DRY WELL DECOMMISSIONING AND CLEANUP ACTION PLAN
Revision 1
FORMER JLI STORE No. 798
6317 NE 4th PLAIN BLVD
VANCOUVER, WASHINGTON

Prepared for:

Jiffy Lube International, Inc.

URS Project No.: 33761822
January 27, 2010

URS

January 27, 2010

Joseph D. Phillips, R.G.
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Dry Well Decommissioning and
Cleanup Action Plan
Former JLI Store No. 978
6317 NE 4th Plain Blvd
Vancouver, Washington
URS Job No. 33761822

Dear Mr. Phillips,

This dry well decommissioning and cleanup action plan has been prepared on behalf of Jiffy Lube International, Inc. (JLI) and presents the proposed remedial action to address environmental issues associated with a dry well at the former JLI facility located at 6317 NE 4th Plain Boulevard in Vancouver, Washington. The plan has been prepared in conformance with our proposal dated August 28, 2009.

We trust this meets your current requirements. If you have any questions or require additional information please feel free to contact us.

Sincerely,

URS CORPORATION

Geoffrey H. Garrison, PhD, LG, PGeo
Senior Geologist

James H. Flynn, LG, LHG
Senior Hydrogeologist

Copy: Eugene Radcliff, Washington State Department of Ecology
Roy A. Johnson, Housing Authority of City of Vancouver

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URS

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URS

1.0 INTRODUCTION

URS Corporation (URS) has prepared this Cleanup Action Plan (CAP) to address the cleanup of a dry well located at the former Jiffy Lube International, Inc. (JLI) Store No. 798 located at 6317 NE 4th Plain Boulevard in Vancouver, Washington (the "site"). JLI operated an automotive oil change and lubrication shop at this site until October 2008. The building was constructed between 1983 and 1985, but it is not clear when JLI began operations there. Investigations conducted on behalf of the Housing Authority of City of Vancouver (VHA), the current property owner, identified impacted sediment within the dry well located southwest of the lube shop facility. Impacts to soil and groundwater appear limited to the area immediately adjacent to the dry well.

This dry well decommissioning and cleanup action plan contains the procedures that will be used to remove the dry well and impacted sediment, excavate impacted soil and assess groundwater quality. A new dry well will be installed to ensure continued management of storm water runoff in accordance with applicable requirements.

The purpose of this plan is to summarize the results of previous investigations at the subject property and describe cleanup procedures for the affected media at the property. Remedial actions will be conducted in general accordance with the requirements provided in the Washington Model Toxics Control Act Cleanup Regulation WAC 173-340 (MTCA) and the Washington Department of Ecology's (Ecology) Voluntary Cleanup Program (VCP).

2.0 PROJECT TEAM AND SAFETY MANAGEMENT

2.1 WORK PLAN CONTACTS

The following is a list of contacts for URS, Jiffy Lube International and the Housing Authority of City of Vancouver for timely notification of unknown contaminant conditions and for general implementation of this cleanup action plan.

URS:	**OFFICE NO.**	**CELL NO.**
James Flynn, URS Project Manager	(206) 438-2113	(206) 619-5952
Jessica Wellmeyer, URS, Site Manager	(206) 438-2319	(480) 316-2372
Jennifer Allen, URS H&S Manager	(206) 438-2120	(206) 295-2029
Jiffy Lube International:		
Joe Phillips, JLI Project Manager	(713) 546-8517	(281) 782-8647
Housing Authority of City of Vancouver		
Roy A. Johnson, Executive Director	(360) 993-9500	

2.2 HEALTH AND SAFETY

URS has developed a Health and Safety Plan (HSP), included as Appendix A, 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 by URS personnel. The HSP complies with Federal Health and Safety Regulations, as set forth in 29 CFR 1910 and 1926, and applicable state regulations. The HSP will be used by URS as a supplement to these rules, regulations, and guidance.

URS implements a behavior-based safety program, and URS personnel are trained to recognize unsafe conditions and practice near-miss reporting. Subcontractors and other personnel who will be on site and directly involved with the investigation and sampling and have the potential to be exposed to hazardous substances will be required to have health and safety training in accordance with the Occupational Safety and Health Administration 29 Code of Regulations (CFR) 1910.120, the Washington Industrial Safety and Health Act Chapter 49.17 Revised Code of Washington and WAC 296-843, and other applicable local, state, or federal regulations as warranted.

