have bidirectional alarms or the operator must be provided with a spotter whenever tracking in either direction.

7. Require all extensions such as buckets, blades, forks, etc. to be grounded when not in use.

8. Require brakes to be set and wheels chocked (when applicable) when not in use.

D. Inspection and Maintenance

1. Require daily inspections of equipment by operators using Attachment 19-1.

2. Prohibit use of equipment deemed to be unsafe as a result of daily inspection until required repairs or maintenance occur.

3. Conduct maintenance as prescribed by the manufacturer in the Operations Manuals for each piece of equipment.

4. During maintenance/repair, require that:

    a. Motors are turned off.

    b. All extensions are grounded or securely blocked.

    c. Controls are in a neutral position.

    d. Brakes are set.

5. Documentation Summary

File the following documents in the Project Health and Safety File.

A. List of authorized operators.

B. Operator qualifications.

C. Daily Equipment Inspection Logs.

D. Site Briefing documentation for operator rules and ground personnel "rules of engagement".

6. Resources

A. U.S. OSHA Standard - Motorized Vehicles and Mechanized Equipment - 29 CFR 1926, Subpart O

B. National Association of Demolition Contractors – Safety Manual (http://www.demolitionassociation.com/)

C. Queensland Workplace Health and Safety - Competency Standard for Users & Operators of Industrial Equipment

D. Attachment 19-1 - Equipment Inspection Form

URS Corporation

DAILY HEAVY EQUIPMENT SAFETY INSPECTION CHECKLIST

EQUIPMENT ID NO.: ______________________ DATE: ______________________

EQUIPMENT NAME: ______________________ INSPECTOR'S NAME: ______________________

BEG HOURS: __________ END HOURS: __________ EMPLOYEE NO.: ______________________

ITEM INSPECTED	CHECK IF SATISFACTORY	COMMENTS
Falling Object Protective Structure (FOP)		
Roll-Over Protection Structure (ROP)		
Seat Belts		
Operator Seat Bar(s)		
Side Shields, Screens or Cab		
Lift Arm Device		
Grab Handles		
Back-up Alarm - Working		
Lights		
Guards		
Horn		
Anti-Skid Tread Clear of Mud		
Safety Signs; i.e., counterbalance swing area		
Fire Extinguisher		
General Condition		
Fuel Connection		
Oil (fuel and no leaks)		
Clear of Extra Materials		
Controls Function Properly		
Damaged Parts		
Hydraulic System (full and no leaks)		
Parking Brake		
Lift Arm and Bucket		
Tires/Tracks		
Steering		
Breathing Air System		
Blast Shields		
Operator Signature:		
Gallons of Fuel Added		
Quarts of Oil Added		

INSTRUCTIONS: Each shift inspect all applicable items indicated. If an unsatisfactory condition is observed, suspend operation of the equipment and report the unsatisfactory condition to the site supervisor immediately.

URS SAFETY MANAGEMENT STANDARD
Lockout and Tagout Safety

1. **Applicability**

   This procedure applies to URS projects involving exposure to uncontrolled sources of energy.

2. **Purpose and Scope**

   This procedure outlines the requirements that must be followed to prevent injuries, either direct or indirect, when work is performed near or on an energy source that is unexpectedly operated.

   Some energy sources that should be protected against include:

   A. Electrical circuits.

   B. Fluid systems (water and liquid product).

   C. Pneumatic systems.

   D. Flammable systems (including liquid and gaseous fuels).

   E. Thermal systems (steam).

   F. Gravity systems.

   G. Hazardous material systems.

3. **Implementation**

   Field Operations - Implementation of this Procedure is the responsibility of the Project Manager

4. **Requirements**

   A. General

      1. "Authorized employee" means a person who locks/tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment, and who has received the training described in Section C, below.

      2. "Affected employee" means an employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout and

tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

3. "Qualified person" means person who is familiar with the construction and operation of the equipment and the hazards involved, and who:

    a. Requests de-energizing of an energy source.

    b. Inspects de-energizing with the authorized employee.

    c. Assures that authorized employee has locked and tagged the source.

    d. Requires that all applicable authorized employees affix lock/tags at the same locations(s).

    e. Operates the equipment controls or otherwise verifies that the equipment cannot be restarted after being locked out.

    f. Coordinates the continuation of lock/tagout protection through shift or personnel changes.

    g. Controls accountability of locks and tags.

    h. Makes appropriate log entries on Attachment 23-1.

    i. Conducts tests and visual inspections prior to reenergizing to check that circuits and equipment can be safely energized.

4. Employees shall not work on or in equipment, vessels, etc., which are **not** in a "zero energy state".

5. Coordinate all lockout and energy control activities with client, owner, contractor, and subcontractor practices and programs.

6. Require that all locks are keyed differently and that only one key exists for each lock and remains in the possession of the authorized employee to whom it has been assigned.

B. Procedure

Follow this lock and tagout procedure whenever the unexpected operation of equipment, switch, or valve or other energy sources could injure someone. Only authorized employees may perform jobs requiring lockout procedures.

1. **Step 1** - Achieving Zero Energy

    a. Identify and locate all sources of energy that could affect individuals involved.

    b. Notify all affected personnel that equipment is going to be de-energized and accessed. This can be done verbally, visually, or by hanging a warning tag on the control panel.

    c. Disconnect the main sources of power by breaking the primary power circuit, valve, pipe, etc. Locking out a low voltage control circuit is not considered breaking a main power source.

    d. Disconnect each separate power source of multiple power systems, e.g., air over hydraulic, electric over hydraulic, etc.

    e. Release all residual energy remaining behind the power source, e.g., hydraulic or air pressure, etc.

    f. Secure all power sources in the de-energized position with a lockout device. Use multiple lock devices when more than one lock is required. Each person who is protected by the lockout:

        1. Places a signed lock and tag on source location(s).

        2. Keeps the key to his/her own lock.

        3. Removes own lock (only exception: person not on site and person is contacted).

        4. Works ***only*** on protected source(s).

        5. Removes lock at completion for work shift or transfer.

    g. Block or blank any machinery, device, or piping system that can move on its own or deliver energy with or without the power source.

    h. Test equipment, prior to working on it, to insure that all sources of energy have been isolated and that it is "safe".

2. **Step 2** - Preparing to Re-Energize

    a. Once the task has been completed, tools picked up, safety chains, guards, guard rails, warning signs, etc. are replaced, notify affected personnel that the lockout device is going to be removed.

    b. Remove locks and tags.

    c. Once all lockout devices have been removed, the equipment or process may be restarted.

3. Temporary operation of locked out source

    a. Make sure everyone is clear of the system.

    b. Make sure tools are clear.

    c. Remove lock(s).

    d. Energize the system and conduct check.

    e. Immediately de-energize the system and replace locks.

4. Unauthorized removal of lock and tag is prohibited. Use the following procedure for Supervisor or Qualified Person to remove lock/tag when employee is not available:

    a. Verify authorized employee is not on site and available to remove own tag.

    b. Check that employees are not exposed to hazards.

    c. Verify equipment is safe to operate, tools have been removed and guards have been replaced.

    d. Remain with affected equipment so that no one returns while equipment or process is being restarted.

    e. Remove lock/tag and energize equipment.

    f. Require that affected employee knows the lockout device(s) has been removed before he/she resumes work.

C. Training

1. Authorized employees must receive training prior to conducting lockout/tagout activities.

2. Training must include:

   a. Purpose of lockout procedure.

   b. Hazards associated with different energy sources.

   c. Recognition of when to lockout.

   d. Electrical lockout procedures.

   e. Valve lockout procedures.

   f. Compliance with lockout procedures.

   g. Discussion of specific procedures.

5. Documentation Summary

File these records in the Project Safety File:

A. Training records for authorized employees

B. Lockout Log

6. Resources

A. ANSI 235.2

B. U.S. OSHA Standard - Accident Prevention Tags and Signs - 29 CFR 1926.200

C. U.S. OSHA Standard - Lockout and Tagging of Circuits - 29 CFR 1926.417

D. U.S. OSHA Technical Links - Lockout/Tagout

E. U.K. - 'Management of Health and Safety Work' Regulations

F. Attachment 23-1 - Lock and Tag Log

URS Corporation

URS Corporation Health and Safety Program

LOCK AND TAG LOG

Job Name: ______________________ Job Location ______________________

Name of Tagging Authority: __________________________ Date: ______________

Date	Lockout Location	Authorized Employee	Activity Initiated	Activity Completed

URS SAFETY MANAGEMENT STANDARD
Medical Screening & Surveillance

1. Applicability

This program applies to employees assigned to work environments where there is a potential for exposure to chemical, biological, and/or physical hazards. Individuals will be selected for medical screening based on regulatory standards, project health and safety plan assessments, the expected use of personal protective equipment, and client contract requirements.

2. Purpose and Scope

The overall goal of this program is to prevent occupational illness and injury by early identification of exposure-related health effects before they result in disease. Medical examinations will be performed in order to determine if employees are capable of safely performing assigned tasks, to verify protective equipment and controls are effectively providing protection, and to comply with governmental regulations. Included are provisions for emergency medical consultation and treatment.

3. Implementation

Office/laboratory locations – Implementation is the responsibility of the Office Manager.

Field activities – Implementation is the responsibility of the Project Manager.

Program Administration – The Occupational Health Specialist (OHS) is responsible for development and administration of this program in coordination with the URS Medical Service Provider (MSP). The OHS will maintain current injury and illness data and participate with Corporate Health & Safety Managers in evaluation of this program. The MSP will provide board certified occupational medicine oversight for the program and will approve medical surveillance protocols.

The United States and Canada locations will follow all requirements of this program.

International locations will follow sections B.1,2,3,5,6,7,8; G.3; and H.1 of this program.

4. Requirements

A. Selection of program participants.

1. The Medical Surveillance Evaluation (MSE) form provides the primary guidance for determining whether medical screening is required for an employee and the frequency of periodic exams. The MSE is to be completed by the employee and their supervisor at time of hire for any employee who may work outside an office environment and is to be reviewed for accuracy at each annual performance review. Other reviews are required whenever there is a change in job tasks.

2. Additional site/project specific biological monitoring or toxicological screening may be required in addition to this program's core exam schedule. These medical tests will be specified by the project-specific health and safety plan and will be authorized by the MSP on the exam appointment protocol. Note: See section D.2 if employee will have an initial assignment at a HAZWOPER site.

B. Types of medical screening and surveillance exams

1. A baseline or preassignment baseline exam will be conducted prior to the start of work assignments requiring medical surveillance.

2. Periodic exam schedules are established by the MSP using the following criteria:

   a. Employees performing the following types of work will receive annual exams: construction activities in the exclusion zone of HAZWOPER sites, field work activities in the exclusion zone of HAZWOPER sites for 30 or more days per year, projects involving exposure to OSHA-regulated materials at or above established action levels.

   b. Employees performing the following types of work will receive biennial exams: field work activities at HAZWOPER sites less than 30 days per year; waste disposal activities; non-HAZWOPER environmental sampling; chemistry laboratory, pilot plant projects, or bench scale operations for 30 or more days per year.

3. Employees currently participating in an examination program will receive exit exams when they leave their work assignment as identified in the Exit Exam Determination. In the event an employee declines the exit exam, the employee will be requested to sign a Waiver of Exit Medical Surveillance Exam.

4. Department of Transportation (DOT) exams will be conducted biennially when an employee is assigned to drive a vehicle with a gross weight rating of more than 10,000 pounds or when driving a placarded vehicle of any size used to transport hazardous chemicals. DOT exam certification can be added to a routine baseline or periodic exam protocol when scheduling with the MSP.

5. When noise levels in the employee's work environment equal or exceed an 8-hour time-weighted average of 85 decibels as measured on the A-scale (dBA), annual audiograms will be performed. For employees involved in construction activities or management of construction, enrollment in this program will be required if more than 50% of their time is spent in an active construction area.

6. Individual radiation dose monitoring will be conducted as required by the site-specific health and safety plan with approval by a Radiation Safety Officer. Personal dosimetry (film badges) are typically required, however, depending on the specific radiation hazard, additional excretory monitoring or thyroid scans may be required.

7. In order to determine an employee's ability to wear a respirator, a medical evaluation will be performed before an employee is fit tested or assigned to wear a respirator.

8. Employees assigned to work environments with airborne concentrations of asbestos fibers at or above the established action level will receive asbestos-specific baseline and annual exams. Exit exams will be performed if an exam has not been performed within the past 6 month period or if an employee has medical complaints related to asbestos exposure.

C. Exam protocols

1. The Medical Screening & Surveillance Exam Protocol identifies the medical exam components of this program.

D. Scheduling of exams

1. The Office or Project Manager, usually with assistance of the local H&S Representative, is responsible for contacting the MSP when baseline, exit, and project specific exams are required. The MSP maintains an employee scheduling database for tracking periodic

exams and will contact the employee for scheduling the month their exam is due. These steps are detailed in the Medical Surveillance Exam Process.

2. Construction Services Division employees hired with an initial assignment to work at a OSHA HAZWOPER site whose work duties require passing a physical exam or who have an essential job function of wearing a respirator, will receive a job offer contingent upon passing a preassignment baseline exam. See HAZWOPER & Respirator Preassignment Baseline Exam Process. In the event of an urgent business necessity a temporary clearance to begin work the day of the exam, issued by the local physician and good for 14 days until the MSP physician final clearance is received, may be requested at the time a baseline exam is scheduled through the MSP.

3. If an exam becomes due during an employee's pregnancy, it is advised to defer the exam until after delivery and the employee returns to work from family/medical leave status.

E. Exam Follow Up

1. Following each exam, the MSP will issue a physician's written opinion (Health Status Medical Report) to the site Health & Safety Representative which will include any medical restrictions and address the employee's ability to use personal protective equipment. See Exam Follow Up Procedures.

2. The MSP will mail the exam invoice to the site H&SR who will approve the charge and forward the invoice to the accounts payable department for payment.

3. The MSP will mail an exam results letter that is confidentially addressed to the employee at their home address within 30 days of the exam date.

F. Emergency Medical Care

1. Preplanning is essential to a prompt and proper response to a medical emergency. Site specific emergency procedures will be provided in the site Health & Safety Plan. See Field First Aid Kit Supply List for recommended supplies. The contents of the first aid kit shall be checked prior to being sent out to each site/project and periodically thereafter to ensure the expended items are replaced.

2. A MSP occupational physician can be reached 24 hours a day for phone consultation at 1-800-455-6155.

3. A workers' compensation claim should be filed by the Human Resource Representative with St. Paul Fire and Marine Insurance (1-800-787-2851) for an injured employee who receives professional medical care or who is disabled from working beyond the initial date of injury.

4. In order to comply with OSHA reporting regulations, immediately notify the OHS or a Division Health & Safety Manager if there is a work-related hospitalization or death.

G. Medical Records

1. Medical records are maintained and preserved in confidential, locked files in the custody of the MSP for at least the duration of employment plus 30 years. Only information regarding the employee's ability to perform the job assignment will be provided to company representatives.

2. Upon request, each employee (or designated representative) will have access to the employee's medical record. Prior to the release of health information to the employee (or designated representative), a specific written consent must be signed by the employee.

3. International records (excluding the United States and Canada) will be maintained in country at the local clinic.

H. Program evaluation

1. The OHS and Division Health & Safety Managers will evaluate this program annually and as needed. Issues to review include program efficacy and efficiency, employee satisfaction, and cost effectiveness.

2. The MSP will prepare an Annual Medical Trending Report specifying the number and types of exams performed and anonymous statistical exam results in group data format.

3. Each employee is mailed a Post-Exam Evaluation by the MSP. Employee feedback regarding the clinic, medical staff, and exam

procedures are reviewed and corrective actions are identified and acted upon as needed.

5. Documentation Summary

The H&SR will file the Medical Surveillance Evaluation and the Health Status Medical Report in the site health & safety records.

6. Resources

A. U.S. OSHA Technical Links - Medical Screening/Surveillance

B. U.S. OSHA Publication 3162 (1999) Screening and Surveillance: A Guide to OSHA Standards

C. Attachment 24-1 WorkCare Medical History Questionnaire

D. Attachment 24-2 Medical Surveillance Evaluation

E. Attachment 24-3 Medical Screening & Surveillance Exam Protocol

F. Attachment 24-4 Medical Surveillance Exam Process

G. Attachment 24-5 HAZWOPER/Respirator Preassignment Baseline Exam Process

H. Attachment 24-6 Exit Exam Determination

I. Attachment 24-7 Waiver of Exit Medical Surveillance Exam

J. Attachment 24-8 Exam Follow Up Procedures

K. Attachment 24-9 Field First Aid Kit Supply List

L. SMS 8 Asbestos Survey and Oversight Operations

M. SMS 17 Hazardous Waste Operations

N. SMS 42 Respiratory Protection

URS SAFETY MANAGEMENT STANDARD
Field First Aid Kit Supply List

- Portable, plastic or metal, water resistance first aid kit, with handle
- Bloodborne pathogens personal protective equipment kit (minimum requirements are latex gloves and CPR shield)
- First aid manual
- Ace bandage 3"
- Assorted band aids
- Sterile gauze pads 4" x 4"
- Sterile non-stick gauze pads 2" x 3"
- Paper tape (hypo-allergenic)
- Burn ointment (for minor burns, use after cold water soak)
- Antibiotic ointment (Neosporin or generic)
- Alcohol prep pads
- Iodine prep pads (if not allergic to iodine, use after soap and water wash for bloodborne exposure)
- Ice pack
- Gauze roll 2"
- Butterfly strips (wound closure)
- Tweezers (one use, disposable)
- Temperature strips
- Flashlight
- Triangular bandage
- Bandage scissors
- Sterile normal saline eye wash, 4 ounce bottle
- Ammonia inhalant ampoules
- Insect sting relief wipes or spray

Certificate of Approval: ______________________________ _______

Peter P. Greaney, MD — Date

WorkCare Medical Director

URS SAFETY MANAGEMENT STANDARD
Noise and Hearing Conservation

1. Applicability

This procedure applies to URS Corporation facilities and field operations where URS Corporation personnel may encounter noise exposures that may exceed 85 dBA as an 8 hour Time Weighted Average.

2. Purpose and Scope

The purpose of this procedure is to protect employees from hazardous noise exposures and to prevent hearing loss.

3. Implementation

Office/Lab locations:	High noise is unlikely to be encountered at URS offices, however, if applicable, the implementation of this program is the responsibility of the Office Manager.
Field Activities:	Implementation of this program is the responsibility of the Project Manager.

4. Requirements

A. General

The use of hearing protectors in any location where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. Use of hearing protectors may only be discontinued when noise levels are verified to be less than 85 dBA through a properly conducted noise survey. Whenever information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, the project manager or location manager will be responsible to enforce the proper use of hearing protectors.

B. Hearing Protectors

1. Require that at least two (2) types of hearing protectors are available to employees free of charge, preferably a plug and a muff type.
2. Minimum Noise Reduction Ratings (NRR)

   Hearing protectors issued must have the following minimum NRR:

Ear Plug	Muffs
29 dBA	27 dBA

3. Require that hearing protectors are used and thus effectively protect hearing.

C. Noise Surveys

1. Noise surveys must be conducted in a manner that reasonably reflects the exposure of the affected employees. Surveys must be conducted under the supervision of a URS Safety Program Representative.

2. Sound level meters and audio dosimeters used to determine employee exposure to noise sources must be Type II (accurate to within +/- 2 dBA), operated in "slow" response, on the "A" scale, and be calibrated to factory guidelines (including periodic factory recalibration).

D. Noise Controls

Eliminate noise sources to the extent possible. Examples of controls that must be considered follow:

1. Addition or replacement of mufflers on motorized equipment.

2. Addition of mufflers to air exhausts on pneumatic equipment.

3. Following equipment maintenance procedures to lubricate dry bearings.

4. Isolation of loud equipment with newer and quieter models.

E. Audiometric Exams

1. Tests

Details on the medical surveillance program (including audiometric testing) are included in SMS 24.

Audiometric tests shall be performed by a person meeting OSHA's 1910.95 (g)(3)'s definition. Within 6 months of an employee's first exposure at or above the action level, a valid baseline audiogram shall be established against which subsequent audiograms can be compared. Testing to establish a baseline audiogram shall be preceded by 14 hours without exposure to noise. Hearing protectors may be used as a substitute for the requirement that baseline audiogram shall be preceded by 14 hours without exposure to workplace noise. The medical surveillance provider shall notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination. For multi-year projects, an annual audiogram shall be obtained for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if there is a standard threshold shift (STS). If the annual audiogram shows that an employee has suffered a standard threshold shift, the employer will obtain a retest within 30 days and consider the results in assessing an STS as the annual audiogram. The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. If an STS has occurred, the medical surveillance provider will notify the employee within 21 days of the determination.

2. Standard Threshold Shifts

   If an employee's test results show a confirmed STS, their hearing protection will be evaluated and refitted, and a medical evaluation may be required.

F. Training

Verify that each employee who must work in a noisy environment is current on the required Hearing Conservation Training. Training must include the following topics:

1. The effects of noise on hearing.
2. The purpose of hearing protectors.
3. The advantages and disadvantages of various types of hearing protectors.
4. The attenuation of various types of hearing protection.
5. The selection, fitting, care, and use of hearing protectors.
6. The purpose of audiometric testing.

7. An explanation of the audiometric testing procedure.

5. Documentation Summary

A. File these records in the Office Safety Filing System:

1. Noise surveys, when applicable.

2. Training Records.

B. File noise surveys, when applicable, in the Project Safety File:

6. Resources

A. U.S. OSHA Standard – Occupational noise exposure – 29 CFR 1910.95

B. U.S. OSHA Construction Standard -- Occupational noise exposure – 29 CFR 1926.52

C. U.S. OSHA Technical Links - Noise and Hearing Conservation

D. American Industrial Hygiene Association: The Occupational Environment – Its Evaluation and Control, Chapter 20. Fairfax, VA: 1997

E. National Hearing Conservation Association web site

F. URS SMS 24 Medical Screening and Surveillance

URS Safety Management Standard
Personal Protective Equipment

1. Applicability

This program applies to URS Corporation laboratory and field operations where the use of Personal Protective equipment (PPE) is warranted. Refer to SMS 42, "Respiratory Protection", for respiratory hazards. Hearing Protection issues are additionally addressed in SMS 26, "Noise and Hearing Conservation."

2. Purpose and Scope

This procedure provides information on recognizing those conditions that require personal protective equipment as will as selecting personal protective equipment for hazardous activities.

3. Implementation

Shop/Lab Locations -	Implementation of this program is the responsibility of the Office Manager.
Field Activities -	Implementation of this program is the responsibility of the Project Manager.

4. Requirements

A. Perform hazard assessments for those work activities that are likely to require the use of PPE.

1. Use Attachment 29-1 to perform the assessment.
2. Reevaluate completed hazard assessments when the job changes.

B. Eliminate the hazards identified in Attachment 29-1, if possible, through engineering or administrative controls.

C. Select PPE that will protect employees if hazards cannot be eliminated.

1. See Attachment 29-1 for recommended PPE.
2. Review Material Safety Data Sheets for chemicals used for PPE recommendations.
3. If needed, consult with the URS Health and Safety Representative for assistance in selecting PPE.

D. Provide required PPE to employees free of charge (excluding in some instances components of standard work attire such as steel-toed boots), assuring that it fits properly giving them a choice if more than one type is available.

E. Whenever a hazard is recognized, and PPE is required, the employees will be provided with the appropriate PPE. However, when a PPE is not required, and the employee selects to wear his or her own PPE, the project manager shall ensure that the employee is properly trained in the fitting, donning, doffing, cleaning, and maintenance of his or her employee owned equipment.

F. Conduct and document employee training.

1. Train all employees who are required to wear PPE.

2. Require that training includes:

   a. When PPE is necessary to be worn.

   b. What PPE is necessary.

   c. How to properly don, doff, adjust and wear PPE.

   d. Limitations of PPE

   e. Proper care, maintenance, useful life and disposal of PPE.