URS' safety management approach to ensure that all appropriate front-end safety planning is in place includes the following:

- **Safety Management System.** Information from the schedule and scope of work were used to prepare the HSP and initial Job Safety Analysis (JSAs). As part of the HSP preparation, medical surveillance requirements associated with site-specific impacts were identified, as well as the nearby occupational health clinics and their operating hours, to allow for appropriate injury management planning. The site HSP is attached as Appendix A.

- **Subcontractor On-Boarding.** URS' subcontractor On-Boarding process includes subcontractor prequalification, interviews, and training.

- **Safety Kick-Off Meeting.** Prior to the start of work, URS will hold a safety kick-off meeting at the site to review site-specific safety concerns and provide program and site-specific training for attendees. Morning tailgate safety meetings will be held daily and documented in the field activity logs.

- **Safety Performance Metrics.** Prior to the start of work, performance targets are set for safety observations, Near Miss and Incident Reports, and site and program safety audits.

3.0 SITE SETTING AND BACKGROUND

3.1 SITE LOCATION AND TOPOGRAPHY

The site is located at 6317 Northeast (NE) 4th Plain Boulevard (Clark County Parcel Numbers 29460-000 and 29450-000) and is occupied by a former Jiffy Lube and a parking area (Figure 2). Jiffy Lube vacated the site in October 2008 and the building remains vacant. An operating restaurant is located on the site to the west of the former Jiffy Lube building. The elevation of the site is approximately 190 feet above mean sea level (U.S. Geological Survey 1990). Local topography slopes gently down gradient to the south-southwest.

The subject property is located in an area used predominantly commercial purposes. The site is bounded to the north by NE 4th Plain Boulevard, beyond which are a credit union and two residences. It is bounded to the east by an undeveloped, grass-covered parcel, two asphalt-paved parking lots, a Goodwill thrift store and a construction company warehouse. The site is bounded to the south by several warehouses occupied by a carpet contractor, a tool warehouse, a window screen company, and a charitable organization. Finally, it is bounded to the west and southwest by the Kyocera Industrial Ceramics Corporation manufacturing facility.

3.2 GEOLOGY AND HYDROGEOLOGY

The subject property is underlain by upper Pleistocene flood deposits of boulder to cobble gravel in a sandy matrix originating from Glacial Lake Missoula (WDNR, 1987). Boring logs from environmental site investigations (described below) indicate that uppermost soils consist of gravelly sand and silts, and groundwater is approximately 18 feet below ground surface (bgs). It is assumed that the uppermost groundwater flow will generally follow surface topography and will generally flow toward surface water bodies. Based on local topography, the uppermost regional groundwater flow direction is inferred to be to the south, toward Burnt Bridge Creek.

3.3 PREVIOUS INVESTIGATIONS

This section provides a summary of the previous investigations conducted at the site. The summary focuses on the results for samples collected near the dry well southwest of the former Jiffy Lube building because this is the only area where hazardous substances have been detected above cleanup levels established in the Model Toxics Control Act cleanup levels. Sample locations near the dry well and former Jiffy Lube building are shown on Figure 3. Analytical results for soil and groundwater samples collected near the dry well are summarized in Tables 1 and 2, respectively, and shown on Figure 3.

3.3.1 Pacific Northern Environmental (PNE), UST Limited Site Assessment & UST Closure - 1996

This report summarizes a site assessment conducted within the lube shop prior to in-place decommissioning of three underground storage tanks (USTs) inside the structure. Soil samples were collected from four soil borings of unspecified depths (B-2 through B-4) located adjacent to the USTs. Analysis of samples from these borings did not detect gasoline- or diesel-range petroleum hydrocarbons above method reporting limits. The report stated that the tank contents were to be removed and the tanks were to be triple-rinsed and filled with controlled density fill as part of their decommissioning (PNE 1996). The report appears to have been prepared prior to the UST decommissioning activities. Based on the results of the analytical testing, PNE concluded that no petroleum hydrocarbons were present in the area of the USTs at levels presenting a risk to human health or the environment (PNE 1996). However, the location, depth and number of soil samples analyzed were not in accordance with current Ecology guidances on UST decommissioning (Ecology 2003).

3.3.2 Hahn and Associates, Inc., Phase I ESA – 2005

This Phase I Environmental Site Assessment (ESA) identified four stormwater catch basins on the site which discharged to at least one dry well on the site. Two of the catch basins reportedly received the stormwater runoff from the former Jiffy Lube operations. The stormwater was not routed through an oil-water separator prior to discharge to the dry well. The potential for petroleum hydrocarbons to enter the subsurface was considered an environmental condition, and a subsurface investigation in the vicinity of the dry wells was recommended.

Prior to commercial development, the Phase I ESA indicates the site appeared as a grass-covered area or was used to grow grain or hay. There was no evidence of pesticide use or spills at the site and the Phase I ESA concludes that while pesticides may be present, they do not appear to pose an environmental concern. Unpaved areas of the Site do not drain to the dry well and there is no reasonable basis to consider pesticides potential constituents of concern (PCOCs).

3.3.3 Hahn and Associates, Inc. (HAI), Phase II ESA – 2005

During this Phase II ESA, a video survey was performed on the drain lines from the four catch basins, and three dry wells were identified. The dry well located to the southwest of the former Jiffy Lube building (Figure 2) received runoff from the area surrounding the lube shop. The dry wells were estimated to be 12 to 13 feet deep based on the video survey. Soil samples were collected from six borings (P-4 through P-9) and analyzed for petroleum hydrocarbons (NWTPH-HCID). Gasoline-, diesel- and oil range petroleum hydrocarbons were not detected above the reporting limits. Groundwater samples were collected from the three borings located adjacent to the dry wells and analyzed for petroleum hydrocarbons, dissolved metals and volatile organic compounds (VOCs). With the exception of low levels of barium (2 to 15 microgram per liter), none of these constituents were detected above the reporting limits.

3.3.4 PBS Engineering and Environmental, Subsurface Investigation – 2009

This report summarizes a 2009 exit assessment which PBS performed to document changes in site condition between the time of the HAI Phase II ESA and when Jiffy Lube vacated the premises. Oil, hydraulic fluid, or other vehicle maintenance fluids were observed in the shed and on the vehicle maintenance pit concrete and asphalt floors. Disconnected product lines were also observed draining contents directly onto the shed floor. Furthermore, surficial staining was observed extending downslope from the shed toward the catch basin south of the former Jiffy Lube building (Figure 3). A sheen was observed on water that had collected in that catch basin.

Using a remote video camera, PBS also visually inspected the drainage conveyance from the catch basin located north of the Jiffy Lube building. This inspection was to determine if any additional piping was connected to the stormwater conveyance system from the restaurant, and none was identified. Approximately 68 feet south from the catch basin and 20 feet north from the dry well being removed, a buildup of sludge prevented the camera from advancing any farther. The conveyance was not completely occluded as the camera could view past this location. This observation was supported by a lack of surface drainage issues.

During their 2009 PBS investigation, PBS collected soil and groundwater samples to assess subsurface condition around the shed, dry well, and downgradient of the interior maintenance bays (Figure 3). Seven direct push borings (BH-1 through BH-7) were completed around the shed, the maintenance pit and dry well. Four shallow (5-foot deep) borings (SS-1 through SS-4) were advanced in the shed to address surficial staining around the ASTs and piping. Furthermore, sediment and standing water in the southwest the dry well were sampled and analyzed.