3. Training must be conducted before PPE is assigned.

4. Refresher training is needed when:

   a. New types of PPE are assigned to the worker.

   b. Worker cannot demonstrate competency in PPE use.

5. Keep written records of the employees trained and type of training provided, including the date of training.

G. Maintain Protective Equipment

1. Check personal protective equipment for damage, cracks, and wear prior to each use. Replace or repair equipment not found in good condition.

2. Wash off contaminated protective equipment with water and mild soap, if necessary, to prevent degradation of the equipment.

H. Periodically inspect worksites where employees are using personal protective equipment, using Attachment 29-2.

1. Field activities – inspect work sites at least monthly.

2. Office locations – inspect work sites semi-annually.

5.0 Documentation Summary

A. Records required in the Project Safety File:

1. Completed Hazard Assessment Certification Forms (Attachment 29-1)

2. Completed Personal Protective Equipment Inspection Sheet (Attachment 29-2)

3. Documentation of employee training.

B. Records required in the Laboratory Safety Filing System:

1. Completed Hazard Assessment Certification Forms (Attachment 29-1)

2. Completed Personal Protective Equipment Inspection Sheet (Attachment 29-2)

3. Documentation of employee training.

6.0 Resources

A. U.S. OSHA Standards - Personal Protective Equipment -29CFR 1910 Subpart I (http://www.osha-slc.gov/SLTC/lead/index.html)

B. U.S. OSHA Construction Standard - Personal Protective Equipment –29 CFR 1926 Subpart E (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_E.html)

C. U.S. OSHA Technical Links - Personal Protective Equipment (http://www.osha-slc.gov/SLTC/personalprotectiveequipment/index.html)

D. Australian Standards SAA HB9-1994 - Occupational Personal Protection

E. American National Standards Institute, ANSI Z89.1-1986, Protective Headwear (http://www.ansi.org/cat_top.html)

F. American National Standards Institute, ANSI Z87.1 - 1989, Eye and Face Protection (http://www.ansi.org/cat_top.html)

G. American National Standards Institute, ANSI Z41.1 - 1991, Foot Protection (http://www.ansi.org/cat_top.html)

H. SMS 40 - Fall Protection

I. Attachment 29-1 Hazard Assessment Form

J. Attachment 29-2 PPE Inspection Form

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HAZARD ASSESSMENT CERTIFICATION FORM

Location:______________________________ **Job No:**________________

Date : ________________ **Assessment Conducted by:** ________________

Specific tasks performed at this location: ______________________________

	Are any of the following present during the task?	No	Yes (Hazard Present)	Eliminate Hazard or Use Following PPE
	Overhead Hazards			
1.	Suspended loads that could fall			Hard hat, ANSI Class A, B
2.	Overhead beams or load that could strike head			Hard hat, ANSI Class A, B
3.	Energized wires or equipment that could strike head			Hard hat, ANSI Class B
4.	Employees working above at an elevated site who could drop objects on others below			Hard hat, ANSI Class A, B
5.	Sharp objects or corners at head level			Hard hat, ANSI Class A, B or C
	Eye Hazards			
6.	Chemical splashes or irritating mists			Chemical protective goggles See Attachment 29-3
7.	Excessive dust			Safety glasses or impact goggles
8.	Smoke & fumes			Chemical protective goggles
9.	Welding operations			See Attachment 29-3 and 29 T-1
10.	Lasers/optical radiation			See Attachment 29-3 and Reference F
11.	Projectiles			See Attachment 29-3
12.	Sawing, cutting, chipping, grinding			See Attachment 29-3
	Face Hazards			
13.	Chemical splashes or irritating mists			Face shield if chemical is irritating to the skin or is corrosive. See Attachment 29-3
14.	Welding operations			See Attachment 29-3 and 29-T1
15.	Projectiles			See Attachment 29-3 and face shield
	Hand Hazards			
16.	Chemical exposure			Use resistant gloves as recommended by manufacturer - See Best Chemrest Guide
17.	Sharp edges, splinters, etc.			Leather gloves

Location : ______________________ Job No: ______________________

	Are any of the following present during the task?	No	Yes (Hazard Present)	Eliminate Hazard or Use Following PPE
18.	Temperature extremes - heat			Leather gloves; hot mill gloves; Kevlar gloves, welders' gloves
19.	Temperature extremes - cold			Leather gloves; insulated gloves
20.	Blood, fungus			Nitrile gloves
21.	Exposure to live electrical current			Electrical gloves - See Reference H
22.	Sharp tools, machine parts, etc.			Leather gloves, kevlar gloves
23.	Material handling			Leather gloves
	Foot Hazards			
24.	Heavy materials (greater than 50 pounds) handled by employees			Safety shoes or boots
25.	Potential to crush whole foot			Safety shoes or boots with metatarsal guard
26.	Sharp edges or points - puncture risk			Safety shoes or boots
27.	Exposure to electrical wires			Safety shoes or boots with electrical protection
28.	Unusually slippery conditions			Rubber soled boots or grips
29.	Chemical contamination			Rubber, nitrile boots or boot covers
30.	Wet conditions			Rubber boots or boot covers
31.	Construction/demolition			Safety shoes or boots with metatarsal guard if who foot crushing hazard exists.
	Fall Hazards			
32.	Elevations above 6 feet without guardrails			Full body harness, ANSI A-10.14 - 1991 - See Reference G
33.	Suspended scaffolds, boatswain's chairs, float scaffolds, suspended staging.			ANSI Type II - full body harness - See Reference G
34.	Working in trees			ANSI Type I full body harness - See Reference G
35.	Working in vehicle mounted, elevating work platforms (bucket trucks, pin-on platforms, etc.)			ANSI Type II full body harness - see Reference G
	Water Hazards			
36.	Working on or above water where drowning hazards exist			U.S. Coast Guard approved personal flotation device, Type I, II, or III PFD
	Excessive Heat or Flame			
37.	Full body chemical protective clothing in temperatures greater than 80 degrees			Cooling vest
38.	Work around molten metal or flame			Nomex or kevlar clothing

Location :______________________________ Job No:____________________

	Are any of the following present during the task?	No	Yes (Hazard Present)	Eliminate Hazard or Use Following PPE
39.	Welding activities			Welding leathers for those areas that are exposed to flame, spark or molten metal
	Respiratory Hazards			
40.	See SMS for RESPIRATORY PROTECTION for selection guidance			
	Excessive Noise			
41.	Exposure to noise			Ear plugs or muffs
	Body and Leg Protection			
42.	Chemical exposure			Have local DMG H&S representative assist you in proper selection
43.	Using chainsaw, cutting brush			Chainsaw chaps

I certify that the above inspection was performed to the best of my knowledge and ability, based on the hazards present on ____________________.

____
Signature

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URS Corporation Health & Safety Program
PERSONAL PROTECTIVE EQUIPMENT INSPECTION SHEET

Date Inspected: ____________________ **Name of Inspector:** ________________________________

		True	False (= Hazard - Needs to be fixed)
	Hard Hats		
1.	The brim or shell does not show signs of exposure and excessive wear, loss of surface gloss, chalking or flaking.		
2.	Suspension system in hard hat does not show signs of deterioration including cracking, tearing or fraying.		
3.	The brim or shell is not cracked, perforated or deformed.		
4.	Employees us hard hats in marked areas.		
5.	Hard hat areas are marked.		
	Safety Shoes		
6.	Safety shoes used by employees do not show signs of excessive wear.		
7.	Safety shoe required areas are marked.		
	Work Gloves		
8.	Gloves are worn when needed.		
9.	Gloves do not show signs of excessive wear such as cracks, scrapes or lacerations, thinning or discoloration or break through to the skin.		
	Protective Clothing		
10.	Protective clothing is worn by employees when required.		
	Hearing Protection		
11.	Noise hazardous areas are marked.		
12.	Employees are using earplugs or muffs when using noise hazardous equipment or working in noise hazardous areas.		
	Safety Glasses		
13.	Eye hazardous areas are marked or posted.		
14.	Employees use safety glasses when working in eye hazardous areas or working with eye hazardous equipment.		

REMARKS

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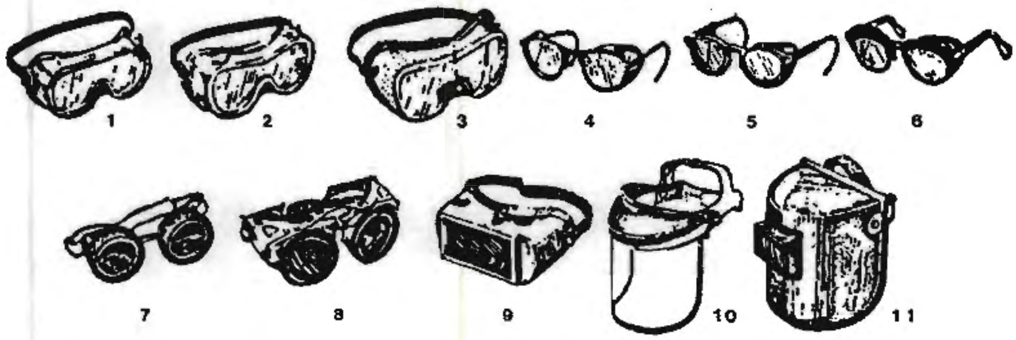
EYE AND FACE PROTECTOR SELECTION GUIDE



1. **GOGGLES,** Flexible Fitting, Regular Ventilation
2. **GOGGLES,** Flexible Fitting, Hooded Ventilation
3. **GOGGLES,** Cushioned Fitting, Rigid Body

*4. **SPECTACLES,** Metal Frame, with Sideshields

*5. **SPECTACLES,** Plastic Frame, with Sideshields

*6. **SPECTACLES** , Metal-Plastic Frame, with Sideshields

*7. **WELDING GOGGLES,** Eyecup Type, Tinted Lenses (Illustrated)

7A. **CHIPPING GOGGLES,** Eyecup Type, Clear Safety Lenses (Not Illustrated)

*8. **WELDING GOGGLES,** Coverspec Type, Tinted Lenses (Illustrated)

8A. **CHIPPING GOGGLES,** Coverspec Type, Clear Safety Lenses (Not Illustrated)

*9. **WELDING GOGGLES,** Coverspec Type, Tinted plate Plate Lens

10. **FACE SHIELD,** (Available with Plastic or Mesh Window)
11. **WELDING HELMETS**

APPLICATIONS		
OPERATION	HAZARDS	RECOMMENDED PROTECTORS Bold Type Numbers Slightly Preferred Protection
ACETYLENE-BURNING ACETYLENE-CUTTING ACETYLENE-WELDING	SPARKS, HARMFUL RAYS MOLTEN METAL, FLYING PARTICLES	**7,8,9**
CHEMICAL HANDLING	SPLASH, ACID BURNS, FUMES	**2,10** (For severe exposure add 10 over 2)
CHIPPING	FLYING PARTICLES	**1,3,4,5,6,7A,8A**
ELECTRIC (ARC) WELDING	SPARKS, INTENSE RAYS, MOLTEN METAL	**9,11** (11 in combination with 4,5,6 in tinted lenses, advisable)
FURNACE OPERATIONS	GLARE, HEAT, MOLTEN METAL	**7,8,9** (For severe exposure add 10)
GRINDING-LIGHT	FLYING PARTICLES	**1,3,4,5,6,10**
GRINDING -HEAVY	FLYING PAPTICLES	**1,3,7A,8A** (For severe exposure add 10)
LABORATORY	CHEMICAL SPLASH, GLASS BREAKAGE	**2** (10 when in combination with 4,5,6)
MACHINING	FLYING PARTICLES	**1,3,4,5,6,10**
MOLTEN METALS	HEAT, GLARE, SPARKS, SPLASH	**7,8** (10 in combination with 4,5,6 in tinted lenses)
SPOT WELDING	FLYING PARTICLES, SPARKS	**1,3,4,5,6,10**

*Non-side shield spectacles are available for limited hazard use requiring only frontal protection.

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Table 29-1
Welding Lens Selection

Operations	Electrode Size 1/32 inch	Arc Current	Minimum Protective Shade
Shielded metal arc welding (SMAW)	Less than 3	Less than 60	7
SMAW	3 - 5	60-160	8
SMAW	5-8	160-250	10
SMAW	More than 8	250-550	11
Gas metal arc welding and flux cored arc welding		Less than 60	7
Gas metal arc welding and flux cored arc welding		60-160	10
Gas metal arc welding and flux cored arc welding		160-250	10
Gas metal arc welding and flux cored arc welding		250-500	10
Gas tungsten arc welding		Less than 50	8
Gas tungsten arc welding		50-150	8
Gas tungsten arc welding		150-500	10
Air carbon arc cutting	(light)	Less than 500	10
Air carbon arc cutting	(heavy)	500-1000	11
Gas tungsten arc welding		Less than 20	6
Gas tungsten arc welding		20-100	8
Gas tungsten arc welding		100-400	10
Gas tungsten arc welding		400-800	11
Plasma arc cutting	(light)	Less than 300	8
Plasma arc cutting	(medium)	300-400	9
Plasma arc cutting	(heavy)	400-800	10
Torch brazing			3
Torch soldering			2
Carbon arc welding			14
Gas welding			5-6
Oxygen cutting			3-5

URS SAFETY MANAGEMENT STANDARD
Sanitation

1. **Applicability**

   This procedure applies to URS field operations.

2. **Purpose and Scope**

   The purpose of this program is to provide employees on field assignments with appropriate personal hygiene facilities, including toilets, wash rooms and eating facilities, and to protect employees from unsanitary conditions.

3. **Implementation**

   Field Activities - Implementation of this program is the responsibility of the Project Manager.

4. **Requirements**

   A. Arrange for the installation of adequate toilet and wash facilities during the planning stage of field projects. Note: Mobile crews having transportation readily available to nearby toilet facilities need not be provided with facilities.

      1. Provide job sites without sanitary sewer with one of the following:

         a. Privies (where their use will not contaminate ground or surface water).

         b. Chemical toilets.

         c. Combustion toilets.

      2. Provide toilets for employees of each sex at field sites according to the following ratio:

Number of Employees	Minimum # of water closets (1)
1 - 15	1
16 - 25	2
36 - 55	3
56 - 80	4
81 - 110	5
111 - 150	6
Over 150	(2)

Footnote (1) where toilet facilities will not be used by women, urinals may be provided instead of the minimum specified.
Footnote (2) 1 additional fixture for each additional 40 employees.

B. Provide a means for washing hands next to toilet areas.

C. Arrange for fresh potable water to be available.

1. Fixed Facilities

   Require backflow prevention devices, testing and administrative controls to be used for all potable water supply branches.

2. Field Sites

   a. Require an adequate supply of potable water to be available.

   b. Water containers must be tightly closed and marked as to the contents. Containers must have a tap and be refilled daily.

D. Maintain existing toilet and wash facilities.

1. Maintain toilets and toilet area in good repair and in a clean and sanitary condition.

2. Provide paper towels and soap or other suitable sanitizing material for washing hands.

3. Locate hand-washing facilities next to or near toilets.

E. Maintain availability and cleanliness of drinking water.

1. Maintain backflow devices in a sanitary condition.

2. Water coolers and water dispensers are to be kept in a sanitary condition and filled only with potable water.

3. Provide fountain-type dispensers or one-use cups at each water dispenser.

F. Maintain lunchrooms in a clean condition.

1. Require microwave ovens to be used for food only.

2. Require refrigerators that are designated for food storage to be used for food only.

3. Do not allow workers to eat or store foods in areas where toxic materials are handled or stored.

4. Periodically clean lunchrooms.

G. Manage waste generated on site.

1. Release sanitary sewage into sanitary sewer lines or to other proper disposal channels.

2. Do not discharge hazardous waste into the sanitary sewer or storm sewer system.

3. Collect garbage and trash daily.

a. Garbage containers located outside buildings should have lids and remained closed. Transport garbage offsite at least weekly.

b. At remote field sites where bears and similar wild animals are a hazard, remove garbage from the site daily (do not let garbage remain on site overnight).

H. Prevent pests and vermin from multiplying on site. Eliminate unsanitary conditions that propagate insects or vermin.

I. Inspect work sites using checksheet provided as Attachment 30-1 for compliance at the beginning of the project and mid -project.

5. Documentation Summary

File completed inspection sheets in the Project Safety File.

6. Resources

A. U.S. OSHA Construction Standard - Sanitation - 29 CFR 1926.51 (http://www.osha-slc.gov/OshStd_data/1926_0051.html)

B. U.S. OSHA General Industry Standard - Sanitation - 29 CFR 1910.141 (http://www.osha-slc.gov/OshStd_data/1910_0141.html)

C. National Interim Primary Drinking Water Regulations 40 CFR 141
(http://www.access.gpo.gov/nara/cfr/waisidx_99/40cfr141_99.html)

D. Attachment 30-1 - Sanitation Inspection Checksheet

E. Queensland Workplace Health and Safety -
Code of Practice for Construction Project Amenities

URS	Health and Safety Program SANITATION INSPECTION SHEET	Attachment 30-1

Location: ____________________ **Job No:** ____________________

Date Inspected: ____________________ **Name of Inspector:** ____________________

	Note: All "No" notations must be corrected	Yes	No
	Toilets		
1.	Are there an adequate number of toilets on site? 1 – 15 employees = 1 toilet 16 - 35 employees = 2 toilets 36 – 55 employees = 3 toilets 56 – 80 employees = 4 toilets 81 - 110 employees = 5 toilets		
2.	Toilets are in clean condition.		
3.	Toilet paper is provided.		
4.	Toilet areas are clean and sanitary.		
	Hand Washing Facilities		
5.	Hand washing facilities are provided near toilets.		
6.	Paper towels and soap are provided.		
	Drinking Water		
7.	Drinking water is provided on site.		
8.	Disposable cups are provided or fountain type dispenser is provided.		
9.	Drinking water containers are kept clean and tightly closed or covered.		
	Lunch Rooms		
10.	Lunch rooms or eating areas are kept clean.		
11.	Microwaves are used for food only.		
12.	Microwave ovens are kept clean.		
13.	Refrigerators are kept clean.		
14.	Refrigerators are used to store food only.		
	Vermin		
15.	Rats, mice and other vermin are not living within buildings.		
16.	Cockroaches and fleas are not thriving within buildings.		

REMARKS:

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URS SAFETY MANAGEMENT STANDARD
Work Zone Traffic Control

1. **Applicability**

   This procedure applies to URS field operations involving work performed on roads, highways, and similar areas where motor vehicles may be a hazard.

2. **Purpose and Scope**

   This procedure is intended to protect personnel from the hazards associated with work performed on or next to highways and roads.

3. **Implementation**

   Field Activities - Implementation of this program is the responsibility of the Project Manager.

4. **Requirements**

   A. Review the project in the planning phase to determine if any work will be performed on or adjacent to any road that will disrupt normal traffic flow.

   B. Hire a qualified contractor or have an in house Competent Person devise a traffic control plan based on the work to be performed.

      1. Competent persons are those who are knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed.

      2. Traffic control plans will be designed to meet requirements as set in the Manual on Uniform Traffic Control Devices (MUTCD) (Resource A) as well as those rules set by state, county and cities in which work is performed.

      3. Require that the plan is commensurate with the complexity of the project.

   C. Submit the traffic control plan to the road authority for approval.

      1. Submissions will be made to the state department of transportation or highways if state or federal highways are impacted as well.

      2. Local county representatives.

      3. Local city representatives, if within city limits.

4. For U.K. operations, submittal is to be made to County Council or local authority.

D. Decide whether to have qualified in house personnel or contract personnel implement the traffic control plan in the field.

1. Certified flaggers may set up work zones.

   Flaggers must attend an eight-hour work zone traffic control course as taught by an ATSSA certified instructor (or equivalent).

2. Obtain appropriate traffic control equipment as described in Resource A.

3. For U.K. operations, all operative must be trained in accordance with 'New Road and Street Works' Act.

E. Execute the traffic control plan developed for the job site. Require all personnel who work on/or adjacent to the roadway to wear bright orange, strong yellow-green or fluorescent versions of these colors of approved work zone clothing, including:

1. Vests, at a minimum.

2. Coveralls, if desired.

3. Rainwear or other apparel as needed.

B. Require a Competent Person who is certified as a Worksite Traffic Supervisor supervises flaggers at least once a day.

C. Develop a plan for the periodic inspection and maintenance of the Traffic Control Zone utilizing Attachment 32-1.

5. Documentation Summary

Records required in the Project Safety File:

A. Copies of traffic control plans used on site.

B. Training certificates for URS flaggers and Competent Persons.

C. Qualifications of contracted flaggers and Competent Persons.

D. Inspection records.

6. Resources

A. Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) (http://www.ohs.fhwa.dot.gov/)

B. American Traffic Safety Services Association (http://www.atssa.com/)

C. ATTSA Flagger Train the Trainer Program (http://www.flagger.com/)

D. U.K. - Section 7, Road Traffic Act

E. U.K. - 'New Road and Street Works' Act

F. Australian Standards SAA HB81.1-.5 - Field Guide for Traffic Controls at Work on Roads

G. Australian Standards AS1742 - Manual of Uniform Traffic Control Devices

H. Australian Standards SAA HB69.13-1995. Guide to Traffic Engineering Practice - Pedestrian

I. Attachment 32-1 - Traffic Control Inspection Checklist

J. Queensland Workplace Health and Safety -
A Guide to Preparing Workplace Health and Safety Plans for
Worker Safety Within Road Reserves
(http://www.detir.qld.gov.au/hs/guide/gde26.pdf)

URS Corporation

URS Corporation Health & Safety Program
TRAFFIC CONTROL INSPECTION CHECKLIST

Project Name:_______________________________ Project Number:_______________________

Item	Yes	No	How Many?
1. Are any devices missing?			
Do any devices need repair?			
Were all replaced or repaired?			
2. Are any lights(flashers, etc.) not functioning?			
Were they all replaced or repaired?			
3. Are any devices improperly placed?			
Were all positions corrected?			
4. Do any devices need cleaning?			
Were all devices cleaned?			

Additional comments:

The above check was completed by:____
(name/title)

on ___________________________ at ___________________________ ❑ a.m. ❑ p.m.
(date) (time)

URS SAFETY MANAGEMENT STANDARD
Utility Clearances And Isolation

1. Applicability

This procedure applies to URS projects where personnel may encounter subsurface or overhead utilities.

2. Purpose and Scope

Many field activities are conducted near aboveground and underground utilities. The primary purpose of this Standard is to establish operating requirements that will permit employees to work safely in the vicinity of electrical, natural gas, fuel, water, and other utility systems and installations. The secondary purpose is to prevent economic damage to utility systems from operations associated with project-related activities.

The term "utility clearance" includes

A. The positive locating of utility systems in or near the work area.

B. A signed statement by an appropriate representative attesting to the location of underground utilities and/or the positive de-energizing (including lockout) and testing of electrical utilities.

Note that in some cases, utility representatives may deem it appropriate or necessary to use insulating blankets to isolate a power line; this is an acceptable alternative to positive de-energizing (only utility representatives can make the determination).

"Contact" with overhead power lines is considered to occur when equipment is closer to power lines than permitted by the criteria in the table in Section 4.0.C.2.b below. (See note for U.K. operations).

3. Implementation

Field Operations - Implementation of this procedure is the responsibility of the Project Manager.

4. Requirements

A. Time for Completion

Complete utility clearances prior to the start of any work in the area of the utility that could feasibly result in contact with or damage to that utility.

B. Local Regulations

Research local codes and regulations regarding utility locating and isolation requirements. Utility companies and locating services are among the appropriate resources.

C. Overhead Power Lines

1. Proximity to Power Lines

No work is to be conducted within 50 feet (15 meters) of overhead power lines without first contacting the utility company to determine the voltage of the system. No aspect of any piece of equipment is to be operated within 50 feet (15 meters) of overhead power lines without first making this determination.

2. Operations adjacent to overhead power lines are **PROHIBITED** unless one of the following conditions is satisfied:

   a. Power has been shut off, positive means (such as lockout) have been taken to prevent the lines from being energized, lines have been tested to confirm the outage, and the utility company has provided a signed certification of the outage.

   b. The minimum clearance from energized overhead lines is as shown in the table below, or the equipment will be repositioned and blocked so that no part, including cables, can come within the minimum clearances shown in the table.