Dry well sediment contained diesel- and heavy oil-range petroleum hydrocarbons, cadmium, toluene, and some carcinogenic polycyclic aromatic hydrocarbons (cPAHs) above MTCA Method A cleanup levels (Table 1). Standing water within the dry well also contained diesel- and heavy oil-range petroleum hydrocarbons above MTCA Method A cleanup levels (Table 2). A soil sample from boring BH-5 adjacent to the southeast of the dry well contained gasoline-, diesel-, and heavy oil-range petroleum hydrocarbons above cleanup levels. However, based on the material type and chemical results, PBS considered it likely that the material encountered in boring BH-5 was dry well sediment and not native soil. This material was not encountered in the other two borings adjacent to the dry well, suggesting the extent of soil impacts was limited. Soils in the other two borings (BH-1 and BH-6) adjacent to the dry well appeared to be native, and samples of these soils did not contained petroleum hydrocarbons above MTCA Method A cleanup levels. Finally, field screening of soils from borings BH-4 and BH-7, located father afield, did not detect evidence of impacted soil. Methylene chloride was detected in two samples at

concentrations exceeding the MTCA Method A soil cleanup level; however, these detections may be attributable to laboratory contamination as it is a commonly used in labs.

Groundwater samples collected adjacent to the north and southwest of the dry well (BH-1 and BH-5) contained diesel- and heavy oil-range petroleum hydrocarbons and/or toluene at levels above MTCA Method A cleanup Levels. However, neither these constituents nor any others were detected in groundwater from any of the other surrounding borings, and the impacts to groundwater appear to be limited to the area immediately adjacent to the dry well.

4.0 CONCEPTUAL SITE MODEL

4.1 POTENTIAL SOURCE AREAS, RELEASES, AND POTENTIAL CONTAMINANTS OF CONCERN

Past vehicle maintenance operations at the now vacant lube shop appear to have released petroleum lubricants and possibly waste oil products to the ground surface. The shop area does not currently appear to be a source area as operations have ceased. Surface water runoff transported the petroleum hydrocarbons and other constituents to the catch basin located southwest of the lube shop, and the impacted water discharged into the dry well. As a result of this discharge, sediment and water in the dry well contained diesel- and heavy oil-range petroleum hydrocarbons, cadmium, toluene, and/or cPAHs above MTCA Method A Cleanup levels for soils and groundwater. These sediments and standing water are a potential source of impacts to the surrounding soil and shallow groundwater.

Potential constituents of concern (PCOCs) were identified based on the chemicals detected in dry well sediments and standing water and in groundwater near the dry well. The PCOCs include: petroleum hydrocarbons, metals, volatile organic compounds (VOCs) and cPAHs, as listed in Table 3.

4.2 SUBSURFACE CONDITIONS AND CONTAMINANT DISTRIBUTION

Samples of native soils around the dry well contained petroleum hydrocarbons below cleanup levels. Groundwater samples collected adjacent to the north and southwest of the dry well contained diesel and heavy oil range petroleum hydrocarbons and/or toluene at concentrations exceeding cleanup levels. Neither petroleum hydrocarbons nor other PCOCs were detected above cleanup levels in the other nearby samples, indicating that impacted soil and groundwater is limited to a small area immediately adjacent to the dry well.

4.3 EXPOSURE ASSESSMENT – RECEPTORS AND PATHWAYS

Cleanup actions must "protect human health and the environment (including, as appropriate, aquatic and terrestrial ecological receptors)," per WAC 173-340-350(8)(c)(i)(A). To establish the cleanup standards applicable for a cleanup action, an exposure assessment should address the following:

- Current and future land and resource uses
- Nature of the contamination
- Potentially impacted media
- Current and potential receptors
- Current and potential pathways of exposure

Current and potential environmental receptors and receptor activities are identified based on the reasonable maximum exposures under current and potential uses of the site, in accordance with WAC 173-340-708(3)(b). The facility is zoned commercial and such use is anticipated to continue. This section discusses receptors that may be present at the site, based on the beneficial uses and observed land and water uses in the area, the nature of the PCOCs and the affected media.

Construction and Utility Workers. Construction or utility workers engaged in excavation work or dry well maintenance workers have the potential for exposure to subsurface soil through dermal contact and incidental ingestion. In addition, the inhalation of airborne contaminants is a risk to these workers. Given the isolated nature of the impacted media, no other potential human exposures are anticipated.

Terrestrial Ecological Receptors. A simplified terrestrial ecological evaluation proscribed by MTCA (WAC 173-340-7492) was used to assess the site's risk potential to terrestrial ecological receptors. Following the Exposure Analysis Procedure under WAC 173-340-7492(2)(a)(iii), substantial wildlife exposure is unlikely based upon the scoring criteria calculated using Table 749-1. The terrestrial ecological evaluation was therefore ended in accordance with WAC 173-340-7492(2)(a)(iii).