MINIMUM DISTANCES FROM POWERLINES	
Powerlines Nominal System kV	Minimum Required Distance
0-50	10 feet (3 meters)
51-100	12 feet (3.6 meters)
101-200	15 feet (4.6 meters)
201-300	20 feet (6.1 meters)
301-500	25 feet (7.6 meters)
501-750	35 feet (10.7 meters)
751-1000	45 feet (13.7 meters)

Note: for U.K. operations, the specific safe distance is determined by the utility company.

   c. The power line(s) has been isolated through the use of insulating blankets which have been properly placed by the utility. If insulating blankets are used, the utility will determine the minimum safe operating distance; get this determination in writing with the utility representative's signature.

3. All inquiries regarding electric utilities must be made in writing and a written confirmation of the outage/isolation must be received by the Project Manager prior to the start of work.

D. Underground Utilities

1. Do not begin subsurface work (e.g., trenching, excavation, drilling, etc.) until a check for underground utilities and similar obstructions has been conducted. The use of as-built drawings must be confirmed with additional geophysical or other survey.

2. Contact utility companies or the state/regional utility protection service at least two (2) working days prior to excavation activities to advise of the proposed work, and ask them to establish the location of the utility underground installations prior to the start of actual excavation.

3. Obtain utility clearances for subsurface work on both public and private property. Clearances are to be in writing, signed by the party conducting the clearance.

4. Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, the Project Manager must notify the utility company or utility protection service to inform them that the markings have been destroyed.

5. Do not conduct mechanical-assisted subsurface work (e.g., powered drill rig, mechanical excavator, etc.) within five (5) feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure. Confirm minimum distances for mechanical-assisted subsurface work with the utility owner, as distances beyond this five foot minimum may be required.

6. Subsurface work within five feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure must be done by hand (e.g., hand auger, shovel) to the point where the obstruction is visually located and exposed. Once the obstruction location is confirmed in this manner, mechanical-assisted work may commence.

7. Reference SMS 13, "Excavation Safety" for additional information regarding subsurface operations.

E. Training

Conduct a site briefing for site employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the method used to isolate the utility and the hazards presented by breaching the isolation.

5. Documentation Summary

File these records in the Safety Filing System:

1. Documents requesting utility clearance.
2. Documents confirming utility clearance.
3. Training/briefing documentation of each isolation.

6. Resources

1. Utility Locating Services (typically under "Utility" in the Yellow Pages)
2. NIOSH Alert - Preventing Electrocutions from Contact Between Cranes and Power Lines (http://www.cdc.gov/niosh/crane.html)
3. One Call Utility Locating List (http://www.underspace.com/refs/ocdir.htm)
4. National Utility Locating Contractor's Association (http://www.underspace.com/nu/index.htm)
5. U.K. - Health and Safety Executive GS6

URS SAFETY MANAGEMENT STANDARD

Fall Protection

1. Applicability

This procedure applies to URS facilities and field operations where personnel could be exposed to fall hazards of 6 feet (2 meters) or greater.

2. Purpose and Scope

The purpose of this procedure is to provide criteria for the recognition and control of fall hazards.

3. Implementation

Facilities - Implementation of this procedure is the responsibility of the Office Manager.

Field Activities -- Implementation of this procedure is the responsibility of the Project Manager.

4. Requirements

A. Training

1. Designate a competent person to provide training in fall hazard recognition to each employee who may be exposed to falls. The competent person must be qualified in the following areas:

    a. The nature of fall hazards in the work area.

    b. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.

    c. The use and operation of guardrail, personal fall arrest, safety net, warning line, and safety monitoring systems, controlled access zones, and other protection to be used.

    d. The role of each employee in the safety monitoring system, when used.

    e. The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.

f. The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.

g. The role of employees in fall protection plans.

h. The standards contained in 29 CFR 1926 Subpart M.

2. Prepare a written certification record which includes the name of the employee trained, the date(s) of training, and the signature of the person who conducted the training.

3. Provide retraining when one of the following situations occur:

   a. Changes in the workplace render previous training obsolete.

   b. Changes in the types of fall protection systems or equipment to be used render previous training obsolete.

   c. Inadequacies in affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.

B. Fall Protection – General

Ensure that one or more of the fall protection/prevention systems outlined in this procedure is provided at **all** locations where fall hazards of 6 feet (2 meters) or greater exist. These locations include, but are not limited to, excavations, unprotected elevations, ladders, scaffolds, floor holes, wall openings, formwork, rebar tying, and all other locations and operations where potential fall hazards exist.

C. Guardrail Systems

1. Provide guardrail systems, when feasible, at all locations where a fall hazard of 6 feet (2 meters) or greater exists. Where guardrail systems are impractical, an alternative form of fall protection as outlined elsewhere in this procedure must be provided.

2. Require that guardrail systems meet the following criteria:

   a. Toprails must be installed 42 inches (1.1 meters) above the walking/working surface and be capable of withstanding, without failure, a minimum force of 200 pounds (91 Kg) in any outward or downward direction with no more than 3 inches (7.6 cm) of deflection.

b. Midrails must be installed 21 inches (53 cm) above the walking/working surface and be capable of withstanding, without failure, a minimum force of 150 pounds (68 Kg) in any outward or downward direction.

c. Posts must be spaced not more than 8 feet (2.5 meters) apart on centers.

3. Require that there are no openings more than 19 inches (48 cm) wide in any guardrail system.

4. Do not use plastic or steel banding as toprail or midrail.

5. Provide toprails and midrails of at least one-quarter inch (6 mm) nominal thickness or diameter, and smoothly surfaced to prevent cuts and punctures.

6. Flag the toprail with high-visibility material when using wire rope for toprails.

7. Erect guardrails on all sides when using guardrail systems around holes.

8. When guardrails are used around holes that are used for access, such as ladderways, provide a gate or offset the guardrail so that a person cannot walk directly into the hole.

9. When guardrails are used at hoisting areas, place a chain, gate, or removable guardrail section across the access point when hoisting operations are not taking place.

10. Provide guardrail systems at all locations above dangerous equipment, whether 6 feet (2 meters) or not.

11. Provide guardrails at all wall openings where the outside bottom edge of the opening is 6 feet (2 meters) or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches (1 meter) above the walking/working surface.

12. Erect guardrail systems on all unprotected sides or edges of ramps and runways when such systems are used.

D. Personal Fall Arrest Systems

1. Provide and require the proper use of personal fall arrest systems on all unprotected elevations 6 feet (2 meters) or more above a lower level. Where these systems are impractical, an alternative form of fall protection as outlined elsewhere in this procedure must be provided.

2. All aspects of personal fall protections systems must be designed, installed, and used under the supervision of a qualified person.

3. Maintain a safety factor of at least 2 in all components of a personal fall protection system.

4. **Safety belts (body belts) are prohibited.**

5. Use only full body harnesses, shock-absorbing lanyards, lifelines, and anchorage points which meet the following criteria:

   a. Body harness design and construction must meet the specifications set forth in 29 CFR 1926.500-.503.

   b. All snaphooks must be of the locking type.

   c. Ropes and webbing used in lanyards, lifelines, and body harnesses must be made of synthetic fibers.

   d. The attachment point (dee-ring) of a body harness must be located in the center of the wearer's back near shoulder level, or above the wearer's head.

   e. Horizontal lifelines must be designed, installed, and used under the supervision of a qualified person; be capable of supporting at least 5,000 pounds (2,270 Kg) per employee attached; and maintain a safety factor of at least 2.

   f. Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 pounds (2,270 Kg).

   g. Self-retracting lifelines and lanyards which limit free fall to 2 feet (60 cm) or less must be capable of sustaining a minimum tensile load of 3000 pounds (1,360 Kg) in the fully extended position.

   h. Self-retracting lifelines and lanyards which do not limit free fall to 2 feet (60 cm) or less, ripstitch, and other shock-absorbing lanyards must be capable of sustaining a minimum tensile load of 5,000 pounds (2,270 Kg) in the fully extended position.

   i. Anchorage points for personal fall protection systems must be independent of any anchorage point being used to support or suspend platforms and must be capable of supporting at least 5,000 pounds (2,270 Kg) per employee attached.

6. Inspect all fall protection components for wear, damage, and deterioration prior to each use.

7. Require employees to be familiar with the fitting and donning of body harnesses; proper tie-off techniques, and suitable anchorage points.

8. Instruct employees to rig fall protection such that they can neither free fall more than 6 feet (2 meters), nor contact any lower level.

9. Never tie off to guardrail systems or hoists.

10. Require employees to remain tied off 100% of the time at or above 6 feet (2 meters) by means of horizontal lifelines, vertical lifelines, a double lanyard system, or other suitable means.

11. Remove from service any component of a personal fall protection system that has been subjected to impact loading and do not use again until inspected by a competent person and determined to be undamaged and suitable for reuse.

12. Make provisions for the prompt rescue of personnel in the event of a fall, or require that employees are capable of self-rescue.

13. Provide separate vertical lifelines for each employee using a vertical lifeline. 5/8-inch (16 mm) nylon rope is recommended for lifeline use.

14. Protect lifelines against cuts and abrasions.

15. Use rope grabs to attach to vertical lifelines – never use knots.

E. Safety Net Systems

1. Provide safety net systems at locations where a fall hazard of 6 feet (2 meters) or greater exists, and other forms of fall protection are not feasible. Where safety net systems are impractical, an alternative form of fall protection as outlined elsewhere in this procedure must be provided.

2. Require that safety net systems meet the criteria set forth in 29 CFR 1926.500 -.503.

3. Install safety nets as close as possible under the walking/working surface on which employees are working, but never more than 30 feet (9 meters) below this level.

4. Require that the potential fall area from the walking/working surface to the net is unobstructed.

5. Install safety nets with enough clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified below.

6. Extend the outer edge of the net 8 feet (2.5 meters) from the edge of the working surface when the vertical distance from the working level to the net is 5 feet (1.5 meters) or less.

7. Extend the outer edge of the net 10 feet (3 meters) from the edge of the working surface when the vertical distance from the working level to the net is 5 feet to 10 feet (1.5 to 3 meters).

8. Extend the outer edge of the net 13 feet (4 meters) from the edge of the working surface when the vertical distance from the working level to the net is greater than 10 feet (3 meters).

9. Conduct a drop test of the safety net after installation and before being used as a fall protection system; whenever relocated; after major repair; and at 6-month intervals if left in one place.

10. Conduct the drop test by dropping a 400 pound (180 Kg) sandbag, 30 inches (76 cm) in diameter, into the net from at least 42 inches (107 cm) above the highest walking/working level at which employees are exposed to a fall.

11. Inspect safety nets at least once a week, and after any occurrence which could affect the integrity of the system, for wear, damage, and deterioration. Remove defective nets and components from service.

12. Remove all materials, scrap, equipment, and tools which have fallen into the net as soon as possible, but at least before the next work shift.

F. Hole Covers

1. Provide covers in roadways and vehicle aisles that are capable of supporting at least twice the maximum axle load of the largest vehicle expected to cross over the cover.

2. Provide walking/working surface hole covers that are capable of supporting at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

3. Secure covers at the time of installation to prevent displacement by the wind, equipment, or employees.

4. Color code or mark all hole covers with the word "HOLE" or "COVER" to provide warning of the hazard.

G. Safety Monitoring Systems, Warning Line Systems, and Controlled Access Zones.

Consult the local URS Health and Safety Representative or URS Health and Safety Manager prior to performing any roofing, overhand bricklaying, leading edge, or other elevated work which may require the use of one or more of these systems.

H. Protection from Falling Objects

1. Install toeboards along the edge of the overhead walking/working surface.

2. Require that toeboards are a minimum of 3 ½ inches (9 cm) in height; that they are capable of withstanding at least 50 pounds (22 Kg) of force applied in any downward or outward direction; and that there is no more than ¼ inch (6 mm) clearance between the toeboard and the walking/working surface.

3. Install paneling or screening from the top of the toeboard to the top rail or midrail when tools, equipment, or materials are piled higher than the top of the toeboard.

4. Provide sidewalk sheds or canopies as appropriate. See SMS 11, "Demolition".

5. Documentation Summary

Place in the Project Safety Files:

A. Competent Person Qualifications.

B. Employee Training Documents.

6. Resources

A. U.S. OSHA Standard - Fall Protection - 29 CFR 1926, Subpart M (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_M.html)

B. U.S. OSHA Technical Links - Fall Protection (http://www.osha-slc.gov/SLTC/fallprotection/index.html)

C. U.K. - Construction (Health, Safety and Welfare) Regulations

D. ANSI A10.11-1971 (http://web.ansi.org/public/std_info.html)

E. ANSI A12.1-1973 (http://web.ansi.org/public/std_info.html)

F. Australian Standards AS/N25 1891.1 to .3 - Industrial Fall-Arrest Systems and Devices

URS SAFETY MANAGEMENT STANDARD
Respiratory Protection

1. Applicability

This program defines responsibilities and procedures and is applicable to URS operations that may require the use of respiratory protection including Immediately Dangerous to Life and Health (IDLH) and emergency conditions. This program also addresses the voluntary use of respirators.

2. Purpose and Scope

The purpose of this procedure is to protect those employees performing operations for which exposures can not be controlled by use of conventional engineering or administrative controls and prior to establishing a negative air exposure assessment, and to require that respiratory protective equipment is selected, used, maintained, and stored in accordance with acceptable practices.

3. Implementation

Laboratory/Office/Shop Locations -	Implementation of this program is the responsibility of the Office Manager.
Field Activities -	Implementation of this program is the responsibility of the Project Manager.
Program Administration-	URS Health and Safety Director is responsible for the development and annual review of this program.

URS Health and Safety Program Representatives are responsible to:

- Assist responsible employees in the implementation of the program.
- Assessing local compliance with the program.

4. Requirements

A. Determine if respirators are needed or going to be used for hazardous jobs before assigning that job to an employee.

1. If the determination is that a potential for respiratory hazards exists with any portion of that job activity then, complete Attachment 42-1.
2. Contact a URS Health and Safety Program Representative if any of the questions in Attachment 42-1 are checked "yes."

3. Follow instructions in Attachment 42-2 for employees who wish to voluntarily use dust masks.

4. Follow all the requirements of this procedure for employees who wish to voluntarily use tight-fitting (e.g., air purifying) respirators.

5. Required respirators will be paid for by URS and will be provided without cost to the employee.

B. Select the proper respirator for the job.

1. For those jobs identified in Attachment 42-1, contact a URS Health and Safety Program Representative for assistance in respirator selection.

2. Contact a URS Health and Safety Program Representative for follow up if there are any problems implementing the recommendations made.

C. Require employees who will use respirators to be medically qualified before fit testing and assigning them a respirator.

1. For program details, refer to SMS 24, Medical Screening and Surveillance.

2. Require that employees have a current and accurate Medical Surveillance form (Attachment 24-2)

3. Obtain a copy of the employee's Health Status Medical Report from the Health and Safety Representative. The consulting occupational physician of the medical service provider following each work related examination issues the Health Status Medical Report. Employees cannot be assigned respirators unless they are medically cleared for respirator use.

D. Require respirator users to receive appropriate training.

1. All respirator users must be trained:

   a. Before they are assigned a respirator.

   b. Annually thereafter.

   c. Whenever a new hazard or job is introduced.

d. Whenever employees fail to demonstrate proper use or knowledge.

2. Training must address, at a minimum, the following:

   a. Why the respirator is necessary, and what conditions can make the respirator ineffective.

   b. What the limitations and capabilities of the respirators are.

   c. How to use respirators effectively in emergency situations.

   d. How to inspect, put on and remove, and check the seals of the respirator.

   e. What the respirator maintenance and storage procedures are.

   f. How to recognize medical signs and symptoms that may limit or prevent effective use of the respirator.

E. Require respirator users to be fit tested.

1. Any employee who has been assigned a reusable respirator must be fit tested on an annual basis (no more than one year may elapse between fit tests), or when the employee is assigned a respirator of a different make, type or size from that previously tested.

2. Fit testing can be performed by contract or in house personnel.

3. Obtain a signed written copy of the fit test results. The fit test results should include:

   a. Employee's name and social security number.

   b. Respirator brand, model and size fitted for.

   c. Date fit tested.

   d. Method of fit testing used.

   e. Name and signature of fit tester.

   f. Statement that fit test protocol met the requirements of 29 CFR 1910.134.

g. Manufacturer and serial number of fit testing apparatus.

A fit test results form is available at Attachment 42-5.

F. Provide qualified employees with respirator(s) and adequate amounts of parts and cartridges.

1. Assign employees whose duties require respirators their own respirator for which they have been fit tested.

2. Provide special eyeglass inserts designed for the respirator if an employee must wear eyeglasses with a full facepiece respirator. Contact lenses may be worn when wearing a full facepiece respirator.

G. Require respirators to be used properly.

1. Prohibit facial hair where the respirator-sealing surface meets the wearer's face.

2. Require employees to perform a positive and negative fit check every time the respirator is put on.

3. Employees will leave the area where respirators are being used:

    a. Before removing the facepiece for any reason.

    b. To change cartridges.

    c. If any of the following is detected:

        1. Vapor or gas breakthrough.

        2. Leakage around the facepiece.

        3. Changes in breathing resistance.

4. Use cartridges with End of Service Life Indicators or determine the respirator cartridge changeout schedule. See Attachment 42-4 for Guidance.

H. Require respirators to be cleaned and stored properly.

1. Clean and disinfect respirators after each use.

2. Store respirators in a plastic bag or case and in a clean location.

3. Inspect respirators before use and after each cleaning.

I. Address issues associated with special use respirators self-contained breathing apparatus; air supply respirators; emergency use respirators).

   1. Self Contained Breathing Apparatus

      Inspect self-contained breathing apparatus and other emergency use respirators monthly and after each use in accordance with manufacturer's instructions.

   2. Air Supplied Respirators

      a. Air used for atmosphere-supplying respirators must meet or exceed the requirements for Type 1 - Grade D breathing air. Never use oxygen.

         1. A certificate of analysis must accompany bottled air.

         2. Compressors used to supply breathing air must:

            i. Prevent entry of contaminated air into the air supply.

            ii. Minimize moisture content.

            iii. Have suitable in-line sorbent beds and filter to provide appropriate air quality.

            iv. Have a high carbon monoxide alarm that sounds at 10 ppm.

      b. Couplings on air hose lines must be incompatible with other gas systems.

J. Require follow up training and medical surveillance to be provided as directed.

   1. Provide follow-up physical examinations as directed by the SMS 24-3, Medical Screening and Surveillance Exam Protocol table.

   2. Provide follow-up physicals as directed by the Regional Medical Surveillance Administrator.

3. Provide annual refresher training.

4. Provide annual fit testing.

5. Documentation Summary

A. Laboratory

1. File these records in the Laboratory Safety Filing System

   a. Completed forms:

      1. "Identifying When A Respirator Is Needed" - Attachment 42-1; and,

      2. "Respirator Standard Operating Procedure" - Attachment 42-3.;

   b. Employee Health Status Medical Report includes clearance for respirator use.

   c. Employee Fit Test Records; and,

   d. Employee Respirator Training Records.

2. Send a copy of the following records to the Regional Health and Safety Manager:

   a. Completed "Voluntary Use of Respirators" form - Attachment 42-2.

   b. Employee Fit Test Records.

   c. Employee Respirator Training Records.

B. Field

1. File these records in the Project Health and Safety File:

   a. Completed forms:

      1. "Identifying When A Respirator Is Needed" - Attachment 42-1; and,

2. "Respirator Standard Operating Procedure" - Attachment 42-3.

3. Employee Health Status Medical Report includes clearance for respirator use.;

4. Employee Fit Test Records; and,

5. Employee Respirator Training Records.

2. Send a copy of the following records to the Regional Health and Safety Manager:

   a. Completed "Voluntary Use of Respirators" form - Attachment 42-2;.

   b. Employee Fit Test Records; and,

   c. Employee Respirator Training Records.

6. Resources

A. U.S. OSHA Standard - Respiratory Protection - 29 CFR 1910.134

B. U.S OSHA Technical Links - Respiratory Protection

C. ANSI Z88.6, Respirator Use – Physical Qualifications for Personnel, Current Revision

D. ANSI Z88.2, Respiratory Protection, Current Revision

E. 3M Cartridge Service Life Interactive Program

F. Australian Standards AS/N25 1715 - 1994. Selection, Use, and Maintenance of Respiratory Protection Devices

G. Australian Standards HB9-1994. Occupational Personal Protection

H. AIHA, The Occupational Environment - Its Evaluation and Control

The following documents are PDF files which must be read with Adobe Reader:

I. NIOSH Respirator Decision Logic

J. NIOSH Guide to Industrial Respiratory Protection

K. Attachment 42-1 - Identifying When a Respirator is Needed

L. Attachment 42-2 - Voluntary Use of Respirators

M. Attachment 42-3 - Respirator Standard Operating Procedure

N. Attachment 42-4 - Respiratory Cartridge Change Schedule

O. Attachment 42-5 - Fit Test Results Form

P. Medical Screening and Surveillance Program - SMS 24

URS Corporation

URS Corporation Health & Safety Program
IDENTIFYING WHEN A RESPIRATOR IS NEEDED

Site Location:________________________________Date:______________________

Name of Person Performing Evaluation:_____________________________________

Project:____

Answer the questions below for the jobs you are to perform on site. If a "yes" response is checked, consult with a URS Corporation Health and Safety Professional to determine:

- ***if a respirator is truly needed for the job, as well as,***
- ***the type of respirator needed for the job.***

MATERIAL USED OR PROCESS TO BE PERFORMED	YES Respirator may be needed	NO	NOTES
Abrasive Blasting • Abrasive blasting (with any type of grit or material) will be performed. • Employee will fill abrasive blasting pots or perform clean-up activities. • Employee will be in a contained area where abrasive blasting is taking place.			
Acids • Liquid or powder acids will be used in a situation where acid vapors, mists or dust may be breathed.			
Adhesives • Aerosol-propelled adhesives are to be used in areas where there is no or insufficient local exhaust ventilation. • Two-part adhesives (mix part one with two, let set then use) are to be used in areas where there is limited ventilation.			
Alkalis/Bases/Caustics • Powdered alkalis will be used in a situation where an airborne dust may be breathed.			
Asbestos Abatement • Asbestos will be removed, repaired or sampled. • Employees will be inspecting or overseeing areas where asbestos will be removed or disturbed.			

MATERIAL USED OR PROCESS TO BE PERFORMED	YES Respirator may be needed	NO	NOTES
Cleaning Compounds • Degreasers or carbon removers will be used in areas where local exhaust ventilation is not provided. • Aerosol propelled cleaning compounds will be used in areas where there is no local exhaust ventilation. • Degreasers or carbon removers will be used in voids, tanks, or other confined spaces.			
Corrosion Preventive Compounds • Corrosion prevention compounds, including chemical conversion compounds and corrosion inhibitors, will be used in areas where there is no local exhaust ventilation.			
Detergents/Soaps • Ammonia based detergents will be used in large quantity (more than five gallons) in areas where local exhaust ventilation cannot be provided. • Large quantities (5 or 55 gallon containers) of high pH powder detergent/soap will be used in a situation where dust may be breathed.			
Fuels (including regular or unleaded gasoline, kerosene, diesel fuel, JP-5) • Employees will be inside unventilated fuel cells or other confined spaces containing fuels.			
Grinding, Cutting, Sanding • Cutting, grinding or sanding surfaces that have coatings containing lead, cadmium, chromium, zinc or beryllium. • Cutting, grinding or sanding surfaces that are concrete or glass without use of ventilation or water.			
Hazardous Waste Sites • Employees will be performing tasks on a hazardous waste site that requires the use of respirator (as indicated in the site safety & health plan). • Employees will be performing site assessments on potential hazardous waste sites.			
Hydraulic Fluids (including petroleum-based fluids, synthetic fire-resistant fluids, and water based fire resistant fluids) • Hydraulic fluids and the vapors generated will not be exhausted using local exhaust ventilation. • Synthetic fire-resistant fluids or water-based fire-resistant fluids will be used in an area where the air is contaminated with visible mist or spray from hydraulic fluids.			

MATERIAL USED OR PROCESS TO BE PERFORMED	YES Respirator may be needed	NO	NOTES
Inspection Penetrants (including Flouro-finder, water indicating pastes, and penetrant removers) • An aerosol-propelled inspection penetrant will be used in an area where local exhaust ventilation cannot be provided, or in a situation where the solvent vapors can be breathed.			
Lead Abatement Activities • Lead containing materials will be disturbed, removed or sampled. • Employees will be inspecting or overseeing areas were lead will be removed or disturbed.			
Lubricants/Oils • Aerosol lubricants/oils will be sprayed with no immediate exhaust ventilation.			
Oxidizers (materials that give off oxygen including chlorine laundry bleach, calcium hypochlorite, calcium oxide, oxygen candles, lithium hydroxide, hydrogen peroxide, and sodium dichromate) • Oxidizers containing organic chlorine will be used in a situation where the dusts/vapors may be breathed. • Powdered oxidizers will be used in a situation where airborne dust may be breathed.			
Paint Materials (including paints, primers, thinners, enamels, lacquers, strippers, coatings and varnishes) • Paint materials will be spray applied in areas where there is no local exhaust ventilation. • Two part (mix part a with part b, let set, then apply) polyurethane or epoxy polyamide paints will be brush or spray applied. • Paints containing lead, chromium, cadmium, beryllium, and zinc (refer to the MSDS). • Paint materials will be applied in confined spaces.			
Solvents (including hydrocarbon solvents such as acetone, methyl ethyl ketone, toluene, xylene, and alcohols, as well as mixed solutions like antifreeze, heat transfer fluid, turpene, dope and naphtha thinner) • Local exhaust ventilation will not be provided and work will involve breathing solvent vapors. • Solvents will be used within confined spaces. • Solvents will be applied using aerosols.			
Thermal Insulation (including asbestos & non-asbestos materials like pipe lagging, fiberglass insulation, boiler insulation, packing materials and floor/ceiling tiles) • Insulation will be disturbed, removed or sampled.			

MATERIAL USED OR PROCESS TO BE PERFORMED	YES Respirator may be needed	NO	NOTES
Water Treatment Chemicals (includes corrosive chemicals such as tri-sodium phosphate, hardness buffer, tritrating solution, morpholine, caustic soda, citric acid and nitric acid as well as toxic chemicals such as mercuric nitrate, hydrazine, EDTA and sodium nitrate) • Morpholine, EDTA, or harness buffer/titrating solution is to be used in poorly ventilated spaces. • Powdered water treatment chemicals will be used in a situation where chemical dusts may be breathed.			
Welding/Brazing • Welding will be performed in confined spaces. • Welding galvanized metal or stainless steel. • Brazing with cadmium or lead.			
For Any of The Above Listed Activities • A employee will be in the immediate area - within 10 feet of the job or operation, or • Employee will be inside confined space where activities are taking place, or • Employee will be inside a "controlled area" such as found in asbestos abatement, lead abatement, radiation control area, or a hazardous waste site.			
Material Safety Data Sheets • For any chemical product used, a respirator is recommended.			
Product Labels • For any chemical or process that indicates respirators should be used.			
Product Use Instructions For any product used, instructions indicate a respirator should be used.			
Standard Operating Procedures A Standard Operating Procedure indicates the use of a respirator.			

URS Corporation

URS Corporation Health & Safety Program
VOLUNTARY USE OF RESPIRATORS

Instructions: Have the employee that is opting to use a respirator for non-overexposure conditions read this page, then sign on the bottom of the page. Forward a copy of the signed form to the Regional Training Records Administrator, and maintain a copy in the employee's personnel file.

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for employees. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee. Sometimes employees may wear respirators to avoid exposures to hazards, even if the amount of the hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your own voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not pose a hazard.

You should do the following:

1. Read and follow all instructions provided by the manufacture on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety & Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear o the respirator or respirator packaging. It will tell you what the respirator is designed for and how it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect you against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, fumes, smoke or very small solid particles.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

5. If you have any health conditions (asthma; high blood pressure; emphysema; heart disease) that could be aggravated by using a respirator, you should check with your doctor before using one.

I have read and understand this information on:______________________________ (date)

Employee's name:____

Employee's signature:____

URS Corporation

URS Corporation Health & Safety Program
RESPIRATOR STANDARD OPERATING PROCEDURE

Job Task Reviewed:____

Date Reviewed:____

Task Reviewed by:____

ADMINISTRATIVE PROCEDURES

1. All respirator users must be medically qualified to use respirators. Point of contact for scheduling is the Regional Medical Surveillance Administrator.
2. Respirator users must be trained annually in respirator use and fit tested annually.
3. Respirator will be used only by the person to whom it was issued.
4. Persons using glasses who are required to use a full-face respirator may use contact lenses or eyeglass inserts designed for the respirator.

GUIDANCE FOR SELECTION OF RESPIRATOR & CARTRIDGES/FILTERS

1. ______________________________________ respirators are currently being issued and used for the following job activity: ____.
2. The respirator will be equipped with the following cartridges/filters:______________________________________.
3. Filters are to be changed when the breathing resistance increases.
4. Cartridges are to be changed:____________________________ or when the contaminant you are protecting yourself from can be smelled or tasted.

FIT TESTING & FIT CHECKING

1. Fit testing is required annually. To arrange for fit testing call your local safety representative.
2. Respirator users will "fit check" the respirator every time the respirator is put on:

- **Negative Check** - cover filters/cartridges with palms of hands and breath in, leakage should not be detected around the face seal of the respirator. Do not use if leakage is detected.
- **Positive Check** - cover the exhalation valve cover with palm of hand and blow out slightly, leakage should not be detected around the respirator seal.
- **For Air Supply Respirators** - kink or close off air supply hose and breath in, leakage should not be detected around the face seal of the respirator.

CLEANING & MAINTENANCE OF RESPIRATOR

1. Clean and disinfect respirator after every use.
2. Inspect respirator after every day in use to ensure parts are not missing. Replace missing parts from stock supply.
3. Store clean respirator in labeled plastic bag out of direct sunlight.
4. Do not alter respirator in any way.

URS Corporation

URS Corporation Health & Safety Program
RESPIRATOR CARTRIDGE CHANGE SCHEDULE

A cartridge change schedule must be developed for cartridges or canisters used with air purifying respirators that do not have an End of Service Life Indicator (ESLI). The purpose of this is to prevent contaminants from breaking through the respirator's sorbent cartridge(s), and thereby over-exposing employees. NIOSH has approved ESLIs for only four cartridges or canisters (mercury vapor, carbon monoxide, ethylene oxide, and hydrogen sulfide). Historically we have relied on the warning properties (odor, irritation) of a contaminant to dictate cartridge change. OSHA no longer allows this as the sole basis for changing respirator cartridges. In developing a change schedule the following factors should be considered:

- Contaminants.
- Concentration.
- Frequency of use (continuously or intermittently throughout the shift).
- Temperature and humidity.
- Work rate.
- The presence of potentially interfering chemicals.

The worst case conditions should be assumed to avoid early breakthrough. This must be documented in the project health and safety plan or, in the cases of office or labs, in the site specific Respiratory Protection Program.

Sources of Help

Manufacturers

3M has an interactive "Cartridge Service Life" program that can be downloaded for free (http://www.mmm.com/market/safety/ohes2/index.html)

This program will estimate cartridge service life for 3M products against many contaminants. The program does not evaluate the service life against mixtures (multiple contaminants). Because of the complexity in evaluating mixtures, OSHA offers the following guidance:

- When the individual compounds in the mixture have similar breakthrough times (i.e., within one order of magnitude), service life of the cartridge should be established assuming the mixture stream behaves as a pure system of the most rapidly migrating component with the shortest breakthrough time (i.e., sum up the concentration of the components).

- Where the individual compounds in the mixture vary by 2 odors of magnitude or greater, the service life may be based on the contaminant with the shortest breakthrough time.

Rule of Thumb (*"The Occupational Environment - Its Evaluation and Control)*

- If the chemical's boiling point is >70°C and the concentration is less than 200 ppm you can expect a service life of 8 hours at a normal work rate.
- Service life is inversely proportional to work rate.
- Reducing concentration by a factor of 10 will increase service life by a factor of 5.
- Humidity above 85% will reduce service life by 50 %.

OSHA Interpretation

The OSHA inspection procedures for the respiratory protection standard specifies that where contaminant migration is possible, respirator cartridges/canisters should be changed after each work shift where exposure occurs unless there is objective data to the contrary (desorption studies) showing the performance in the conditions and schedule of use/non-use found in the workplace.

Respiratory Fit Test Record — Attachment 42-5

Name: ______________________ **Social Security No:** ______________________

Company/Office: ______________________ **Last Medical Exam:** ______________________

Fit Test Date: ______________________ **Corrective Lenses Needed:** Yes ☐ No ☐

Briefed on fundamental principles of respiratory protection, use, selection, inspection cleaning, maintenance and storage of equipment. Yes ☐ No ☐

Isoamyl acetate odor recognition Yes ☐ No ☐

	RESPIRATOR 1	RESPIRATOR 2	RESPIRATOR 3
Equipment Type	________	________	________
Manufacturer's Name	________	________	________
Model	________	________	________
Size	________	________	________
Facepiece Composition (Rubber/Silicone)	________	________	________

TEST PERFORMED	RESPIRATOR 1	RESPIRATOR 2	RESPIRATOR 3
Negative Pressure Test:	P ☐ F ☐	P ☐ F ☐	P ☐ F ☐
Positive Pressure Test:	P ☐ F ☐	P ☐ F ☐	P ☐ F ☐
Isoamyl Acetate Vapor Test:	P ☐ F ☐	P ☐ F ☐	P ☐ F ☐
Irritant Smoke Test:	P ☐ F ☐	P ☐ F ☐	P ☐ F ☐

This qualitative fit test protocol has been adapted from OSHA Respiratory Protection Standard 29 CFR 1910.134, Appendix A.

______________________ ______________________ ______________________
Examiner's Name (Please Print) **Examiner's Signature** **Date**

______________________ ______________________
Employee's Signature **Date**

URS SAFETY MANAGEMENT STANDARD
Personal Monitoring (Industrial Hygiene)

1. Applicability

This standard applies to URS operations where employees may be exposed to unacceptable concentrations of hazardous air contaminants.

2. Purpose and Scope

This standard is intended to assist and provide guidance to URS personnel that need to conduct personal industrial hygiene monitoring

Personal monitoring is to be conducted under the following conditions:

A. Where directed by a site-specific health and safety plan.

B. Where employees are exposed to known or suspected human carcinogens.

C. Where regulations require "initial exposure assessments." The only exception to conducting an "initial exposure assessment" where there is a regulatory requirement to do so is when similar exposure assessments have been conducted under similar site conditions within one year prior to the start of work on the current project.

Retain a copy of the referenced initial exposure assessment and place it in the Project Safety File.

2. Implementation

Laboratory Locations - Implementation of this standard is the responsibility of the Laboratory Manager.

Field Activities - Implementation of this standard is the responsibility of the Project Manager.

3. Requirements

A. Procedures for Personal Industrial Hygiene Monitoring

1. Collect samples using the applicable methodologies established by either NIOSH or OSHA. Require the selected laboratory to utilize the applicable analytical methodologies.

2. Document personal monitoring activities using a URS Industrial Hygiene Monitoring Form (Attachment 43-1) and require that all Chain of Custody forms are properly completed.

B. Evaluation of Personal Monitoring Results

1. Require that the analytical results be evaluated by a URS Health and Safety Program Representative.

2. Obtain a written evaluation report from the URS Health and Safety Program Representative. If exposures exceed the Action Level and/or Permissible Exposure Limit for the air contaminant(s) of concern, a verbal report is to be made to the Project Manager immediately, and the evaluation report will include required corrective actions.

3. Evaluation reports are to be completed within five working days of the receipt of the analytical results.

C. Communication of Sample Results and Evaluation

1. Provide copies of the evaluation report to the employee(s) monitored and to employees working in the area for whom the exposures could be representative.

2. Provide a copy of the evaluation report and monitoring data to the Medical Surveillance Administrator.

D. Corrective Actions

Implement required corrective actions immediately.

4. Documentation Summary

Maintain in the Project Safety File:

A. Calibration data

B. Completed IH Monitoring Form(s)

C. Evaluation Report with sample results

D. Relevant prior initial exposure assessments

E. Provide to affected employees:

- Evaluation Report with sample results

F. Provide to the Medical Surveillance Administrator:

- Evaluation Report with sample results
- List of employees affected by the sampling

5. Resources

A. OSHA Analytical Methods

B. OSHA Chemical Sampling Information

C. American Industrial Hygiene Association, The Occupational Environment, Its Evaluation and Control.

D. American Conference of Governmental Industrial Hygienists. Air Sampling Instruments for Evaluation of Atmospheric Contaminants.

E. U.K. - 'Control of Substances Hazardous to Health'

F. NIOSH Analytical Methods

G. Attachment 43-1 - IH Monitoring Form

URS Corporation

URS Corporation Health & Safety Program
INDUSTRIAL HYGIENE MONITORING FORM

Project Information

Name		Date / /
Social Security #		
Project Number		
Project Name and Location		
Weather Conditions		

Sample type Personal ☐ Area ☐	URS Control Number:
Sample location:	Pump Manufacturer:
Sample media:	Pump Model Number:
Lot Number:	Pump Serial Number:
Contaminant sampled:	Analytical Method:

Sample Information

Sample I.D. Number	Sample Location	Pump Number	Flow Rate	Start Time	Stop Time	Elapsed Time (mins)	Volume (liters)

PPE Used

Corresponding Photographs

Sample I.D. Number	Photo Number, Roll No., Exposure No.	DESCRIPTION

Site Activities Description/Comments:
(Continue on reverse side if necessary

URS SAFETY MANAGEMENT STANDARD
Back Injury Prevention

1. Applicability

This procedure applies to URS operations where personnel perform manual lifting.

2. Purpose and Scope

The purpose of this procedure is to prevent back injuries to URS personnel.

3. Implementation

Office Locations -	Implementation of this procedure is the responsibility of the Office Manager.
Field Activities -	Implementation of this procedure is the responsibility of the Project Manager.

4. Requirements

A. Safe Lifting Practices in the Office

1. Require that personnel receive the training described in (C) below.
2. Evaluate all assignments that involve lifting, such as moving boxes of files and paper, computer equipment, and the like to see that the task can be completed without risk of back injury to assigned personnel.
3. Provide material handling devices, such as carts and dollies, to assist in the safe moving of materials.
4. Obtain outside assistance, such as contract movers, if the job cannot be safely accomplished by URS personnel.
5. Require that heavier items are stored on lower shelving units.

B. Safe Lifting Practices in the Field

1. Recognize that field assignments tend to be lifting-intensive, and that URS has a duty to provide the means by which personnel can perform lifting duties without risk of injury.
2. Require that personnel receive the training described in (C) below.

3. Evaluate all field assignments that involve lifting to see that the tasks can be completed without risk of back injury to assigned personnel.

4. Provide material handling devices, such as carts, dollies, trucks with lift gates, to assist in the safe moving of materials. If required, assign additional personnel to the task.

5. Direct field personnel not to assist in lifting tasks that are normally undertaken by subcontractor personnel.

6. Contact a URS Health and Safety Program Representative when assistance is necessary to evaluate a lifting task that may pose a back injury risk to assigned personnel.

C. Training

1. Require that personnel who may have lifting as part of their duties receive training that includes the following topics:

    a. Showing personnel how to avoid unnecessary physical stress and strain.

    b. Teaching personnel to become aware of what they can comfortably handle without undue strain.

    c. Instructing personnel on the proper use of equipment.

    d. Teaching personnel to recognize potential hazards and how to prevent or correct them.

2. This training must be completed prior to an employee being assigned to a task that involves lifting.

D. Office Moves and Relocations

1. Utilize professional movers (who are appropriately insured) to move office furniture such as desks, file cabinets, and bookcases, even if such a move is only between offices or cubicles at a particular location (on-site move).

2. Utilize professional movers for intensive moving of file boxes and other heavy materials.

E. Material Packaging

1. Use only smaller size (<18") file ("Banker") boxes for file storage, as the larger (>18") boxes are awkward and readily overloaded.

2. Use only smaller coolers for field samples, as the larger coolers are awkward and readily overloaded.

5. Documentation Summary

File the following documents in the Office Health and Safety File

- Training rosters

File the following documents in the Project Health and Safety File

- Training rosters

6. Resources

A. Work Practices Guide for Manual Lifting, NIOSH

URS SAFETY MANAGEMENT STANDARD
Injury / Illness / Incident Reporting

1. Applicability

This procedure applies to URS Corporation offices and field operations.

2. Purpose and Scope

The purpose of this procedure is to provide guidance for the timely reporting of work related injuries, illness, and incidents.

3. Implementation

Office Locations -	Implementation of this program is the responsibility of the employee's Supervisor.
Field Activities -	Implementation of this program is the responsibility of the Project Manager.

4. Requirements

A. Reporting: All employees shall immediately notify their appropriate level of management (line, project, and/or office) of a reportable incident. A reportable incident includes the following:

1. An injury to any URS employee, subcontractor, client representative, or private citizen, even if the injury does not require medical attention;
2. An injury to a member of the public occurring on a URS work site or possibly resulting from a URS or subcontractor activity or involving URS or subcontractor property, equipment, or resource;
3. Illness resulting from suspected chemical exposure;
4. Chronic or re-occurring conditions such as back pain or cumulative trauma disorders (example: carpal tunnel syndrome);
5. Fire, explosion, or flash;
6. Any vehicle accidents occurring on site, while traveling to or from client locations, or with any company-owned or leased vehicle;
7. Property damage resulting from any URS or subcontractor activity;
8. Structural collapse or potential structural hazards;

9. Unexpected release or imminent release of a hazardous material;

10. Unexpected chemical exposures to workers or the public;

11. A safety related complaint from the public regarding URS activities.

12. Any other significant occurrence that could impact safety.

B. Actions: The following actions will be taken following a reportable incident:

1. Employees:

   a. If necessary, suspend operations and secure and/or evacuate the area;

   b. Immediately notify your supervisor and/or project manager

   c. Record information pertaining to the incident (e.g., time, date, location, name and company of person(s) involved, description of event, and actions taken);

   d. Assist with incident investigation as directed by management;

   e. Implement corrective actions as directed by management;

   f. *Do not* discuss the incident with members of the news media or legal representatives (except URS legal counsel or your personal legal advisor) unless directed to do so by URS management;

   g. *Do not* make statements pertaining to guilt, fault, or liability.

2. Line/Project Management:

   a. Review circumstances of the incident with applicable employee(s);

   b. Notify local Health and Safety representative. If incident involves and an injury/illness of a URS employee, also notify the local Human Resources Representative;

   c. Complete and distribute injury/incident report within 24 hours. (Note: If the employee is unable to complete the report, another company employee, line manager, project manager, or local health and safety representative may complete the report.);

d. Review and verify that necessary corrective actions are identified and implemented;

e. Discuss with department or project staff the circumstances surrounding the incident and corrective actions taken.

3. Local Health And Safety Representative

   a. Assist with incident evaluation;

   b. With management, identify cause(s) of incident and identify corrective actions needed to avoid recurrence;

   c. Review injury/incident report for completeness and accuracy;

4. Local Human Resources Representative

   a. Report work-related injuries and illness to worker compensation carrier

      (St. Paul Fire and Marine @ 1-800-787-2851);

5. Documentation Summary

A. File these records in the Office Safety File:

   1. Attachment 49-1 - Incident Report Form

   2. Maintain OSHA 200 Log.

B. File these records in the Project Health and Safety File

   1. Attachment 49-1 - Incident Report Form

   2. Maintain OSHA 200 Log if applicable for Project.

6. Resources

A. U. S. OSHA

B. Attachment 49-1 - Incident Report Form

URS	Health and Safety Program **INCIDENT REPORT FORM**	Attachment 49-1

ADMINISTRATIVE INFORMATION:

URS Division/Company: ____________________

Project Office: ____________________

Project Number: ____________________

Date/Time of Incident: Date____________ Time ____________

Location: ____________________

FOR INJURIES / ILLNESSES:

Name of Injured Employee: ____________________

Age: ____________________

Sex: ○ Male ○ Female

See a Doctor? ○ Yes ○ No

If yes, attach a doctor's report.

Describe Injury:

TYPE OF INCIDENT (Check all applicable items)			
☐ Illness	☐ Injury	☐ Fire, Explosion, Flash	☐ Unexpected Exposure
☐ Property Damage	☐ Vehicular Accident	☐ Other (describe):	

DESCRIPTION OF INCIDENT: (Describe the facts contributing to the incident. Identify individuals involved, witnesses, and their affiliations. Attach additional sheets, drawings, or photographs as needed.)

URS	Health and Safety Program **INCIDENT REPORT FORM**	Attachment 49-1

PREPARED BY:

Name: ______________________________

Date: ____________________

Signature: ______________________________

Reporter must deliver this report to the operating unit health and safety representative within 24 hours of the reported incident for medical treatment cases and within 5 days for other incidents.

REVIEWED BY:

____

Supervisor Date

____

Health and Safety Representative Date

DISTRIBUTION:

- Division Health and Safety Manager
- Project File
- Occupational Health Specialist (Fax 512-419-6013)
- Local Human Resources (Injury / Illness cases only)

CORRECTIVE ACTONS (*For Internal Use Only*):

URS SAFETY MANAGEMENT STANDARD

Health and Safety Training

1. Applicability

This SMS applies to all URS personnel. These are the minimum Environmental, Health and Safety (EHS) compliance training requirements and tracking procedures. Specific geographic entities, business units, and projects may require additional training. These requirements may be dictated by federal/national, state/provincial or local agencies or by the activities of a specific work group or project team. Each location or project manager is responsible for ensuring documentation and informing employees of these additional requirements.

2. Purpose and Scope

This SMS was developed to assist employees and managers in the identification of training requirements and to define the URS procedures for tracking/documenting this training. It covers environmental, hazardous materials, and health and safety training only. The goals of this program are to ensure regulatory compliance and to provide employees with the information/training they need to accomplish their work assignments safely, prevent injuries to themselves, coworkers, surrounding communities and clients, and to protect company property and the environment.

3. Implementation

Location — Location Manager is responsible for ensuring compliance with this program and any additional requirements necessary because of the physical location of the facility, and/or the business units in operation at that facility (e.g., laboratories).

Projects — Project Manager is responsible for ensuring project-related compliance (e.g., compliance of project staff members) with this program and any additional training necessary because of specific project activities.

Corporate HS Training Coordinator (CTC) — The CTC is responsible for maintaining the corporate training calendar, filing original records/tests, issuing certificates, maintaining and issuing corporate training materials, helping to develop materials that meet requirements, adding approved courses and course information to the corporate training database, updating the intranet site with course information.

4. Requirements

Employee training requirements are dictated by the work each employee performs (or are expected to perform) and the geographic area(s) where they perform these activities. In most cases there is a regulatory driver for specific training. Attachment 55-1 shows a decision tree designed to help employees and managers determine training requirements.

A. Health & Safety Orientation: All URS employees must be informed as to existence of and basic content of the URS Health and Safety Program. Locations will have the option of selecting the appropriate method of delivery but the content of this orientation must include at a minimum:

1. Review of the URS EHS policy statement
2. The Management System
3. The URS H&S Organization
4. Overview of the Safety Management Standards and Hazard Assessment Process
5. Incident Reporting (SMS 049)

Based on job assignment, additional training covered during this orientation:

6. Office Ergonomics (SMS 054)
7. Hazard Communication (US) or WHMIS (Canada)
8. Emergency Procedures (emergency action plans, evacuation plans, fire alarms, gathering points, emergency communications)

B. Table 1 contains a list of the most common courses that may be required, their frequency, and expected participants. This table will be updated as regulatory and company requirements change.