5.0 PROPOSED REMEDIAL ACTION

The following sections present the objectives, permitting requirements, plans, and procedures for the remedial action. It is anticipated that the cleanup action will be completed under Ecology's Voluntary Cleanup Program (VCP). The goal of entering this program is to obtain a No Further Action determination for the site.

5.1 REMEDIAL ACTION OBJECTIVES AND POTENTIAL CONTAMINANTS OF CONCERN

The objectives of the proposed remedial action are protection of human health and the environment and compliance with applicable cleanup standards and state and federal laws. MTCA Method A cleanup levels for unrestricted land use will be used when available. For constituents that do not have a published Method A cleanup level, Method B cleanup levels may be used. These cleanup levels are presented in Table 3. Carcinogenic PAH compounds (cPAHs) will be assessed using the toxicity equivalency factor (TEF) methodology (see WAC 173-340-708(8)(e)(iii)(A)). The TEF methodology was developed by the USEPA to assess mixtures of structurally related chemicals with a common mechanism of action. The TEF value of each compound is used to scale its toxicity relative to benzo(a)pyrene.

5.2 DESCRIPTION OF THE REMEDIAL ACTION

The remedial action will include the removal and disposal of sediment within and soil immediately adjacent to the dry well which contains concentrations of PCOCs exceeding applicable cleanup levels. The approximate limits of the excavation are shown on Figure 4. Confirmation samples will be collected from the base and sidewalls of the excavation and analyzed for PCOCs to confirm that the impacted sediment and soil have been removed. Impacted soil will be placed in lined roll-off boxes, profiled for disposal, and then transported offsite for disposal at a permitted landfill. This material may also be loaded directly into trucks for transportation to the disposal facility. Clean over-burden will be stockpiled separately and samples from this stockpile will be analyzed to confirm that it is suitable for reuse onsite.

The removal of sediment and soil will be done concurrently with removal of the dry well, and a new dry well will be installed in its place. Following installation of the replacement dry well, a monitoring well will be installed and monitored quarterly to confirm the effectiveness of the remediation as described in Section 5.5.2. Furthermore, soil and groundwater samples will be analyzed from around the former JLI building to confirm that remedial action is not required in relation to the three decommissioned USTs.

5.3 PRE-EXCAVATION ACTIVITIES

5.3.1 Dry Well Pre-Excavation Soil and Groundwater Sampling

Four soil and groundwater samples will be collected from direct-push borings around the location of the impacted dry well prior to decommissioning the well and removing impacted sediment and soil. Previous investigations indicate that the impacted groundwater is isolated to an area immediately adjacent to the north and southeast of the dry well (Figure 3). Four additional borings will be completed north, east, and south of the previous borings to confirm the limited nature of soil and groundwater impacts around the dry well (Figure 4). One soil sample from each boring will be collected at the water table interface or at an interval indicated by field observations. One groundwater sample will also be collected from each boring. These samples will be analyzed for the constituents listed in Table 4. Groundwater samples for metals analyses will be filtered in the field. The results of this investigation will be reviewed with VHA and provided to Ecology prior to commencing with the dry well removal and soil excavation.

5.3.2 UST Soil and Groundwater Sampling

Three soil borings will be completed near the three decommissioned USTs located within the former Jiffy Lube building (Figure 4). One vertical boring (BH-12) will be completed south of the building nearest to and down gradient from the former waste oil UST. Both a soil and groundwater sample will be collected an analyzed according to Table 4. Two angled borings (BH-13 and BH-14) will be completed east of the building nearest the two former motor oil USTs. These borings will be angled in order to access soils located beneath the motor oil USTs. The intent of these borings is to collect soil samples from a depth approximately two feet below the bottom of the tanks. The actual sample locations and depths will depend on site access and drilling conditions.

5.3.3 Permit Acquisition and Notifications

The City of Vancouver is the primary agency responsible for issuing permits related to the proposed cleanup action. Based on preliminary discussions with planners at the City, the following permits and submittals will be required:

- Minor Grading permit, submittal to include an Erosion Prevention and Sediment Control Plan;
- Drainage permit for the new dry well, which includes engineering design review by the City; and
- Dry well registration with Ecology.