TABLE 1

Course Title	Regulatory Requirement	Frequency	Audience	Comments
Hazardous Waste Operations (40-Hrs - U.S.) (24-Hrs- non U.S.)	Y	Once	Anyone performing work or expected to perform at hazardous waste sites or treatment, storage, and disposal facilities	
Hazardous Waste Operations – Refresher (8 Hrs - U.S.) (4 Hrs - non-U.S.))	Y	Annually	(See above)	
Hazardous Waste Operations – Supervisor (8 Hrs)	Y	Once	Required for anyone serving as the site supervisor at a hazardous waste site.	
Field Safety (4 Hrs)	N	Biennially	Required for all URS non-craft employees performing field work that are not in hazardous waste training program.	Specific content will depend on the office and the employees' expected work.
Health & Safety Orientation	Y	Once	Required for all URS employees.	Specific content will depend on the office and the employees' expected work.
Respiratory Protection	Y	Annually	Required for any employee who may be required to wear a respirator.	Initial training is approximately 1 hr. Annually refresher training and fit testing is approximately .5 hrs.

Course Title	Regulatory Requirement	Frequency	Audience	Comments
Hazardous Materials Shipping[1]	Y	Biennially	Required for anyone who packages, labels, transports, completes paperwork for, or offers for shipment, hazardous materials/dangerous goods	
Bloodborne Pathogens[1]	Y	Annually	Required for anyone designated as a first aid responder or others who have a potential bloodborne pathogen exposure.	
First Aid	N	Biennially	Required for Hazardous Waste Site Safety Officers and personnel at remote sites (e.g., no local emergency medical response).	
Hazard Communication[1]	Y	Initially and if hazards change	Required for anyone who is potentially exposed to/works with hazardous chemicals	Training must occur before any work with hazardous chemicals. Included (as needed) in H&S Orientation. After the initial training, required updates will typically be handled as part of project specific H&S training.

[1]This material is covered in the Hazardous Waste Operations initial and annually refresher courses, however individuals who are not Hazardous Waste Operations staff may be required to take one or more of these courses based on their work activities and as required by federal regulations.

C. Attachment 55-1 is a tool used to identify *additional* training requirements. These requirements may be necessary due to the individual's project or office activities, or the location of the facility. The responses to this simple questionnaire dictate what training an individual needs above and beyond the basic URS courses. Each employee, once these requirements have been identified, is expected to complete the required training as soon as possible and to track his/her progress.

D. Training requirements should be re-evaluated at least annually and more frequently if an employee's assigned duties change significantly.

E. To ensure consistency in content and duration and in meeting regulatory and company requirements, corporate training materials should be used as the base materials whenever they are available. Trainers may always elect to supplement the base corporate training materials for these courses with project/office/geographic unit specifics.

F. For training requiring certifications (regulatory or corporate) trainers must be regional or divisional H&S Managers or be approved by the Corporate Health and Safety Director. This training includes but is not limited to, Hazardous Waste Health and Safety courses and Field Safety Training.

G. Training is offered in a variety of formats including classroom instruction, computer-based training (CBT), and on-the-job (OTJ) training. To ensure consistency and that all requirements are being met, external courses (e.g., 40 Hour HAZOPWER) including classroom instruction and CBT should be evaluated and approved by the Corporate Health and Safety Director or a designee (e.g., Divisional or Regional H&S

Manager). Local, regional or divisional H&S staff will be able to assist in identifying qualified external vendors when the need arises.

H. Internal training course schedules will be posted on the Health and Safety intranet site at http://healthandsafety.com/ .

I. URS staff is expected to be familiar with applicable training requirements. In addition to the corporate training tracking. Staff members are expected to track their own progress toward meeting those requirements.

5. Documentation Summary

A. Those courses shown in Table 1 will be tracked in a corporate training database. These courses were selected for a variety of reasons including:

1. Audits/compliance checking
2. Written certification requirements
3. Easy access to qualified individuals for project/office staffing purposes

B. All training must be documented using Training Attendance form (Attachment 55-2) and Course Agenda. Minimum course agenda requirements include:

- Type of course
- Course date
- Course location
- Topics covered
- Length of time covered for each topic
- Course duration (start / end times)
- Instructor(s) name

C. For client/vendor provided training, training documentation must include:

- Copy of the attendee's course certificate
- Course agenda

D. Divisional H&S Managers will ensure the course agenda meet regulatory/company requirements. The Corporate H&S Training Coordinator will then enter attendance records in the corporate training database.

E. Original attendance sheets, agendas, and any completed tests will be sent to the Corporate H&S Training Coordinator. These should be filed by course then by date for easy access/auditing.

F. Locations/projects will maintain records on any project or location specific training requirements such as fire extinguisher training, project H&S plan training, and chemical hygiene program (laboratory safety) training. They may optionally elect to maintain copies of attendance records for courses also being tracked corporately.

G. For courses requiring certification, certificates will be issued by the Corporate Health and Safety Director, unless the certificate is issued by a vendor or client. Under those conditions a copy of the certificate must be provided to the Corporate H&S Training Coordinator (along with course content information and sign in sheets).

H. Managers (local, regional, project) can access the information for staffing and compliance purposes through the Divisional H&S Managers or Corporate H&S Training Coordinator. Divisional H&S Managers will have "read only" access to the corporate training database.

6. References

The following are sites that provide additional information to assist you in identifying training requirements.

A. OSHA website training section (U.S. Regulatory Requirements)
http://www.osha-slc.gov/Training/

B. National Occupational Health and Safety Commission (Australia)
http://www.nohsc.gov.au/work/education/index.htm

C. European Agency for Safety and Health at Work
http://europe.osha.eu.int/training/

D. Additional Training Requirements Evaluation - Attachment 55-1

E. Training Attendance Form - Attachment 55-2

URS	Health and Safety Program ADDITIONAL H&S TRAINING EVALUATION	Attachment 55-1

Name ____________________ Location ____________________ Date ______________

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required ✓	Comments
Asbestos Inspector	Y	Annual	You perform asbestos sampling tasks.		Not offered in-house
Asbestos Planner	Y	Annual	You serve as the project asbestos planner.		Not offered in-house
Confined Space Entry	Y	Once	You perform confined space entry/authorizer/attendant duties (including anyone performing non-entry rescue activities).		Tracked in corporate database.
Confined Space Refresher	N	As needed	Recommended if you perform entry activities.		
Confined Space Rescuer	Y	Once	You may have to enter a confined space to perform a rescue		Not offered in-house. Tracked in corporate database.
Construction Safety OSHA 500		Once	Recommended if you are a Supervisor and/or Safety Officers at Construction Sites		Tracked in corporate database.
Emergency Action Plan	Y	Once	You are assigned to and at least occasionally work at a fixed facility in the US. This should be covered in EHS Orientation.		For field/site personnel this will be covered in project/site safety training.
Excavations/Trenching Awareness	Y	Once	You work at sites where excavation/trenching tasks are performed.		Covered in HAZWOPER and Field Safety
Excavations/Trenching Competent Person	Y	Once	You are or may be designated as a competent person (educational background and experience may allow for grand-fathering)		Tracked in corporate database.
Fall Prevention/Protection	Y	Once	You supervise tasks or perform tasks at heights (on roofs, scaffolding, ladders, unfinished flooring).		Tracked in corporate database.
Fire Extinguisher	Y	Annual	You may be expected to use fire extinguishers (fixed facilities and project sites)		
Powered Industrial Trucks (Forklifts)	Y	Once	Your job assignments includes operating a powered industrial truck (forklift)		Required more frequently if required assessments indicate the need.
General Industry Safety	N	Once			See Field Safety

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required ✓	Comments
H&S Issue for Project Managers	N	Once	Required if you manage projects with field work.		Will be offered as part of PM Training
Hazard Communication	Y	Once	You work with or around hazardous materials in a US facility (includes URS facilities and client facilities)		Tracked in corporate database. Typically included in H&S Orientation.
HAZWOPER HazMat Team	Y	Once	Emergency Response Team Members (First Responders Operations Level, HazMat Technicians and Incident Commanders)		Tracked in the corporate training database.
Hearing Conservation	Y	Annual	Employees exposed to noise at or above 85 decibels averaged over an 8 hour day.		Covered in HAZWOPER Refresher and Field Safety
Injury/Illness Prevention	Y	Once	You are assigned to CA offices		Covered in CA office H&S Orientation.
Laboratory Safety	Y	Once	You work in a fixed or mobile wet chemistry lab.		
Lead Inspector	Y		You are a project lead inspector.		Not offered in house.
Lead Planner	Y		You are a project lead planner.		Not offered in house.
Lockout/Tagout	Y	Once	You work with and around equipment that may need to be locked out/tagged out. (You are not responsible for applying tags/locks)		General awareness covered in HAZWOPER and Field Safety
Nuclear Density Gauge Operator	Y	Once	You operate nuclear density gauges		
Radiation Safety Officer	Y	Once	You are designated as a Radiation Safety Officer		
SCBA/Cascade Systems	Y	Once	Required for any employee required to wear SCBAs or to operate a supplied air system.		Part of Project H&S training as needed.
Shipping Specialist	Y	Once	You are designated as a Shipping Specialist and/or are a Regional H&S Manager.		Updates are required as regulations change. Tracked in the corporate training database.
Substance Specific	Y	Once	Any employee potentially exposed to a substance covered by the 29 CFR substance specific regulations. SMS 050.		Includes lead, asbestos, benzene, etc.
Waste Awareness	Y	Annual	You generate, handle or manage hazardous waste at a fixed facility or		Updates/refreshers can be part of Project H&S

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required ✓	Comments
			field project.		training.
Waste Specialist	Y	Once with Annual Refresher	You are responsible for waste management at a small or large quantity generator facility.		
Welding/Brazing/ Cutting	Y		You job duties include these activities		
WHMIS	Y		You are assigned to a Canadian facility and work with or around hazardous materials.		Canadian "HazCom"

URS	Health and Safety Program EXAMPLE TRAINING ATTENDANCE FORM	Attachment 55-2

OCCUPATIONAL SAFETY AND HEALTH TRAINING

ATTENDANCE RECORD

DATE: ______________________ **PAGE**_____ **OF**______

LOCATION: ______________________

TYPE OF COURSE: ______________________

INSTRUCTOR SIGNATURE: ______________________

Name (print legibly)	Signature	Company/Location	Social Security Number
Sophia Miller	*Sophia Miller*	URS - Pittsburgh	999-02-4581

(SSN - Social Security Number requested for training database use <u>only</u>. Information will be kept confidential.)

URS SAFETY MANAGEMENT STANDARD

Drilling Safety Guidelines

1. Applicability

This program applies to URS projects in which truck-mounted, or other engine powered, drill rigs are used. It is applicable to URS employees and URS owned rigs. For drill rigs operated by contractors, the primary responsibility for drilling safety is with the drilling contractor.

2. Purpose and Scope

The purpose of these guidelines is to provide an overview for working safely around drilling operations with truck-mounted and other engine-powered drill rigs. The procedure addresses off-road movement of drill rigs, overhead and buried utilities, use of augers, rotary and core drilling, and other drilling operations and activities.

3. Implementation

Field Activities — Drill rig safety and maintenance is the responsibility of the drill rig operator. URS employees are responsible for their own safety including recognizing and avoiding drill rig hazards. URS employees that observe a drill rig condition believed to be unsafe shall advise the drill rig operator of the unsafe condition.

4. Safety Guidelines

A. General Guidelines

URS technicians, geologists, engineers, or other field staff assigned to observe drilling operations or collect soil samples should observe the following guidelines:

- Require a meeting at project start-up regarding the drill rig operator responsibility for rig safety and any site and equipment specific safety requirements
- Set up any sample tables and general work areas for the URS field staff to the side of the drill rig (preferably 10 meters away) and not directly behind the rig.
- URS engineers, technician, and geologists shall not assist the drillers with the drilling equipment or supplies and shall not at any time operate the drill rig controls.

B. Movement of Drill Rigs

Before moving a rig, the operator must do the following:

- To the extent practical, walk the planned route of travel and inspect it for depressions, gullies, ruts, and other obstacles.
- Check the brakes of the truck/carrier, especially if the terrain along the route of travel is rough or sloped.
- Discharge all passengers before moving on rough or steep terrain.
- Engage the front axle (on 4x4, 6x6, etc. vehicles) before traversing rough or steep terrain.

Driving drill rigs along the sides of hills or embankments should be avoided; however, if side-hill travel becomes necessary, the operator must conservatively evaluate the ability of the rig to remain upright while on the hill or embankment. The possibility must be considered that the presence of drilling tools on the rig may reduce the ability of the rig to remain upright (raises the center of mass of the rig).

Logs, ditches, road curbs, and other long and horizontal obstacles should be normally approached and driven over squarely, not at an angle.

When close lateral or overhead clearance is encountered, the driver of the rig should be guided by another person on the ground.

Loads on the drill rig and truck must be properly stored while the truck is moving, and the mast must be in the fully lowered position.

After the rig has been positioned to begin drilling, all brakes and/or locks must be set before drilling begins. If the rig is positioned on a steep grade and leveling of the ground is impossible or impractical, the wheel of the transport vehicle should be blocked and other means of preventing the rig from moving or topping over employed.

C. Buried and Overhead Utilities

The location of overhead and buried utility lines must be determined before drilling begins, and the locations should be noted on boring plans and/or assignment sheets.

When overhead power lines are close by, the drill rig mast should not be raised unless the distance between the rig and the nearest power line is at least 20 feet (7 meters) or other distance as required by local ordinances, whichever is greater. The drill rig operator or assistant should walk completely around the rig to make sure that proper distance exists.

When the drill rig is positioned near an overhead line, the rig operator should be aware that hoist lines and power lines can be moved towards each other by wind. When necessary and approved by the Project

Manager (PM), the utility and/or power lines may be shielded, shut down, or moved by the appropriate personnel.

For additional information, please refer to SMS #34 "Utility Clearances and Isolation".

D. Clearing the Work Area

Before a drill rig is positioned to drill, the area on which the rig is to be positioned should be cleared of removable obstacles and the rig should be leveled if sloped. The cleared/leveled area should be large enough to accommodate the rig and supplies.

E. Safe Use of Augers

Never place hands or fingers under the bottom of an auger flight or drill rods when hoisting the augers or rods over the top of another auger or rod in the ground or other hard surfaces, such as the drill rig platform.

Never allow feet to get under the auger or drill rod while they are being hoisted.

When the drill is rotating, stay clear of the drill string and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.

Move auger cuttings away from the auger with a long-handled shovel or spade; never use hands or feet.

Never clean an auger attached to the drill rig unless the transmission is in neutral or the engine is off, and the auger has stopped rotating.

Do not wear loose clothing or jewelry while working near the drill rig. Long hair must be pulled back to avoid entanglement with moving parts.

Hearing protection is required when working near an operating drill rig.

F. Safe Use of Hand Tools

Regulations regarding hand tools should be observed in addition to the guidelines provided below:

- Each tool should be used only to perform tasks for which it was originally designed.
- Damaged tools should be repaired before use or discarded.
- Safety goggles or glasses should be worn when using a hammer or chisel. Nearby co-workers and by-standers should be required to wear safety goggles or glasses also, or move away.

- Tools should be kept cleaned and stored in an orderly manner when not in use.

G. Safe use of Wire Line Hoists, Wire Rope, and Hoisting Hardware

Safety rules described in Title 29 Code of Federal Regulations (CFR) 1926.552 and guidelines contained in the Wire Rope User's Manual published by the American Iron and Steel Institute shall be used whenever wire line hoists, wire rope, or hoisting hardware are used. The driller should provide written reports (upon request) documenting inspections of equipment.

H. Traffic Safety

Drilling in streets, parking lots or other areas of vehicular traffic requires definition of the work zones with cones, warning tape, etc. and compliance with local police requirements.

I. Fire Safety

- Fire extinguishers (type ABC) shall be kept on or near drill rigs for fighting small fires.
- If methane or other flammable gases or vapors are suspected in the area, a combustible gas indicator (CGI) shall be used to monitor the air near the borehole with all work to stop at 20 percent of the Lower Explosive Limit (LEL).
- Work shall stop during lightning storms.

J. Protective Gear

1. Minimum Protective Gear

Items listed below should be worn by all staff working within 30 feet (10 meters) of drilling activities.

- Hearing Protection;
- Hard Hat;
- Eye Protection (safety glasses, goggles, or face-shield)
- Safety Shoes (shoes or boots with steel toes)

2. **Other Gear**

Items listed below should be worn when conditions warrant their use. Some of the conditions are listed after each item.

- **Safety Harnesses and Lifelines:** Safety harnesses and lifelines shall be worn by all persons working on top of an elevated derrick beam or mast. The lifeline should be secured at a position that will allow a person to fall no more than six feet (2 meters). OSHA Fall Protection (1926 Subpart M) requirements apply.
- **Life Vests**: Use for work over water.

5. Resources

A. International Association of Drilling Contractors Safety Alerts
http://iadc.org/alerts.htm

B. Fall Protection - SMS 040

C. Hearing Conservation - SMS 026

D. Subcontractor Health and Safety Requirements - SMS - 046

E. Utility Clearances and Isolation - SMS 034

URS SAFETY MANAGEMENT STANDARD
Vehicle Safety Program

1. Applicability

This procedure applies to URS Corporation domestic U.S. operations.

2. Purpose and Scope

The purpose of this procedure is to reduce the risk of injury to URS employees and control liability related to vehicle accidents.

This SMS applies to employees operating motor vehicles that are owned, rented or leased by the Company, and the use of personal vehicles while on company business.

This SMS does not apply to heavy equipment operations (see SMS 019).

3. Implementation

The overall responsibility for program implementation is with the URS Health and Safety Director. Other responsibilities include:

Administration - Fleet management, vehicle acquisition, insurance, claims reporting, controlling access to vehicles, maintenance of vehicles, participating on accident review committee.

Human Resources - Documentation of driver's license, discipline.

Health and Safety - Employee safety training, maintenance of the vehicle safety program, participation on the accident review committee.

Employee - Familiarization with URS Vehicle Safety Program, compliance with its requirements.

4. Requirements

A. Authorized Drivers

1. Authorized Drivers are those individuals permitted to drive URS owned, leased, or rented vehicles. Employees that only operate rental cars obtained on a daily basis through URS National Service Agreements are not required to be designated as Authorized Drivers.

2. Must be at least 18 (non-commercial license) or 21 (commercial license) years of age and have a current driver's license for the appropriate class of vehicle (unless more stringent requirements are established by the leasing/renting agency).

3. Human Resources and Office Administrators requires new employees and current employees (on an annual basis), designated as Authorized Drivers, to provide a copy of their driver's license. Authorized drivers who lose their license through legal action must notify their Human Resources

Representative immediately. The Human Resources Representative will notify the Fleet Manager.

4. The Company may suspend the privilege to operate vehicles on Company business due to non-compliance with the URS Vehicle Safety Program, involvement in a motor vehicle accident, or motor vehicle violations.

5. Authorized drivers must review the Vehicle Safety Program (SMS 057) and sign the Drivers Information form (Attachment 57-2).

6. Non-URS employees (e.g., subcontractors, alliance partners) may operate URS vehicles only when this activity is specifically agreed to in the applicable contract.

B. Training

1. Authorized Drivers shall be provided basic driver safety training, including a review of the URS Vehicle Safety Program (SMS 057) and video or on-line training, within 6 months of the effective date of this SMS or within 3 months of their hire date.
2. The Accident Review Committee may require additional training for select employees based on accident involvement.

C. General Operating Policy and Procedure (Applies to Authorized and Non-Authorized Drivers Operating Motor Vehicles on Official Company Business)

1. Company owned/rented/leased motor vehicles may be operated only by properly licensed employees who are specifically authorized to drive company vehicles.
2. Authorized drivers required to operate vehicles with special hazards (i.e. trucks carrying fuel cells, vehicles used to tow trailers, vehicles with limited visibility, etc.) shall be thoroughly briefed on the hazards and control measures necessary for safe operation of the vehicle. The local office shall maintain documentation of the briefing.
3. Drivers/operators shall know and obey all federal, state and local motor vehicle laws applicable to the operation of their vehicle.
4. A driver shall not permit unauthorized persons to operate a Company-owned/rented/leased vehicle.
5. URS policy regarding reimbursement and insurance coverage requirements for use of personal automobiles may be found in the Policy and Procedures Manual (Section 074.020).
6. Cell phone use while driving requires use of a hands-free device (e.g., headset or speakerphone), the vehicle must be stopped when the operator performs an activity that requires diverting attention from the operation of the vehicle (i.e. dialing calls).

7. Company owned/rented/leased vehicles are for official business use only and are not to be used for personal activities.
8. Seat belts and shoulder harnesses (occupant restraint systems) shall be worn or used whenever the vehicle is in operation. The vehicle may not move until all passengers have fastened their restraints.
9. When parking or leaving a vehicle, the following procedures must be followed: Shut off the engine, engage the transmission in park (automatic transmission) or first gear (standard transmission), set the parking brake, remove the ignition keys, and lock the vehicle.
10. The vehicle's engine is to be turned off during refueling. Smoking or cell phone use is not allowed while refueling.
11. Drivers/operators will not drive or operate vehicles while under the influence of alcohol or illegal drugs. Further details on the URS Substance Abuse Policy may be found in the Policy and Procedure Manual (section 034.030).
12. Drivers/operators will not drive or operate vehicles while under the influence of medications when told by a physician, another healthcare provider, or the manufacturer (i.e. instructions on the label) that the activity is unsafe.
13. Vehicle operators are responsible for any fines levied by law enforcement agencies for the operation of their vehicles.
14. Articles, tools, equipment, etc. placed in vehicles shall be stored as not to interfere with vision or the proper operation of the vehicle in any way. This also includes preventing items from flying about or out of the vehicle during sudden stops, turning, etc.
15. Trucks or vehicles with obstructed rear-view mirrors must observe the following procedures when backing up: Position an employee to act as a spotter at the rear of the vehicles, in the driver's line of sight, to ensure that the are behind the truck is clear. If no other employee is present, then the driver must step out of the vehicle and check the area behind the vehicle before backing up. As an added precaution, avoid backing up whenever possible.
16. Driver/operators may not deactivate or muffle any backup warning device.
17. All cargo extending 4 feet or more beyond the end of a truck, trailer or similar vehicle shall be clearly marked with a red warning flag or cloth measuring no less than 16 inches square. Red lights must be used at night.

D. Field Site Vehicle Safety

1. Define specific vehicle travel routes and parking areas at field sites. Use fencing, cones or other markings to define roads and parking.
2. If parking on the shoulder of an active road, park as far off the road as possible.

3. If work is required alongside an active road (e.g., surveying) park the vehicle behind the area of work to provide a barrier against out-of-control vehicles.

4. URS will not transport DOT-placard quantities of hazardous materials. However, small quantities of hazardous materials (e.g., sample coolers) may be transported if properly packaged. Be careful to prevent chemical contamination of the vehicle. Further details on DOT shipping may be found in the DOT Shipping SMS 048.

5. Nuclear density meters (e.g.,Troxler units) may be transported only by employees who have been trained in the use of nuclear density meters (see SMS 044). Nuclear density meters must be secured from movement and locked during transport. NRC and state-specific regulations regarding transport documentation also apply.

6. When performing fieldwork requiring the blocking of traffic lanes (e.g., bridge inspection), follow URS SMS 032, the Manual on Uniform Traffic Control Devices for Streets and Highways (ANSI D6.1) and local police requirements for barriers, cones, and flaggers.

7. No employee may ride in the bed of a pickup truck unless seating and restraints are provided for this specific use.

E. Accident Response and Reporting

1. In case of injury, call or have someone else call, 9 1 1 immediately for emergency assistance. If you are involved in an accident and are not injured, do the following:

   a. Protect the accident scene

   b. Do not admit liability or place any blame for the accident

   c. Provide only your name, address, driver's license number, and vehicle insurance information.

   d. Obtain the following:

      i. name(s), addresses, and telephone number(s) of the owner

      ii. driver and occupants of other vehicle(s)

      iii. the owner's insurance company

      iv. driver's license number

      v. year, make, model and license number of the vehicle(s)

      vi. name(s) and addresses of any witnesses

   e. **DO NOT:**

      - Call the insurance company; the Fleet Manger's office will do this (unless the incident involves your personal vehicle)

      - Give a statement to the press

- Give a signed statement to the claims adjuster representing the other driver's insurance company

NOTE: The Auto Claim Report (Attachment 57-1) for Company-leased or owned vehicles is located in the vehicle glove compartment. The driver must complete this form at the scene of the accident and submit it to management.