URS will obtain the grading permit and drainage permit on behalf of VHA. A remedial contractor (RC) will be retained by URS and will be responsible for complying with permit requirements, including the erosion control and stormwater pollution prevention procedures. JLI, URS, and the RC will be jointly responsible for completing the necessary waste profiling forms as required by the disposal facility. JLI will be responsible for the selection of the disposal facility.

5.3.4 Utilities

URS and the RC will be responsible for notifying utility companies and locating underground utilities, as appropriate, within the project area prior to the start of excavation. The contractor will also be responsible for identifying overhead utilities and required set-back and maintaining safe distances from overhead and underground lines during all site work.

5.3.5 Site Security and Safety

The RC will be responsible for installing a temporary chain-link around the active excavation areas to protect site workers and the general public at the end of each work day. The RC will also be responsible for the installation of an exclusion area for decontamination of equipment in accordance with their site-specific health and safety plan. During the work day, the URS site manager will be responsible for site safety as outlined in the Health and Safety Plan (Appendix A).

5.3.6 Staging and Equipment Set-Up

The RC will be responsible for mobilizing the necessary equipment and personnel to the site, setting up the equipment at the site, and holding site safety meetings (as described in their health and safety plan). URS will be responsible for designating an appropriate staging area for equipment and stockpiles and obtaining approval for this staging area from VHA. The RC will also install erosion control measures as required.

5.4 REMEDIAL ACTIVITIES

5.4.1 Dry Well Removal and Soil Excavation

The existing dry well and impacted sediments and soil will be removed by the RC under the direction of URS. The approximate extent of soils to be excavated is shown on Figure 4. The existing dry well is believed to extend 13 feet bgs, and the excavation is anticipated to extend to a depth of approximately 15 feet bgs. Thus it is estimated that approximately 50 cubic yards (about 70 tons) of affected soil will be removed. URS will periodically field screen the soils using a photoionization detector (PID) and observe the soil to identify staining or odors to aid in directing soil excavation activities. If field observations (i.e., staining, strong odors or PID readings) suggest that impacted soil extends beyond the limits shown on Figure 3, then URS will direct the contractor to excavate in these areas. Dewatering activities are not anticipated as the excavation is not planned to extend significantly below the water table. If impacted soils are detected below the existing dry well, the excavation will be extended down as far as if considered safe and practical. The RC will slope the walls of the excavation in accordance with guidance provided in OSHA/WISHA as needed.

Confirmation sampling procedures are described in Section 5.3. Confirmation samples from the exaction base and sidewalls will be analyzed for the constituents listed in Table 4. Soil excavation will continue until the soil sampling results indicate the affected soils have been removed, or when URS determines that further excavation activities are not practical.

If the existing data are sufficient to profile the soils for disposal, the excavated soil may be directly loaded into dump trucks and transported to a permitted off-site disposal facility. Otherwise, the soil will be stockpiled and removed for disposal at a later date. Transport trucks will be covered, if needed, to ensure no loss of material during transport.

5.4.2 Catch Basin and Conveyance Clean Out

Each of the two catch basins which drain to the dry well (CB-1 and CB-2, Figure 4) will be inspected for sediment accumulation. If significant amounts of sediment are present, a qualified vendor will be contracted to clean out these catch basins. This vendor will also be contracted to remove the sediment accumulation noted in the drainage conveyance during the 2009 video inspection (Section 3.3.4). The material removed may be managed with the material to be excavated around the dry well, or it may be disposed of separately. If sampling and chemical analyses of this material is required it will be performed in accordance with the Standard Operating Procedures (SOPs) detailed in Appendix B.

5.4.3 Stockpiling Procedures

Soils that do not exhibit any field evidence of impacts during excavation will be temporarily stockpiled on and covered with plastic sheeting in accordance with the guidelines provided in Ecology's *Guidance for Remediation of Petroleum Contaminated Soils,* (Ecology 1995). Soils which appear to have been impacted by release from the dry well will be place in lined roll-of boxes or directly loaded into trucks for transportation to the disposal facility.