2. Notification

All accidents with a Company-leased, rented, or owned vehicle must be reported to your Office/Branch Manager/Supervisor and Fleet Manager within 24-hours of the time it occurs. Use the Auto Claim Report (Attachment 57-1) for this purpose. The Fleet Administrator will report the accident to the insurance carrier (leased and owned vehicles only) within 48 hours of when it occurred.

F. Accident Review Committee

1. The Fleet Manager will review all accidents involving URS-owned, rented or leased vehicles. Accidents involving any of the following will result in immediate disciplinary action in coordination with Human Resources:
   a. Driving under the influence of alcohol or illegal drugs
   b. Reckless driving
   c. Driving without a license
   d. Hit-and-run driving
   e. Repeat accidents involving the same employee,
   f. Unauthorized use of company vehicles.
2. Disciplinary action includes possible:
   a. Loss of URS driving privileges
   b. Additional driver safety training
   c. Suspension without pay
   d. Termination
3. The Accident Review Committee will review those accidents referred by the Fleet Manager or by employees appealing disciplinary action.
4. The Accident Review Committee will include one representative from each of the following:
   a. Corporate Administration
   b. Corporate Health and Safety
   c. Corporate Human Resources
   d. Operations

G. Inspection

1. The driver is responsible for inspecting the vehicle prior to use and not driving a vehicle with obvious safety defects.
2. Basic safety checks must include:
    a. Tire condition/pressure
    b. Lights/turn signals
    c. A clean windshield and adequate window washer fluid
    d. Gauges/warning lights indicating a normal condition
    e. Mirrors properly adjusted
    f. Brakes with adequate pedal pressure for proper braking
3. Any defects must be reported to the local office Fleet Representative/Office Administrator.

H. Vehicle Maintenance

1. The Office Administrator (or designee) is to ensure that all URS-leased/owned vehicles are properly maintained.
2. Routine maintenance must be performed in accordance the schedule provided in the owner's manual stored in the vehicle.
3. Reported defects/problems with vehicles must be repaired promptly.

5. Documentation Summary

A. Auto Claim Report - (Attachment SMS 57-1)

B. Driver's Information - (Attachment SMS-57-2)

6. References

The following sites provide additional information to assist you:

A. National Safety Council; Information on Defensive Driving Courses
http://www.nsc.org/psg/ddc.htm

B. AAA Foundation for Traffic Safety
http://www.aaafts.org/

URS	Health and Safety Program **AUTO CLAIM REPORT**	Attachment 57-1

To be used for <u>all</u> vehicle accidents involving URS-leased/rented/owned vehicles and for personal vehicles used on company business.

Name of Employee Involved in Accident ______________________

Office Location ______________________

Contact Person ______________________

Phone Number ______________________

Fax Number ______________________

Company Vehicle ❑ On Company business at the time of accident? Yes ❑ No ❑

Personal Vehicle ❑ Vehicle Identification Number (company or personal):

Rental Vehicle ❑ ______________________

Year ________ Make ________ Model ________

Other Driver's Information

Name ______________________ Phone Number ______________

Address ______________________

____

Description of Accident

Date of Accident ______________ Police Report # ______________

Location of Accident ______________ Police Department ______________

Description (provide a clear, inclusive description of the accident):

____

____

____

____

____

____

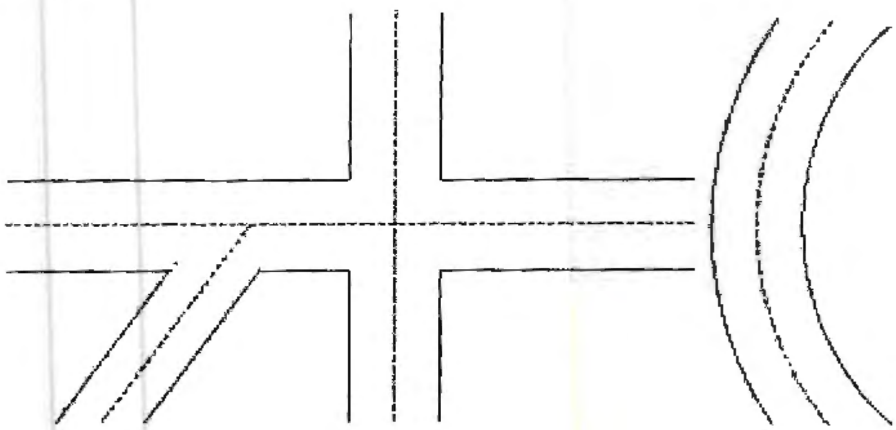
____

Accidents should be reported immediately to the Office Administrator who will then forward the information to:

ALL ACCIDENTS WILL BE REPORTED TO:
URS Corporation
Kay Tenuta in the Tampa, FL. Office.
813-636-2196, 813-636-2111 (Fax)

URS	Health and Safety Program AUTO CLAIM REPORT	Attachment 57-1

Draw a diagram showing the position of vehicles before and after the accident. Correct the diagram to fit your situation.



Check all applicable conditions on each subject

WEATHER
- ❑ Clear
- ❑ Cloudy
- ❑ Fog
- ❑ Rain
- ❑ Snow
- ❑ Sleet
- ❑ Other

LIGHTING
- ❑ Daylight ❑ Dark
- ❑ Dusk ❑ Dawn
- ❑ Dark - no street lights on
- ❑ Dark - street lights on
- ❑ Headlights
- ❑ Headlights on dim
- ❑ Headlights on bright
- ❑ No lights on

ROAD SURFACE
- ❑ Dry
- ❑ Wet
- ❑ Muddy
- ❑ Snowy
- ❑ Snow-covered
- ❑ Ice in places
- ❑ Ice -covered
- ❑ Other

ROAD DESCRIPTION
- ❑ Straight ❑ Curve
- ❑ Level
- ❑ Hill ❑ Up ❑ Down
- ❑ Paved ❑ Black top
- ❑ One-way
- ❑ Two-way
- ❑ Divided road
- ❑ Intersection

ACTION OF DRIVER	You	Other
Exceeding safe speed		
On wrong side of street		
Did not have right-of-way		
Disobeyed traffic signal		
Passed illegally		
Improper turning		
Improper backing		
Following too closely		
Failure to signal		
Improper lane change		
Misjudged clearance		
Other		

What was speed limit?

________ MPH

Witnesses?

❑ Yes ❑ No

Traffic control
- ❑ Signal lights
- ❑ Caution lights
- ❑ Stop sign
- ❑ Police officer
- ❑ None ❑ Other

Witness Name ____________________

Address ____________________

____

Name ____________________

Address ____________________

____

URS	**DRIVERS INFORMATION**	Attachment 57-2

Policy

All Company employees who operate a vehicle on company business must comply with the URS Vehicle Safety Program (SMS 57).

License

I authorize URS or its agents to verify any driving information necessary to determine if I meet the Acceptable Driving Criteria, as established in the Safety Program, and the requirements of Section 391.23 of the Federal Motor Carrier Safety Regulations.

I agree to notify URS Administration immediately if my driver's license is suspended or revoked.

Please Print Legibly

Name ______________________________ Social Security Number ________________________

License Number __________________________ State ______________ Class ______________

Employee Signature ______________________________________ Date ________________

If you, the prospective employee, do not have a current valid driver's license, withhold the above information, or do not meet the Company's Acceptable Driving Criteria, you will not be allowed to drive any Company vehicles or to drive your own vehicle on Company business.

(Attach the applicant's driver's license to this space and photocopy this sheet. All information on the license must be legible after photocopying.)

URS SAFETY MANAGEMENT STANDARD

Cold Stress

1. Applicability

This procedure applies to URS projects where field crews are working outdoors in damp and cool (below 50° F or 10°C) conditions or anytime temperatures are below 32°F or 0°C.

2. Purpose and Scope

The purpose of this procedure is to protect project personnel from the following conditions:

Hypothermia: Hypothermia results when the body loses heat faster than it can be produced. When this situation first occurs, blood vessels in the skin constrict in an attempt to conserve vital internal heat. Hands and feet are first affected. If the body continues to lose heat, involuntary shivers begin. This is the body's way of attempting to produce more heat, and it is usually the first real warning sign of hypothermia. Further heat loss produces speech difficulty, confusion, loss of manual dexterity, collapse, and finally death. Wet clothes or immersion in cold water greatly increases the hypothermia risk. The progressive clinical presentation of hypothermia may be seen in Attachment 59-1.

Frostbite: Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite can be categorized into:

- **Frost Nip or Initial Frostbite:** (1st degree frostbite) Characterized by blanching or whitening of skin.
- **Superficial Frostbite:** (2nd degree frostbite) Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient. Blistering and peeling of the frozen skin will follow exposure.
- **Deep Frostbite:** (3rd degree frostbite) Tissues are cold, pale, and solid; extremely serious injury with possible amputation of affected area.

Frostbite can occur without hypothermia when the extremities do not receive sufficient heat. The toes, fingers, cheeks, and ears are the most commonly affected. Frostbite occurs when there is freezing of the fluids around the cells of the affected tissues. The first symptom of frostbite is an uncomfortable sensation of coldness, followed by numbness. There may be tingling, stinging, or cramping. Contact by the skin with tools or other metal objects below 20°F (-7°C) may result in contact frostbite.

3. Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager and the field supervisor.

4. Requirements

A. Carefully plan work anticipated to be performed in cool or cold conditions. Include costs in project budgets for specialized equipment and supplies needed to complete the field activities.

B. Monitor weather forecasts immediately prior to entering the field.

C. Observe and monitor weather conditions such as ambient temperature, wind speed, and precipitation while in the field. Use Attachment 59-2 to determine wind chill.

D. Wear at least 3 layers of clothing.

- An outer layer to break the wind and allow some ventilation (e.g., Gortex® or nylon)
- A middle layer of down, wool, or similar materials to provide insulation
- An inner layer of cotton or synthetic weave to allow ventilation

In addition:

- Wear a hat. Up to 40% of body heat can be lost when the head is left exposed.
- Wear insulated boots or other insulated footwear.
- Keep a change of dry clothing available in case work clothes become wet.
- Do not wear tight clothing. Loose clothing allows better ventilation.

E. Use the following work practices:

- Use Attachment 59-3 to establish work/rest cycles in cold weather.
- Drink plenty of warm liquids. It is easy to become dehydrated in cold

weather.

- Avoiding caffeine and alcohol. Alcohol will accelerate loss of body heat.
- Eat high calorie snacks to help maintain body metabolism.
- If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold.
- Work in pairs to keep an eye on each other and watch for signs of cold stress.
- NEVER IGNORE SHIVERING. Persistent or violent shivering is a clear warning that you are on the verge of hypothermia.
- Avoid exhaustion.

F. When possible, use the following engineering controls:

- Provide shelter to escape cold, wind and precipitation
- Provide a source of heat (such as warm packs or portable heaters)
- Use insulating materials on equipment handles when temperatures drop below 30°F or -1°C.

G. Watch for symptoms and signs of hypothermia (see Attachment 59-1).

H. Treat cold stress illness as follows:

- <u>Hypothermia</u>: Prompt treatment of hypothermia is essential. Once the body temperature drops below 95°F or 35°C, the loss of temperature control occurs, and the body can no longer rewarm itself. Initial treatment includes reducing heat loss by moving the individual out of the wind and cold, removal of wet clothing, applying external heat (such as a pre-warmed sleeping bag, electric blanket, or body-heat from other workers) and follow-up medical attention.
- <u>Frost Bite</u>: The initial treatment for frostbite includes bringing the individual to a warm location, removal of clothing in the affected area, and, **if help is delayed**, placing the affected parts in warm (100° to104° F or 38° to 40°C) water. Do not massage or rub the frostbite area. After

the initial treatment, wrap the affected area loosely in sterile gauze and seek medical attention.

For further discussion on Cold Stress treatment, please refer to Attachment 59-1

I. Hypothermia in Water:

Loss of body heat to the water is a major cause of deaths in boating accidents. Often the cause of death is listed as drowning; however the primary cause is often hypothermia. It should also be noted that alcohol lowers the body temperature around two to three degrees by dilating the blood vessels. Do not drink alcohol around cold water. The following table shows the effects of hypothermia in water:

WATER TEMPERATURE	EXHAUSTION	SURVIVAL TIME
32.5° F (0°C)	Under 15 min.	Under 15 to 45 min.
32.5 to 40°F (0 – 4°C)	15 to 30 min.	30 to 90 min.
40 to 50°F (4 – 10°C)	30 to 60 min.	1 to 3 hrs.
50 to 60°F (10 – 16°C)	1 to 2 hrs.	1 to 6 hrs.
60 to 70°F (16 – 21°C)	2 to 7 hrs.	2 to 40 hrs.
60 to 70°F (16 – 21°C)	3 to 12 hrs.	3 hrs. to indefinite
Over 80°F (27°C)	Indefinite	Indefinite

SOME POINTS TO REMEMBER:

- Wear your PFD. Review SMS 053 - Marine Safety and Boat Operations.
- If water is less than 50°F (10°C), wear a wet suit or dry suit for work in water (e.g., wading) or if significant potential to fall in water.
- While in the water, do not attempt to swim unless to reach nearby safety. Unnecessary swimming increases the rate of body heat loss. Keep your head out of the water. This will increase your survival time.

- Keep a positive attitude about your rescue. This will increase your chances of survival.

- If there is more than one person in the water, huddling is recommended.

J. Training

Workers at risk of developing hypothermia or cold-related injury will be trained in:

- recognition of the signs and symptoms of cold injury or impending hypothermia,

- proper re-warming procedures and appropriate first aid treatment,

- proper use of clothing,

- proper eating and drinking practices

- safe work practices appropriate to the work that is to be performed.

5. Documentation Summary

File these records in the Project Safety File.

A. Completed Project Hazard Analysis form (see Health and Safety Website – "Hazard Analysis")

B. Cold stress training records

6. Resources

A. OSHA Fact Sheets – "Protecting Workers in Cold Environments" http://www.osha-slc.gov/OshDoc/Fact_data/FSNO98-55.html

B. Attachment 59-1 "Signs of, and Treatment for, Cold Stress related Illnesses"

C. Attachment 59-2(a) "Wind Chill Index" (units in °F and miles/hour)

D. Attachment 59-2(b) "Wind Chill Index" (units in °C and Kilometers/hour)

E. Attachment 59-3 "TLVs Work/Warm-up Schedule for Outside Workers based on a Four-hour Shift"

Attachment 59-1
Signs of and Treatment for Cold Stress Related Illnesses

Condition	Signs/Symptoms	Treatment
Hypothermia **Mild** (98° - 90° F) (36° - 32°C)	• shivering • lack of coordination • stumbling, fumbling hands • slurred speech • memory loss • pale, cold skin	• move to warm area • stay active • remove wet clothes and replace with dry clothes or blankets • cover the head • drink warm (not hot) sugary drink
Hypothermia **Moderate** (90° - 86° F) (32° - 30°C)	• shivering stops • unable to walk or stand • confused and irrational	• All of the above, plus • Call for an ambulance • Cover all extremities completely • Place very warm objects, such as hot packs or water bottles on the victim's head, neck, chest and groin
Hypothermia **Severe** (86° - 78° F) (30° - 26°C)	• severe muscle stiffness • very sleepy or unconscious • ice cold skin • death	• Call for an ambulance • Treat the victim very gently • Do not attempt to re-warm -- the victim should receive treatment in a hospital
Frostbite	• Cold, tingling, stinging or aching feeling in frostbitten area; numbness • Skin color turns red, then purple, then white or very pale skin, cold to the touch • Blisters in severe cases	• Seek medical attention • Do not rub the area • Wrap in soft cloth • If help is delayed, immerse in warm, not hot, water
Trench Foot	• Tingling, itching or burning sensation • Blisters	• Soak feet in warm water, then wrap with dry cloth bandages • Drink a warm, sugary drink

Source: Princeton University, Department of Environmental Health and Safety, posted 2/2/99.

Attachment 59-2(a)
Wind-Chill Index[1]
(miles per hour and °F.)

	ACTUAL THERMOMETER READING (°F)									
	50	40	30	20	10	0	-10	-20	-30	-40
Wind speed in mph	EQUIVALENT TEMPERATURE (°F)									
calm	50	40	30	20	10	0	-10	-20	-30	-40
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-21	-33	-46	-58	-70
15	36	22	9	-5	-18	-36	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-74	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	-35	-49	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
Over 40 mph (little added effect)	Little Danger (for properly clothed person)				Increasing Danger			Great Danger		
					(Danger from freezing of exposed flesh)					

[1] Source: Fundamentals of Industrial Hygiene, Third Edition. Plog, B.A., Benjamin, G.S., Kerwin, M.A., National Safety Council, 1988

Attachment 59-2(b)
Wind-chill Index[1]
(Kilometers per hour and °C.)

Estimated wind speed	Actual temperature reading (°C)												
	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
(in km/h)	Equivalent chill temperature (°C)												
0 (Calm)	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
8	9	3	-2	-7	-12	-18	-23	-28	-33	-38	-44	-49	-54
16	4	-2	-7	-14	-20	-27	-33	-38	-45	-50	-57	-63	-69
24	2	-5	-11	-18	-25	-32	-38	-45	-52	-58	-65	-72	-78
32	0	-7	-14	-21	-28	-35	-42	-50	-56	-64	-71	-78	-84
40	-1	-8	-16	-24	-31	-38	-46	-53	-60	-67	-76	-82	-90
48	-2	-10	-17	-25	-33	-40	-48	-55	-63	-70	-78	-86	-94
56	-3	-11	-18	-26	-34	-42	-50	-58	-65	-73	-81	-89	-96
64	-3	-11	-19	-27	-35	-43	-51	-59	-66	-74	-82	-90	-98
(Wind speeds greater than 64 km/h have little additional effect.)	LOW HAZARD Risk of exposed, dry skin being affected in less than one hour. Awareness of hazard low.				INCREASING HAZARD Danger from freezing of exposed flesh within one minute.			HIGH HAZARD Flesh may freeze within 30seconds.					

The table was originally developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA, and is adapted from the 1995-1996 *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices,* published by the ACGIH. The ACGIH publication provides the equivalent table with temperature in degrees Fahrenheit and wind speed in mph.

Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36°C (96.8°F).

Attachment-59-3

TLVs Work/Warm-up Schedule for Outside Workers based on a Four-hour Shift*

The ACGIH has adopted the guidelines developed by the Saskatchewan Labour for working outdoors in cold weather conditions. These guidelines recommend protective clothing and limits on exposure time. The recommended exposure times are based on the wind chill factor, a scale based on air temperature and wind speed. The work-break schedule applies to any four-hour period with moderate or heavy activity. The warm-up break periods are of 10-minute duration in a warm location. The schedule assumes that "normal breaks" are taken once every two hours. At the end of a 4-hour period, an extended break (e.g. lunch break) in a warm location is recommended. More information is available in the ACGIH publications "2000 TLVs and BEIs" and "Documentation of TLVs and BEIs" and on the Saskatchewan Labour web page "Cold Conditions Guidelines for Outside Workers".

<table>
<tr><th colspan="2">Air Temperature - Sunny Sky</th><th colspan="2">No Noticeable Wind</th><th colspan="2">5 mph Wind</th><th colspan="2">10 mph Wind</th><th colspan="2">15 mph Wind</th><th colspan="2">20 mph Wind</th></tr>
<tr><td>°C (approx.)</td><td>°F (approx.)</td><td>Max. work Period</td><td>No. of Breaks**</td><td>Max. Work Period</td><td>No. of Breaks</td><td>Max. Work Period</td><td>No. of Breaks</td><td>Max. Work Period</td><td>No. of Breaks</td><td>Max. Work Period</td><td>No. of Breaks</td></tr>
<tr><td>-26° to -28°</td><td>-15° to -19°</td><td colspan="2">(Norm breaks) 1</td><td colspan="2">(Norm breaks) 1</td><td>75 min.</td><td>2</td><td>55 min.</td><td>3</td><td>40 min.</td><td>4</td></tr>
<tr><td>-29°to -31°</td><td>-20°to -24°</td><td colspan="2">(Norm breaks) 1</td><td>75 min.</td><td>2</td><td>55 min.</td><td>3</td><td>40 min.</td><td>4</td><td>30 min.</td><td>5</td></tr>
<tr><td>-32° to -34°</td><td>-25°to -29°</td><td>75 min.</td><td>2</td><td>55 min.</td><td>3</td><td>40 min.</td><td>4</td><td>30 min.</td><td>5</td><td colspan="2" rowspan="5">Non-emergency work should cease</td></tr>
<tr><td>-35° to -37°</td><td>-30° to -34°</td><td>55 min.</td><td>3</td><td>40 min.</td><td>4</td><td>30 min.</td><td>5</td><td colspan="2" rowspan="4">Non-emergency work should cease</td></tr>
<tr><td>-38° to -39°</td><td>-35° to -39°</td><td>40 min.</td><td>4</td><td>30 min.</td><td>5</td><td colspan="2" rowspan="3">Non-emergency work should cease</td></tr>
<tr><td>-40° to -42°</td><td>-40°to -44°</td><td>30 min.</td><td>5</td><td colspan="2" rowspan="2">Non-emergency work should cease</td></tr>
<tr><td>-43° & below</td><td>-45° & below</td><td colspan="2">Non-emergency work should cease</td></tr>
</table>

*2000 TLVs and BEIs - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati : American Conference of Governmental Industrial Hygienists (ACGIH), 2000 - page 176. Adopted from Saskatchewan Labour "Cold Conditions Guidelines for Outside Workers"

FIELD SAMPLING PLAN
(FSP)
The Closed Alumax Extrusions, Inc. Facility
Dunkirk, NY

TABLE OF CONTENTS

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1.0 INTRODUCTION

This Field Sampling Plan (FSP) is designed to provide detailed procedures for the field activities outlined in the Work Plan for the Site Investigation (SI) at the closed Alumax Extrusion, Inc. Facility (the site), 320 South Roberts Road, Dunkirk, New York. It will serve as the field procedures manual to be strictly followed by all URS personnel. Adherence to these procedures will ensure the quality and defensibility of the data collected in the field. Previous site work performed as part of the site assessment activities also conformed to the general field practices presented in this FSP. In addition to the field procedures outlined in this document, all personnel performing field activities must do so in compliance with: (1) the scope of work and schedule, outlined in Work Plan; (2) the procedures outlined in the Quality Assurance/Quality Control Plan; (3) the appropriate Health and Safety guidelines found in the Health and Safety Plan.

2.0 MOBILIZATION

A temporary equipment decontamination pad will be constructed on site to decontaminate drilling equipment. Decontamination fluids and investigation-derived wastes will be stored in drums. The drums will be placed on pallets covered with plastic sheeting near the decontamination area.

Proposed soil boring and sampling locations will be marked with paint or staked, labeled, and flagged prior to drilling. Utilities in areas designated for intrusive activities will be cleared through the Underground Facilities Protective Organization (UFPO).

3.0 SUBSURFACE INVESTIGATION

3.1 General Drilling Program

The subsurface investigation program will provide information that will assist in geologic, geotechnical, hydrogeological, and chemical site interpretations. Soil borings and monitoring wells will be advanced/installed as part of the subsurface program. Geoprobe® soil borings will be advanced at the proposed locations as indicated in the work plan. Borings will be advanced to bedrock estimated to be less than 10 feet below ground surface (ft-bgs), at the proposed boring locations. Four water table and three bedrock wells will be installed at the locations identified in the work plan.

Required investigation and well installation procedures are discussed in the following sections:

- Geoprobe® direct push procedure (Section 3.2)
- Well Installation Procedures (Section 3.3)
- Disposal of drill cuttings (Section 3.4)
- Well development procedures (Section 3.5)
- Documentation (Section 3.6)

3.2 Geoprobe® Direct Push Procedure

Procedure

1) Inspect the sampling equipment to ensure proper working condition.

2) Select additional components for the sampler as required (i.e., leaf spring core retainer for clays, or a sand trap for non-cohesive sands).

3) Lower the sampler to the ground surface, or bottom of the hole previously made by the sampler, and check the depth against length of the rods and the sampler.

4) Attach the drive head assembly to the sample rods.

5) Push the sampler in 4-foot increments into the subsurface up to the desired depth with a hydraulic press.

6) Rotate the sampling rods clockwise and remove the sampler.

7) Sample selection will conform to the program and specifications set forth in the Work Plan. Extrude the sample, describe the soil, and collect any necessary samples into appropriate containers and label the containers (Section 7.0). Samples will be collected for chemical analysis (Section 3.2.2) from each boring based on the criteria presented in the work plan.

8) Document all soil descriptions and sample information in the field notebook.

9) Sample containers will be labeled as described in Section 7.0 and shipped to the laboratory under the chain-of-custody as described in Section 8.0

10) Abandon the Geoprobe® hole by backfilling with bentonite pellets and hydrate with potable water. Concrete or asphalt patch may be used to restore the original surface materials.

3.2.1 Geoprobe® Sample Screening Procedures

Soil cores will be characterized in discrete 2-foot increments. For each depth increment, the soil will be visually characterized for textural classification by the Unified Soil Classification System (USCS), and screened with a photoionization detector/flame ionization detector (PID/FID). Procedures for these field techniques are described in section 3.2.3 for USCS classification, and below for the PID/FID screening.

Procedure

1) Follow procedure for Geoprobe® sampling (Section 3.2) up to step 7.0.

2) Cut acetate macrocore liner open.

3) Slowly scan the soil core with the PID/FID.

4) For each 2-foot increment record the reading in the field notebook.

5) Divide the soil core in 2-foot increments.

6) Classify the soil core by USCS and record in the field notebook.

3.2.2 Soil Sampling Procedures for Chemical Analysis

Subsurface soil samples will be collected from four Geoprobe® soil boring locations to determine the extent of soil at the site. Eight soil samples will be collected from four Geoprobe® borings. All samples will be analyzed for TCL VOCs, TCL SVOCs, and TPH metals. Soil samples from each boring will be field-screened with a PID/FID and described using a detailed soil classification system (Section 3.2.3). The zone exhibiting the highest organic vapor readings on a field photo ionization detector (PID) and degree of staining will be sampled for analysis from each boring. Absent any visual staining or elevated organic vapor readings, two soil samples will be submitted for analysis (one from the top 2 inches of soil and one from the interval just above bedrock.

Procedure

1) Follow procedure for Geoprobe® sampling (Section 3.2) up to Step 7.

2) Scan the soil core with the PID/FID and record the readings. Inspect the soil core closely for olfactory evidence of contamination including staining, and sheen.

3) After selecting which soil macro-core to sample, collect the sample for VOCs first using an Encore® sampler. Fill the container directly from the soil core without mixing. Label the sample jars as described in Section 7.0.

4) Other chemical fractions (i.e., SVOCs, PCBs, TAL metals) will be composited into a stainless-steel mixing bowl and placed into the appropriate sample bottles.

5) Secure cap onto each bottle and place the samples on ice in a cooler for transport/shipment to the laboratory (Section 8.0).

6) Label the sample bottles with the appropriate tag and complete all chain-of-custody documents.

7) Decontaminate sampling equipment after each use as described in Section 6.0.

8) Record all field data in the field notebook.

3.2.3 Unified Soil Classification System (USCS)

Soils are classified for engineering purposes according to the USCS adopted by the United States Army Corps of Engineers and United States Department of the Interior Bureau of Reclamation. Soil properties which form the basis for the USCS are:

- Percentage of gravel, sand, and fines
- Shape of the grain-size distribution curve
- Plasticity and compressibility characteristics

According to this system, all soils are divided into three major groups: coarse-grained, fine-grained, and highly-organic (peaty). The boundary between coarse-grained and fine-grained soils is taken to be the 200-mesh sieve (0.074 millimeters). In the field, the distinction is based on whether the individual particles can be seen with the unaided eye. If more than 50 percent of the soil by weight is judged to consist of grains that can be distinguished separately, the soil is considered to be coarse-grained.

The coarse-grained soils are divided into gravelly (G) or sandy (S) soils, depending on whether more or less than 50 percent of the visible grains are larger than the No. 4 sieve (3/16 inch). They are each divided further into four groups:

- W: Well graded; fairly clean (less than 5 percent finer than 0.074 mm)
- P: Poorly graded; fairly clean (less than 5 percent finer than 0.074 mm)
- C: Clayey (greater than 12 percent finer than 0.074mm); plastic (clayey) fines. Fine fraction above the A-line with plasticity index above 7.
- M: Silty (greater than 12 percent finer than 0.074 mm); nonplastic or silty fines. Fine fraction below the A-line and plasticity index below 4.

The soils are represented by symbols such as GW or SP. Borderline materials are represented by a double symbol, as GW-GC.

The fine-grained soils are divided into three groups: inorganic silts (M), inorganic clays (C), and organic silts and clays (O). The soils are further divided into those having liquid limits lower than 50 percent (L), or higher than 50 percent (H). The distinction between the inorganic silts (M), the inorganic clays (C), and organic soils (O) is made on the basis of a modified plasticity chart. Soils CH and CL are represented by points above the A-line, whereas soils OH, OL, and MH correspond to positions below the A-line. Soils ML, except for a few clayey fine sands, are also represented by points below the A-line. The organic soils O are distinguished from the inorganic soils M and C by their characteristic odor and dark color.

3.2.4 Visual Identification

Soil properties required to define the USCS classification of a soil are the primary features to be considered in field identification. These properties and other observed characteristics normally identified in describing a soil are defined below:

- Color
- Moisture conditions
- Grain size
  - Estimated maximum grain size
  - Estimated percent by weight of fines (material passing No. 200 sieve)
- Gradation
- Grain shape
- Plasticity
- Predominant soil type
- Secondary components of soil
- Classification symbol
- Other features such as:
  - organic, chemical, or metallic content
  - compactness
  - consistency
  - cohesiveness near plastic limit
  - dry strength
- source - residual, or transported (aeolian, water borne, glacial deposit, etc.)

3.3 Well Installation Procedures

Wells may be installed using air rotary, coring, and augering techniques, or a combination of these techniques. Water table and deep wells are proposed. The deep wells may be double cased (commonly referred to as telescoping casing) may be used to seal off shallow zones of potential contamination. The shallow or water table wells will be screened at first encountered water and will be single cased. All wells will be logged by a qualified geologist. ASTM "Standard Practice for the Classification of Soils for Engineering Purposes (Unified Soil Classification System) – D 2488 – 00" will be followed for logging the unconsolidated material and are summarized in Section 3.2.3.

The water table wells will be installed using a hollow stem auger to advance the boring to bedrock. Continuous split spoon samples will be collected to log the lithology and environmental conditions encountered. The boring will be advanced into bedrock using either air rotary or coring methods to a total depth of approximately 17 feet for the shallow wells, which is consistent with the previously installed AL-1 and AL-2. Monitoring wells installed on the adjacent property were also completed to this approximately depth.

The bedrock wells will be installed in a similar fashion. However, the shallow zone may be double cased to reduce the potential for cross contamination from the upper unit. The bedrock well installed in the vicinity of AL-1 will be doubled cased to approximately 30 feet below the surface. An outer steel casing will be grouted in place and allowed to set for 24 hours prior to advancing the well to depth, approximately 40 to 60 feet below the surface. The other two bedrock wells will also be double cased, if significant contamination is identified during well installation.

Core samples will be collected from one of the bedrock wells. The core samples will be placed in the core boxes and maintained on the premises until the site investigation is completed. The cores will be logged in accordance with ASTM D2113-99 "Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation." The following will be recorded in the field log book: lithology, color, total recovery, percent recovery, fractures, staining, organic vapor readings, water table, fracture filling, apparent porosity. If air rotary methods are used, the rock chips will be logged. The cuttings, open bore hole, and ambient air will be monitored for organic vapors, which will also be recorded in the field notebook.

The monitoring wells will be constructed of 2-inch, schedule 40, PVC screen, riser, and bottom plug. Screens will be 10-slot PVC and will not exceed 10 feet in length. The sand pack will be appropriately sized for the slot size and extend from the base of the screen to approximately 2 feet above the screened interval. A clay seal will be placed above the sand pack using bentonite pellets. The pellets will be hydrated prior to grouting. The remainder of the well annulus will be grouted using a bentonite cement grout, which will contain approximately 3% bentonite. Depending on the location, the well will be completed with either a flush-mount protective cover or security casing. All monitoring wells will have locking caps. The well will be completed with a concrete pad that slopes away from the wellhead. Each well will be labeled. Wells will be developed in accordance with the well development protocol provided.

Slug tests will be performed on selected wells in accordance with the ASTM Standard D4044-96 "Standard Test Method for (field procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers" and analyzed in accordance with the appropriate ASTM standard method for the aquifer conditions encountered (ASTM Standard D5785-95, D4104-96, ASTM5912-96e1).

3.4 Disposal of Drill Cuttings

Drill cuttings will be disposed of in accordance with New York State Department of Environmental Conservation (NYSDEC) *Technical and Administrative Guidance Memorandum* (TAGM) HWR-89-4032, November 21, 1989.

Procedure

1) Cuttings will be stored/disposed on site in 55-gallon drums.

2) If pure wastes are present in the cuttings, the material shall be sampled and analyzed to ensure chemical compatibility with other cuttings before placing the materials in a common storage or disposal area.

3) Drill cuttings generated near or adjacent to the site will be collected and staged at the site prior to disposal.

4) If materials are found to be hazardous, cuttings will be properly containerized, characterized, and manifested for disposal off site at a properly permitted treatment, storage or disposal facility.

3.5 Well Development Procedures

Following completion of each phase of drilling and well installation, each well will be developed by pumping until the discharged water is relatively sediment free and the indicator parameters (pH, temperature, turbidity, and specific conductivity) have reached steady-state or a minimum of 5 well volumes has been purged, whichever is achieved first. Developing the well not only removes any sediment, but also may improve the hydraulic properties of the formation. The effectiveness of the development measures will be monitored closely to keep the volume of discharged water to the minimum necessary to obtain sediment-free samples. A portable turbidity meter will be used to monitor effectiveness of development. A turbidity reading of less than 50 nephelometric turbidity units (NTUs) and steady-state pH, temperature, dissolved oxygen, and specific conductivity readings will be used as a guide for discontinuing well development.

Procedure

1) Wells will be developed using a pump and high-density polyethylene tubing (HDPE) or bailer until the turbidity is consistently less than 50 NTUs, and the indicator parameters have reached steady-state.

2) Equipment should be assembled, decontaminated (if necessary), and installed in the well. Care should be taken not to introduce contaminants to the equipment during installation.

3) Well development should proceed by repeatedly removing water from the well until the discharged water is less than 50 NTUs. The volume of water removed

from the wells will not be less than that lost to the formation during drilling. All development water will be containerized on site in 55-gallon drums. The water will be tested and disposed of at an offsite facility. The effectiveness of development should be monitored at regular intervals using a portable turbidity meter.

Volume of water removed and turbidity, pH, temperature, and conductivity measurements will be recorded in the field notebook.

4) Well development will be discontinued when the turbidity of the discharged water is below 50 NTUs and the other indicator parameters have stabilized or a minimum of 5 well volumes has been purged, whichever is achieved first.

3.6 Documentation

A field notebook will be initiated at the start of on site work and maintained by the Field Coordinator. The field notebook will include the following daily information regardless of what activity is being performed.

- Date
- Meteorological conditions
- Crew members
- Brief descriptions of proposed field activities
- Locations where work is performed
- Problems and corrective actions taken
- All field measurements or descriptions recorded
- Calibration of field equipment used
- All modifications of the FSP

Each subsurface boring will be logged in a bound field notebook during drilling by the supervising geologist. Field notes will include descriptions of subsurface materials encountered during drilling, sample numbers, and types of samples recovered from the borehole.

Additionally, the geologist will note time and material expenditures for later verification of contractor invoices in the field notebook.

Upon completion of daily drilling activities, the geologist initiate a chain-of-custody for any samples recovered for chemical laboratory testing.

4.0 GROUNDWATER INVESTIGATION

As indicated in the work plan, six water table and four bedrock wells will be sampled during the SI. Groundwater samples will be analyzed for TCL VOCs and SVOCs, and TAL metals. To collect representative groundwater samples, groundwater wells must be adequately purged prior to sampling. Purging will require the removal of one to three volumes of standing water.

4.1 Well Purging Procedures

Procedures

Prior to sampling, a complete round of water levels is to be collected prior to sampling. Groundwater samples will be collected using conventional well evacuation techniques. That is, a minimum of three well volumes will be purged prior to sampling, unless the well is completely evacuated. If the well is completely evacuated, the well will be sampled after the water level has recovered to at least 50 percent of its original level. Low flow sampling methods are preferred; however, wells previously sampled at the site indicate that recharge rates are insufficient to meet the suggested criteria for the use of low flow sampling. Well evacuation will be performed by either bailers or pumps. Sampling will be performed using a clean bailer, which has either been decontaminated or is new and dedicated to use in the sampled well. Parameters to be measured in the field will include turbidity, pH, Eh, hydraulic conductance. Field instrumentation will be calibrated as indicated in the operations manual and record of the calibration will be recorded in the field notebook.

4.2 Groundwater Sampling Procedures

Procedures

1) After well purging is completed, a sample will be collected into the appropriate containers. The sampling order shall be 1)VOCs, 2)SVOCs, and 3) metals. The aliquot for total metals will not be filtered if the turbidity is less than 50 NTUs.

Filtered and unfiltered samples will be analyzed for dissolved metals, if a turbidity of less than 50 NTUs is not achieved.

2) Direct the discharge tubing toward the inside wall of the sample container to minimize volatilization. Fill volatile sample containers so no headspace (air bubbles) are present. Preserve as needed and cap all sample containers.

3) All sample bottles will be labeled in the field using a waterproof permanent marker (Section 7.0).

4) Samples will be collected into sample bottles (containing required preservatives) and placed on ice in coolers for processing (preservation and packing) prior to shipment to the analytical laboratory. A chain-of-custody record will be initiated. The analytical laboratory will certify that the sample bottles are analyte-free prior to shipping.

5) Remove pump and tubing.

6) Well sampling data are to be recorded in the field notebook.

4.3 Water Level Monitoring Procedures

Determination of groundwater surface elevations throughout a monitoring well network makes possible the construction of a potentiometric surface contour map and determination of groundwater flow patterns.

Water levels in all monitoring wells will be measured using an electronic water level indicator or weighted tape. Initially, measurements will be taken following well development until the well has recovered to anticipated static conditions. Water levels will also be measured prior to groundwater purging sampling. Water level measurement procedures are presented below.

Procedure

1) Clean water level probe following the decontamination procedures and test water level meter to ensure that the batteries are charged.

2) Lower probe slowly into the monitoring well until audible alarm indicates the top of the water column.

3) Read the depth to the nearest hundredth of a foot, from the graduated cable using a set reference point on the riser pipe.

4) Repeat the measurement for confirmation and record the water level.

5) Remove the probe from the monitor slowly, drying the cable and probe with a clean "Chem Wipe" or paper towel.

6) Replace monitoring well cap and lock protective cap in place.

7) Decontaminate the water level indicator (Section A6.0) if additional measurements are to be taken.

4.4 Sample Container, Preservation and Holding Time Requirements

Table 4-1 presents the summary of analytic parameters for all samples to be collected as part of this SI. Table 4-2 lists the sample container, volume, preservation and holding time requirements for samples to be collected at the site.

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TABLE 4-1
Analytical Methodology

Analysis	Matrix	NYSDEC ASP	Number Of Analyses
TCL VOCs	Soil	OLM04.2	12
TCL SVOCs	Soil	OLM04.2	14
TAL Metals	Soil	ILM04.1	4
PCBs	Soil	OLM04.2	2
Arsenic	Soil	ILM04.1	2
TPH	Soil	Modified 418.1	8
TCL VOCs	Groundwater	OLM04.2	10
TCL SVOCs	Groundwater	OLM04.2	10
TAL Metals	Groundwater	ILM04.1	10

TABLE 4-2
Analytical Methodology

Analysis	Matrix	NYSDEC ASP	Container	Preservative/ Holding Time
TCL VOCs	Soil	OLM04.2	3 Encore	None/48 Hours
TCL SVOCs	Soil	OLM04.2	8 oz.	None/7 days
TAL Metals	Soil	ILM04.1	8 oz.	None/6 Months
PCBs	Soil	OLM04.2	8 oz.	None/7 days
Arsenic	Soil	ILM04.1	8 oz.	None/6 Months
TPH	Soil	Modified 418.1	8 oz.	None/7 days
TCL VOCs	Groundwater	OLM04.2	2-40 mL	HCL/14 days
TCL SVOCs	Groundwater	OLM04.2	2-1L amber	None/14 days
TAL Metals	Groundwater	ILM04.1	2-500 mL HDPE	HNO_3/6 Months

5.0 SURVEYING AND MAPPING

Project control surveying will provide for location of sampling points. All surveying will be performed under the supervision of a New York State licensed land surveyor, following the requirements of the Work Plan and the HASP. Benchmarks established during the site assessment activities will be used for site control during the investigation activities.

5.1 Establishing Horizontal Primary Project Control

In order to determine the horizontal locations of site features, horizontal control will be established by surveying to/from established survey monuments in the New York State Plane Coordinate System, Transverse Mercator Projection, West Zone, North American Datum (NAD) of 1983. A site benchmark has already been established during previous work and will be used during the phase of work.

Procedure

1) Research for monuments.
2) Recover monuments in field.
3) Set and reference points on primary traverse.
4) Turn angles and measure distances.
5) Compute closures and adjust traverse.

5.2 Establishing Vertical Primary Project Control

In order to determine site elevations, vertical control must be established by surveying to/from established survey monuments in the North American Vertical Datum (NAVD) of 1988.

Procedure

1) Research for monuments.
2) Recover monuments in field.
3) Set project benchmarks.

4) Run level line from monuments to set project benchmarks and back.

5) Reduce notes and adjust benchmark elevations.

6) Prepare recovery sketches.

6.0 SAMPLING EQUIPMENT CLEANING PROCEDURES

To assure that no outside contamination will be introduced into the samples/data, thereby invalidating the samples/data, the following cleaning protocols will apply for all equipment used to collect samples/ data during the field investigations. Drilling equipment and heavy machinery will be steam cleaned on site on a decontamination pad. All water generated during washing will be containerized and transported to the drum staging area.

Procedures:

Sampling and downhole equipment cleaned in the field will follow the procedure presented below:

1) Wash thoroughly using tap water and non-phosphate detergent. Scrub with a brush as necessary to remove visible particular matter and surface film.
2) Rinse thoroughly with tap water.
3) For equipment used to collect samples for metals analysis, rinse with 10 % nitric acid solution.
4) Rinse with deionized water
5) Rinse equipment with methanol, if to be used to collect samples for organic compound analysis.
6) Air dry

As an alternative, equipment may be steam cleaned or dedicated, disposal sampling equipment may be used.

7.0 SAMPLE LABELING

In order to prevent misidentification and to aid in the handling of environmental samples collected during the field investigation, sample labeling procedures listed below will be followed:

Procedure:

1) Affix a label to each sample container. The following information will be written on each label with permanent marker prior to wrapping label with cellophane tape:

Site Name:
Sample identification
Project number
Date/time
Sampler's initials
Sample preservation
Analysis required

2) Each sample of each matrix will be assigned a unique alpha-numeric identification code. An example of this code and a description of its components is presented below:

Examples

1. MW1 - GW
MW1 = Monitoring Well 1
GW = Groundwater

2. SB1 - 2'-4'

SB1 = Soil Boring 1

2' - 4' = Two-foot to four-foot soil sample

List of Abbreviations

Monitor Type

MW	=	Monitoring Well

Sample Type

SB	=	Soil Boring
GW	=	Groundwater
EB	=	Equipment Rinse Blank
TB	=	Trip Blank
RB	=	Rinse Blank
MS	=	Matrix Spike
MSD	=	Matrix Spike Duplicate
MD	=	Matrix Duplicate

8.0 SAMPLE SHIPPING

Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for presentation of sample analytical chemistry results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with the samples. When possible, preprinted sample labels will be provided from the laboratory to minimize labeling in the field.

The procedures used in this remedial predesign follow the chain-of-custody guidelines outlined in NEIC Policies and Procedures, prepared by the National Enforcement Investigations Center (NEIC) of the U.S. Environmental Protection Agency Office of Enforcement.

Procedure

1) The chain-of-custody (COC) record should be completely filled out, with all relevant information.

2) The original COC goes with the samples. It should be placed in a ziplock bag and taped inside the sample cooler. The sampler should retain a copy of the COC.

3) Place 2-inches of inert cushioning material such as vermiculite or bubble-wrap in bottom of cooler.

4) Place bottles in cooler in such a way that they do not touch (use cardboard dividers or bubble-wrap).

5) Wrap VOA vials securely in bubble-wrap and tape. Place them in the center of the cooler.

6) Pack cooler with ice in doubled ziplock plastic bags.

7) Pack cooler with cushioning material.

8) Tape drain shut.

9) Wrap cooler completely with strapping tape at two locations securing the lid. Do not cover any labels.

10) Place lab address on top of cooler. For out-of-town laboratory, add the following: Put "This side up" labels on all four sides and "Fragile" labels on at least two sides. Affix numbered custody seals on front right and left of cooler. Cover seals with wide, clear tape.

11) Ship samples via overnight carrier the same day that they are collected, whenever possible.

9.0 FIELD SAMPLING INSTRUMENTATION

Field sampling equipment, such as macrocore samplers will require no maintenance beyond decontamination between sampling locations. Detailed procedures for instrument calibration and maintenance can be found in the equipment operating manuals.

Maintenance procedures for the common instrumentation that will be used during field investigations are discussed in the manufacturer operating manuals. A copy of the manufacturer's operating manual for each instrument will be kept with the instrument or the operator. All field sampling equipment will be calibrated each day of use. The calibration procedures and results will be recorded in the field notebook.

9.1 Preventative Maintenance

Preventive maintenance will follows procedures presented in the operations manual for the particular instrument. Any maintenance activities performed will be recorded in the field notebook. In case of an emergency, other URS offices, the instrument manufacturer, and/or equipment rental vendor will be contacted. If necessary, instrumentation manufacturers will be contacted for unit repair/replacement. In addition, potential instrumentation rental vendors, which could provide overnight UPS/Federal Express service, are listed below.

<u>Vendors</u>
Field Environmental: Pittsburgh, PA 1-412-622-9400
Response Rentals: Rochester, NY: 1-716-424-2140
Hazco Services: Dayton, OH 1-800-343-0256

10.0 INVESTIGATION-DERIVED WASTE CHARACTERIZATION AND DISPOSAL

Fluids generated during equipment decontamination (if any), well development and well purging will be contained on site and transported to a TSD facility for treatment. Soil cuttings may also require off-site disposal following characterization. Sampling and treatment will be coordinated by URS. Personal protective equipment and disposable, high density polyethylene (HDPE) sampling equipment will be double bagged and placed for disposal at a municipal landfill.

QUALITY ASSURANCE/QUALITY CONTROL PLAN

The Closed Alumax Extrusions, Inc. Facility

320 South Roberts Road

Dunkirk, NY

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QUALITY ASSURANCE/QUALITY CONTROL PLAN

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TABLES

1.0 INTRODUCTION

This Quality Assurance/Quality Control (QA/QC) plan addresses the major QA/QC programs and procedures to be implemented during the Voluntary Clean-up Program (VCP) activities at the closed Alumax Extrusions, Inc. facility (the Site), 320 South Roberts Road, Dunkirk, New York. This QA/QC plan establishes guidelines for data collection, analysis, and validation and is to be used in conjunction with approved investigation, interim remedial measures (IRMs), and remedial action work plans, which include specific field sampling programs. Project description and goals are provided in the work plans for specific work items.