5.4.4 Loading

The RC will be responsible for developing and providing a truck routing plan to be used during soil loading and transporting activities. The RC will also be responsible for adhering to the routing plan during all excavation and loading activities. The RC will be responsible for loading the petroleum-affected soil into the trucks and transporting these soils to the selected disposal facility in accordance with all local, state, and federal regulations. Prior to the trucks exiting the site, the RC will inspect each truck to ensure that loading was conducted properly and that affected soils are not adhering to the tires and that there are no free liquids present.

5.4.5 Dry Well Replacement and Resurfacing

After confirmation soil sampling is completed (Section 5.3), and URS has reviewed and approved the final analytical results and excavation limits, the excavation will be backfilled to the specified design depth (approximately 10 feet bgs) with clean imported fill. Fill below the base of the new dry well will be compacted utilizing mechanical compaction techniques. The soil will be compacted in lifts no greater than 18 inches thick. The new dry well will be constructed in accordance with the design approved by the City of Vancouver.

If asphalt is removed or damaged during the dry well removal, URS will retain a contractor to replace the asphalt. Similarly, any damage to piping or catch basins will also be repaired.

5.4.6 Decontamination

After completion of the remediation activities, equipment that has come in contact with the affected soils will be washed and the wash water will be contained. This small quantity of water, including water used by URS to decontaminate field sampling equipment, will be disposed of with the impacted soil.

5.4.7 Residual Materials Management

Residual materials generated during soil excavation and loading activities will likely include decontamination water, soiled personal protective equipment (PPE), and general municipal-type solid

wastes. The procedures for handling decontamination water are described above. The RC will also be responsible for disposal of solid wastes.

5.4.8 Soil Disposal

The RC will be responsible for disposing of the affected soils in accordance with all applicable federal, state, and local regulations. Based on site characterization results, it is anticipated that soils will require disposal at a RCRA Subtitle D landfill. JLI will provide the name of the proposed disposal facility. The RC will coordinate with the selected disposal facility for approval, delivery, and disposal of excavated soils, as necessary. JLI and URS will provide assistance to the RC for completing waste profiles prior to the start of the soil excavation program, as required by the disposal facility.

5.5 SAMPLING AND ANALYSIS PLAN

This Soil Sampling and Analysis Plan (SAP) details the sampling and data gathering methods to be used during the pre-excavation activities and the confirmation and soil stockpile sampling activities performed following excavation and removal of the affected soils. Standard Operating Procedures (SOPs), including procedures for decontamination and soil and groundwater sampling, are included in Appendix B.

5.5.1 Direct-Push Soil Sampling

Soils around the dry well location will be assessed to better delineate the extent of impacted material than will need to be removed. Soils around the decommissioned USTs will also be assessed to confirm previous investigation findings that significant subsurface impact is not present. Direct-push sampling methods will be used to collect soil and groundwater samples from the borings drilled around the dry well prior to removal. This method can collect a nearly continuous core of soil form the surface to the bottom of the boring. A stainless steel sampling rod will be driven into the soil with a vehicle-mounted hydraulic ram and/or percussion hammer attached to a vehicle. The hammer and static weight of the vehicle are used to drive a small-diameter (1- to 2-inch outer diameter) rod with a soil sample tube at its end into the soil. Upon reaching the desired sample depth the rod is withdrawn and the sample removed from the rod within an acrylic sample sleeve. The sleeve is then cut open allowing immediate access to the sampled soil material. To continue the boring the sample rod is decontaminated, a new acrylic sample sleeve is inserted, and the rod is retuned to the hole and driven down an additional four feet.

Sample collection information and the requested analyses will be recorded on the chain-of-custody form. Soil samples will be submitted to an Ecology-accredited laboratory for analysis. One soil sample from each boring will be analyzed for the constituents listed in Table 4. Laboratory reporting limits for the analytical methods will be less than the applicable cleanup levels.