2.0 PROJECT/SITE DESCRIPTION

A complete project/site description of the Site is provided in the main body of the Investigation Work Plan.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The organization of the project team and general responsibilities of each of its members are outlined as follows:

Alcoa Project Manager

Responsible for project implementation and direction, defining project objectives, identifying technical and financial resources, and provide overall technical direction. Primary regulatory liaison for the overall project scope and schedule, as the principal interface/single point of contact between the Volunteer and NYSDEC.

Site Manager – URS Corporation

Responsible for identifying project resources and implementing technical approaches for achieving the strategic project objectives identified by the Alcoa Project Manager. Serves as primary regulatory liaison concerning technical issues. Specific duties of the Site Manager include the following:

- Primary responsibility for the day to day performance of the activities under the VCP;
- Certify that activities were performed in full accordance with the Investigation Work Plan;
- Develop and implement a detailed work plan(s) and schedule;
- Establish project policy and procedures to address the specific needs of the project;
- Acquire and apply technical and corporate resources as needed to ensure performance within budget and schedule constraints;
- Review the work performed on each task to ensure its quality, responsiveness, and timeliness;
- Oversee field and laboratory QA/QC programs to ensure compliance with the QA/QC Plan;
- Approve all external reports (deliverables) before their submission to the client and/or regulatory agencies;
- Ultimately responsible for the preparation and quality of interim and final reports; and
- Represent the project team at meetings

Quality Assurance Officer – URS Corporation

The primary role of the Quality Assurance Officer (QAO) is to oversee the review laboratory data and oversee the preparation of data usability summary reports (DUSRs) to ensure that the data meets the data quality objectives required under the VCP. In addition, the QAO will be responsible to ensure that all field data collection activities and taking of environmental measurements comply with URS protocols and that such are consistent with NYSDEC requirements and good practice. The QAO must have a minimum of a bachelors degree in chemistry or natural science with a minimum of 20 hours in chemistry to meet NYSDEC guidelines. The QAO must be proficient in analytical methodology, data interpretation and validation, the development of sampling plans, quality control procedures, and auditing techniques.

The QAO will assist the project manager in the development of the sampling and analytical portion of the Quality Assurance Project Plan. The QAO or his/her designee shall conduct periodic field and sampling audits, interface with the analytical laboratory to make requests and resolve problems, interface with the data validator, and develop DUSRs. Because on-site work on the part of the QAO or his/her designee will be necessary, verification of completion of the 40-hour OSHA safety training course and 8-hour annual refreshers is required.

The table below provides a listing of project personnel.

Title	Name
Project Manager – Alcoa	John George
Site Manager – URS	William Randall
QA Officer - URS	Mary Bitka

3.1 Proposed Laboratory

Severn Trent Laboratories (STL), a NYSDOH ELAP, CLP-certified laboratory, has been selected as the primary laboratory for the investigation analytical work. Previous analytical work was also performed by STL and its precursor Quanterra Environmental Services. Category B deliverables are required for all analysis used for final characterization and clean-up verification sampling.

4.0 DATA QUALITY OBJECTIVES

4.1 Background

Data quality objectives (DQOs) are qualitative and quantitative statements which specify the quality of data required to support the investigation for the Site. DQOs focus on the identification of the end use of the data to be collected. The project DQOs will be achieved utilizing definitive data categories, as outlined in *Guidance for the Data Quality Objectives Process,* EPA QA/G-4 (September 1994). The definitive data are generated using rigorous analytical methods, such as approved USEPA reference methods. A summary of the analytical methods to be used is presented in Table 4-1.

The project DQOs for data collected during this SI are to:

- Complete definition of the extent of contamination in surface and subsurface soil associated with past operations. (Significant site investigation has already occurred since 2000 and the SI Work Plan provides a summary review of these data and delineates data gaps that yet need to be resolved during the SI.)

- Characterize site hydrogeology and assess groundwater quality.

- Maintain the highest possible scientific/professional standards for each analytical procedure to assure the ultimate defensibility of the data produced during the SI.

4.2 QA Objectives For Chemical Data Measurement

For the definitive data category described above, the data quality indicators of precision, accuracy, representativeness, comparability, and completeness will be measured during offsite chemical analysis.

4.2.1 Precision

Precision examines the distribution of the reported values about their mean. The distribution of reported values refers to how different the individual reported values are from the average reported value. Precision may be affected by the natural variation of the matrix or contamination within that matrix, as well as by errors made in the field and/or laboratory handling procedures. Precision is evaluated using analyses of a laboratory matrix spike/matrix spike duplicate and matrix duplicates (inorganics), which not only exhibit sampling and analytical precision, but indicate analytical precision through the reproducibility of the analytical results. Relative Percent Difference (RPD) is used to evaluate precision. RPD criteria must meet the requirements for the methods identified in Table 4-1.

4.2.2 Accuracy

Accuracy measures the analytical bias in a measurement system. Sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques. Sampling accuracy may be assessed by evaluating the results of rinse and trip blanks. These data help to assess the potential contamination contribution from various outside sources. The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical methods on samples of the same matrix. The percent recovery criterion is used to estimate accuracy based on recovery in the matrix spike/matrix spike duplicate and matrix spike blank samples. The spike and spike duplicate, which will give an indication of matrix effects that may be affecting target compounds, are also a good gauge of method efficiency. For organic analyses, surrogate recovery results will also be measured. Acceptable ranges of recovery are reported in the referenced methods identified in Table 4-1.

4.2.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represent the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program or subsampling of a given sample. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the investigative objectives. The sampling procedures, as described in the SI Work Plan have been selected with the goal of obtaining representative samples for the media of concern.

4.2.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. This goal is achieved through using standard techniques to collect and analyze representative samples, and reporting analytical results in appropriate units. Complete field documentation using standardized data collection forms will support the assessment of comparability. Comparability is limited by the other parameters (e.g., precision, accuracy, representativeness, completeness, comparability), because only when precision and accuracy are known can data sets be compared with confidence. For data sets to be comparable, it is imperative that the analytical methods and procedures be explicitly followed.

4.2.5 Completeness

Completeness is defined as a measure of the amount of valid data obtainable from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is important that appropriate QA procedures be maintained to verify that valid data and project needs are thereby met. For the data generated, a goal of 100% is required for completeness (or usability) of the analytical data. If this goal is not met, then URS project personnel will determine whether the deviations may cause the data to be rejected.

TABLE 4-1
Analytical Methodology

Analysis	Matrix	NYSDEC ASP	Number Of Analyses
TCL VOCs	Soil	OLM04.2	12
TCL SVOCs	Soil	OLM04.2	14
TAL Metals	Soil	ILM04.1	4
PCBs	Soil	OLM04.2	2
Arsenic	Soil	ILM04.1	2
TPH	Soil	Modified 418.1	8
TCL VOCs	Groundwater	OLM04.2	10
TCL SVOCs	Groundwater	OLM04.2	10
TAL Metals	Groundwater	ILM04.1	10

QA/QC Sampling Frequency:
Trip Blanks: Every Shipment Containing VOCs
Rinseate Blanks: 1 per every 20 samples
MS/MSD: 1 per every 20 samples
Duplicate: 1 per every 20 samples

5.0 SAMPLING LOCATIONS AND PROCEDURES

Sampling locations and procedures are discussed in Investigation Work Plan and Field Sampling Plan.

6.0 SAMPLE HOLDING TIMES

Table 6-1 identifies the analytical method and holding time requirements. All holding times begin with validated time of sample receipt (VTSR) at the laboratory. All samples will be shipped to arrive at the laboratory within 48 hours of collection.

TABLE 6-1
Analytical Methodology

Analysis	Matrix	NYSDEC ASP	Container	Preservative/ Holding Time
TCL VOCs	Soil	OLM04.2	3 Encore	None/48 Hours
TCL SVOCs	Soil	OLM04.2	8 oz.	None/7 days
TAL Metals	Soil	ILM04.1	8 oz.	None/6 Months
PCBs	Soil	OLM04.2	8 oz.	None/7 days
Arsenic	Soil	ILM04.1	8 oz.	None/6 Months
TPH	Soil	Modified 418.1	8 oz.	None/7 days
TCL VOCs	Groundwater	OLM04.2	2-40 mL	HCL/14 days
TCL SVOCs	Groundwater	OLM04.2	2-1L amber	None/14 days
TAL Metals	Groundwater	ILM04.1	2-500 mL HDPE	HNO_3/6 Months

7.0 ANALYTICAL PROCEDURES

Table 4-1 identifies the specific methods to be performed on the individual matrices. All analyses will be performed in accordance with the following document:

- *Test Methods for Evaluating Solid Waste – Physical/Chemical Methods, SW-846, Final Update III,* June 1997.

8.0 CALIBRATION PROCEDURES AND FREQUENCY

In order to obtain a high level of precision and accuracy during sample processing procedures, laboratory instruments must be calibrated properly. Several analytical support areas must be considered so the integrity of standards and reagents is upheld prior to instrument calibration. The following sections describe the analytical support areas and laboratory instrument calibration procedures.

8.1 Analytical Support Areas

Prior to generating quality data, several analytical support areas must be considered:

Standard/Reagent Preparation - Primary reference standards and secondary standard solutions shall be obtained from National Institute of Standards and Technology (NIST), or other reliable commercial sources to verify the highest purity possible. The preparation and maintenance of standards and reagents will be accomplished per the methods referenced in Table 4-1. All standards and standard solutions are to be formally documented (i.e., in a bound logbook) and should identify the supplier, lot number, purity/concentration, receipt/preparation date, preparer's name, method of preparation, expiration date, and any other pertinent information. All standard solutions shall be validated prior to use. Care shall be exercised in the proper storage and handling of standard solutions (e.g., separating volatile standards from nonvolatile standards). The laboratory shall continually monitor the quality of the standards and reagents through well documented procedures.

Balances - The analytical balances shall be calibrated and maintained in accordance with manufacturer's specifications. Calibration is conducted with two Class "S" weights that bracket the expected balance use range. The laboratory shall check the accuracy of the balances daily and properly document results in permanently bound logbooks.

Refrigerators/Freezers - The temperature of the refrigerators and freezers within the laboratory shall be monitored and recorded daily. This will verify that the quality of the standards and reagents is not compromised and the integrity of the analytical samples is upheld. Appropriate acceptance ranges (4°C ± 2°C for refrigerators) shall be clearly posted on each unit in service.

Water Supply System - The laboratory must maintain a sufficient water supply for all project needs. The grade of the water must be of the highest quality (analyte-free) in order to eliminate false-positives from the analytical results. Ultraviolet cartridges or carbon absorption treatments are recommended for organic analyses and ion-exchange treatment is recommended for inorganic tests. Appropriate documentation of the quality of the water supply system(s) will be performed on a regular basis.

8.2 Laboratory Instruments

Calibration of instruments is required to verify that the analytical system is operating properly and at the sensitivity necessary to meet established quantitation limits. Each instrument for organic and inorganic analyses shall be calibrated with standards appropriate to the type of instrument and linear range established within the analytical method(s). Calibration of laboratory instruments will be performed according to methods specified in Table 4-1.

In addition to the requirements stated within the analytical methods, the contract laboratory will be required to analyze an additional low level standard at or near the detection limits. In general, standards will be used that bracket the expected concentration of the samples. This will require the use of different concentration levels, which are used to demonstrate the instrument's linear range of calibration.

Calibration of an instrument must be performed prior to the analysis of any samples and then at periodic intervals (continuing calibration) during the sample analysis to verify that the instrument is still calibrated. If the contract laboratory cannot meet the method-required calibration requirements, corrective action shall be taken as discussed in Section B11.0. All corrective action procedures taken by the contract laboratory are to be documented, summarized within the case narrative, and submitted with the analytical results.

9.0 INTERNAL QUALITY CONTROL CHECKS

Internal QC checks are used to determine if analytical operations at the laboratory are in control, as well as determining the effect sample matrix may have on data being generated. Two types of internal checks are performed-batch QC and matrix-specific QC procedures. The type and frequency of specific QC samples performed by the laboratory will be determined by the specified analytical method and project specific requirements. Acceptable criteria and/or target ranges for these QC samples are presented within the analytical methods referenced in Table 4-1.

QC results which vary from acceptable ranges shall result in the implementation of appropriate corrective measures, potential application of qualifiers, and/or an assessment of the impact these corrective measures have on the established data quality objectives. Quality control samples including any project-specific QC will be analyzed are discussed below.

9.1 Batch QC

Method Blanks - A method blank is defined as laboratory-distilled water or that is carried through the entire analytical procedure. The method blank is used to determine the level of laboratory background contamination. Method blanks are analyzed at a frequency of one per analytical batch.

Matrix Spike Blank Samples - A matrix spike blank (MSB) sample is an aliquot of water spiked (fortified) with all the analytes being analyzed for calculation of precision and accuracy to verify that the analysis being performed is in control. A MSB will be performed for each matrix and for organic parameters only, as indicated on Table 4-1.

9.2 Matrix-Specific QC

Matrix Spike Samples - An aliquot of a matrix is spiked with known concentrations of specific compounds as stipulated by the methodology. The matrix spike (MS) [organics and inorganics] and matrix spike duplicate (MSD) [organics only] are subjected to the entire analytical procedure in order to assess both accuracy and precision of the method for the matrix by measuring the percent recovery and RPD of the two spiked samples. The samples are used to assess matrix interference effects on the method, as well as to evaluate instrument performance. MS/MSDs are analyzed at a frequency of one each per twenty samples per matrix. MS/MSDs will be performed for the parameters as listed in Table 4-1.

Matrix Duplicates - The matrix duplicate (MD) is two representative aliquots of the same sample which are prepared and analyzed identically. Matrix duplicate samples provide for the evaluation of precision both in the field and at the laboratory by comparing the analytical results of two samples taken from the same location. Every effort will be made to obtain replicate samples; however, due to interferences and lack of homogeneity, the analytical results are not always reproducible. Matrix duplicate samples will be analyzed for inorganics only and are to be included at a frequency of one per twenty samples per matrix, as listed in Table 4-1.

9.3 Additional QC

Rinsate (Equipment) Blanks - A rinsate blank is a sample of laboratory demonstrated analyte-free water passed over or through the cleaned sampling equipment. A rinsate blank is used to indicate potential contamination from sample instruments used to collect and transfer samples. The water must originate from one common source within the laboratory and must be the same water used by the laboratory performing the analysis. The rinsate blank should be collected, transported, and analyzed in the same manner as the samples acquired that day. Rinsate blanks will be performed at the rate listed in Table 4-1.

Trip Blanks - Trip blanks are not required for nonaqueous matrices. Trip blanks are required for aqueous sampling events. They consist of a set of sample bottles filled at the laboratory with laboratory demonstrated analyte-free water. These samples then accompany the bottles that are prepared at the laboratory into the field and back to the laboratory, along with the collected samples for analysis. These bottles are never opened in the field. Trip blanks must return to the laboratory with the same set of bottles they accompanied to the field. Trip blanks will be analyzed for volatile organic parameters only. Trip blanks will be analyzed at the frequency of one per shipment of aqueous volatile organics.

10.0 CALCULATION OF DATA QUALITY INDICATORS

10.1 Precision

Precision is evaluated using analyses of a field duplicate and/or a laboratory MS/MSD which not only exhibit sampling and analytical precision, but indicate analytical precision through the reproducibility of the analytical results. RPD is used to evaluate precision by the following formula:

$$\% RPD = \frac{(X_1 - X_2)}{[X_1 + X_2)/2]} x\, 100\%$$

where:

X_1 = *Measured value of sample or matrix spike*

X_2 = *Measured value of duplicate or matrix spike duplicate*

Precision will be determined through the use of MS/MSD (for organics) and matrix duplicates analyses. RPD criteria for this project must meet the method requirements referenced in Table 4-1.

10.2 Accuracy

Accuracy is defined as the degree of difference between the measured or calculated value and the true value. The closer the numerical value of the measurement comes to the true value or actual concentration, the more accurate the measurement is. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at known concentrations before analysis. Analytical accuracy may be assessed through the use of known and unknown QC samples and spiked samples. Accuracy is presented as percent recovery. Accuracy will be determined from matrix spike, matrix spike duplicate, and matrix spike blank samples, as well as from surrogate compounds added to organic fractions (i.e., volatiles), and is calculated as follows:

$$\% R = \frac{(X_s - X_u)}{K} x\, 100\%$$

where:

X_s - Measured value of the spike sample

X_u - Measured value of the unspiked sample

K - Known amount of spike in the sample

10.3 Completeness

Completeness is calculated on a per matrix basis for the project and is calculated as follows:

$$\% \ Completeness = \frac{(X_v - X_n)}{N} \ x \ 100\%$$

where:

X_v - Number of valid measurements

X_n - Number of invalid measurements

N - Number of valid measurements expected to be obtained

11.0 CORRECTIVE ACTIONS

Laboratory corrective actions shall be implemented to resolve problems and restore proper functioning to the analytical system when errors, deficiencies, or out-of-control situations exist at the laboratory. Full documentation of the corrective action procedure needed to resolve the problem shall be filed in the project records, and the information summarized in the case narrative. A discussion of the corrective actions to be taken is presented in the following sections.

11.1 Incoming Samples

Problems noted during sample receipt shall be documented by the laboratory. URS Data Validation Chemist (or designee) shall be contacted immediately for problem resolution. All corrective actions shall be documented thoroughly.

11.2 Sample Holding Times

If any sample extractions and/or analyses exceed method holding time requirements, URS Data Validation Chemist (or designee) shall be notified immediately for problem resolution. All corrective actions shall be documented thoroughly.

11.3 Instrument Calibration

Sample analysis shall not be allowed until all initial calibrations meet the appropriate requirements. All laboratory instrumentation must be calibrated in accordance with method requirements. If any initial/continuing calibration standards exceed method QC limits, recalibration must be performed, and if necessary, reanalysis of all samples affected back to the previous acceptable calibration check.

11.4 Reporting Limits

The laboratory must meet all method-required detection limits, which are referenced in the methods listed in Table 4-1. If difficulties arise in achieving these limits due to a particular sample matrix, the laboratory must notify URS project personnel for problem resolution. To achieve those detection limits, the laboratory must utilize all appropriate cleanup procedures in an attempt to retain the method required detection limits. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory must document all initial analyses and secondary dilution results. Secondary dilution will be permitted only to bring target analytes within the linear range of calibration. If samples are analyzed at a secondary dilution with no target analytes detected, URS Data Validation Chemist (or designee) will be immediately notified so that appropriate corrective actions can be initiated.

11.5 Method QC

All QC, including blanks, matrix duplicates, matrix spikes, matrix spike duplicates, surrogate recoveries, matrix spike blank samples, and other method-specified QC samples, shall meet the method requirements referenced in Table 4-1. Failure of method-required QC will result in the review and possible qualification of all affected data. If the laboratory cannot find any errors, the affected sample(s) shall be reanalyzed and/or re-extracted/redigested, then reanalyzed within method-required holding times to verify the presence or absence of matrix effects. If matrix effect is confirmed, the corresponding data shall be flagged accordingly using the flagging symbols and criteria as defined by the data validation guidelines identified in Section B12.2. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed and/or re-extracted/redigested, then reanalyzed at no cost to URS. URS shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

11.6 Calculation Errors

All analytical results must be reviewed systematically for accuracy prior to submittal. If upon data review calculation and/or reporting errors exist, the laboratory will be required to reissue the analytical data report with the corrective actions appropriately documented in the case narrative.

12.0 DATA REDUCTION, VALIDATION, AND USABILITY

For all analyses, USEPA Superfund Category B deliverable requirements will be required for documentation and reporting of all data.

12.1 Data Reduction

Laboratory analytical data are first generated in raw form at the instrument. These data may be either graphic or in printed tabular form. Specific data generation procedures and calculations are found in each of the referenced methods. Analytical results must be reported consistently. Data for aqueous samples will be reported in concentrations of micrograms per liter (μg/L). Data for soils will be reported in concentrations of micrograms per kilogram (μg/kg). All soil data will be reported on a dry weight basis.

Identification of all analytes must be accomplished with an authentic standard of the analyte traceable to NIST or USEPA sources. Data reduction will be performed by individuals experienced with a particular analysis and knowledgeable of requirements.

12.2 Data Validation

Data validation is a systematic procedure of reviewing a body of data against a set of established criteria to provide a specified level of assurance of validity prior to its intended use.

Data validation will be performed by environmental chemists under the supervision of the URS Data Validation Chemist. All analytical samples collected will receive a limited data review. This review will include a review of holding times, completeness of all required deliverables; review of QC results (surrogates, spikes, duplicates) to determine if the data is within the protocol-required limits and specifications; a determination that all samples were analyzed using established and agreed upon analytical protocols; an evaluation of the raw data to confirm the results provided in the data summary sheets; and a review of laboratory data qualifiers. The methods referenced in Table 4-1 as well as the general guidelines presented in the following document will be used to aid the chemist during the data review:

- USEPA Region II CLP *Organic Data Review and Preliminary Review*, SOP HW-6, Revision 11, June 1996; and

- USEPA Region II *Evaluation of Metals Data for the Contract Laboratory Program*, HW-2, Revision XI, January 1992.

Where possible, discrepancies will resolved by URS chemists (i.e., letters will be written to laboratories). A complete analytical data validation is not anticipated. However, if the initial limited data review reveals significant deviations and problems with the analytical data, URS may recommend a complete validation of the data.

13.0 PREVENTIVE MAINTENANCE

The laboratory is responsible for maintaining its analytical equipment. Preventive maintenance is provided on a regular basis to minimize down-time and the potential interruption of analytical work. Instruments are maintained in accordance with the manufacturer's recommendations. If instruments require maintenance, only trained laboratory personnel or manufacturer-authorized service specialists are permitted to do the work. Maintenance activities will be documented and kept in permanent logs. These logs will be available for inspection by auditing personnel.

14.0 PERFORMANCE AND SYSTEM AUDITS

Audits are a careful evaluation of both field and laboratory quality control procedures, and are performed before or shortly after systems are operational. Performance audits are conducted by introducing control samples into the data production process. These control samples may include performance evaluation samples, or field samples spiked with known amounts of analytes.

Systems audits are onsite qualitative inspections and reviews of the quality assurance system used by some part of or the entire measurement system. They provide a quantitative measure of the quality of the data produced by one section or the entire measurement process. The audits are performed against a set of requirements, which may be a QA/QC or work plan, a standard method, or a project statement of work. The primary objective of the systems audits is to verify that the QA/QC procedures are being followed.

14.1 Performance and External Audits

In addition to conducting internal reviews and audits, as part of its established quality assurance program, the laboratory is required to take part in regularly-scheduled performance evaluations and laboratory audits from state and federal agencies. They are conducted as part of the certification process and to monitor the laboratory performance. The audits also provide an external quality assurance check of the laboratory, and provide reviews and information on the management systems, personnel, standard operating procedures, and analytical measurement systems. Acceptable performance on evaluation samples and audits is required for certification and accreditation. The laboratory shall use the information provided from these audits to monitor and assess the quality of its performance. Problems detected in these audits shall be reviewed by the QA Manager and Laboratory Management, and corrective action shall be instituted as necessary.

14.2 <u>Systems/Internal Audits</u>

As part of its Quality Assurance Program, the Laboratory Quality Assurance Manager shall conduct periodic checks and audits of the analytical systems. The purpose of these is to verify that the analytical systems are working properly, and that personnel are adhering to established procedures and documenting the required information. These checks and audits also assist in determining or detecting where problems are occurring.

The QA Manager periodically will submit laboratory control samples. These samples will serve to check the entire analytical method, the efficiency of the preparation method, and the analytical instrument performance. The results of the control samples are reviewed by the QA Manager who reports the results to the analyst and the Laboratory Director. When a problem is indicated, the QA Manager will assist the analyst and laboratory management in determining the reason and in developing solutions. The QA Manager will also recheck the systems as required.

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