5.5.2 Groundwater Sampling

Direct Push Probe Grab Sample

Groundwater around the dry well location will be assessed to determine if contamination exists which exceeds applicable clean up levels. Groundwater downgradient of the decommissioned USTs will also be assessed to confirm previous investigation findings that significant subsurface impact is not present. Groundwater samples will be collected using a stainless steel sampling probe driven into the ground with a vehicle-mounted hydraulic ram and/or percussion hammer. A four-foot long stainless steel sintered screen is placed within the sample rod and driven to the desired depth at which the rod is withdrawn and the screen exposed. A groundwater sample is extracted using a disposable HDPE tube running from the

screen to a peristaltic pump at the surface. Groundwater is purged from the sample screen until the water either runs clear or no significant improvement in water clarity is achieved.

Sample collection information and the requested analyses will be recorded on the chain-of-custody form. Groundwater samples will be submitted to an Ecology-accredited laboratory for analysis. Samples will be analyzed for the constituents listed in Table 4. Laboratory reporting limits for the analytical methods will be less than the applicable cleanup levels.

Groundwater Monitoring Well

A groundwater monitoring well will be installed adjacent to the new dry well. The well will be monitored quarterly for a minimum of four quarters to show compliance with applicable cleanup standards. Samples will be analyzed for the constituents listed in Table 4. The well will be constructed within a borehole in accordance with applicable regulations and guidelines. The well will be constructed of 2-inch Schedule-40-PVC casing with threaded couplings with an end plug placed at the bottom of the casing. Groundwater has been encountered at approximately 13 feet bgs at the site, and the monitoring well will be screened between 10 and 20 feet bgs with 0.010-inch mill-slotted PVC well screen to intercept the water table. In accordance with Washington State requirements for sealing a resource protection well (WAC 173-160-450), the annular space of each well will be backfilled with No. 10-20 Colorado silica sand or equivalent to approximately one foot above the top of the well screen, or about nine feet bgs. The upper nine feet of the annular well space will consist of a concrete seal (in accordance with WAC 173-160-450(4)(b)(iii)). A steel, flush-mount, traffic grade, watertight monument will be anchored within the concrete seal.

The well will be developed to remove fine-grained materials from within and around the sand pack by pumping and surging with a positive displacement pump, stainless-steel or PVC bailer, surge block, centrifugal or positive-displacement bladder pump, or combination of these technologies. The well will be alternately surged and overpumped until the discharge water is clear of fine materials (fines) or a minimum of 10 well casing volumes have been removed. Water quality parameters (pH, temperature, specific conductance, and turbidity) will be monitored periodically during development. Development water will be managed as Investigation Derived Waste (Section 5.5.6).

At least 24 hours after development, groundwater will be monitored by URS field personnel in the newly constructed wells in accordance with the procedure for groundwater sampling (**Appendix B**). Samples for dissolved metals analyses will be filtered with a new 0.45 micron filter placed on the sample hose.

Sample collection information and the requested analyses will be recorded on the chain-of-custody form. Groundwater samples will be submitted to an Ecology-accredited laboratory for analysis. Samples will be analyzed for the constituents listed in Table 4. Laboratory reporting limits for the analytical methods will be less than the applicable cleanup levels.

5.5.3 Confirmation Soil Sampling

The purpose of the confirmation sampling is to confirm that soils containing PCOCs at concentrations above the applicable cleanup levels have been effectively removed. The excavation will be continued until the soil cleanup goals are achieved or until it is not practical to excavate further due to proximity to structures, utilities or the water table. In addition, stockpile sampling of excavated soils will be conducted, as needed, for waste designation and profiling purposes.

Approach

Once field screening results indicate that affected soils have been successfully removed (i.e., no staining, odors, or significant PID readings are observed), confirmation samples will be collected from near the center of the base of the excavation and each sidewall and submitted for laboratory analysis. If the analytical results indicate that affected soils have been successfully removed, the excavation will be backfilled. If the analytical results indicate that soils contain PCOCs above the applicable cleanup levels, then additional excavation will be conducted and an additional confirmation sampling will be conducted.

Procedures

Confirmation soil samples will be collected in the areas of impacted soils according to the following schedule:

- Excavation Sidewalls: one from each sidewall. In the unlikely event that the extent of the excavation is greater than expected, one sample will be collected for every 15 lineal feet for excavation sidewalls.
- Excavation Base: one sample. In the unlikely event that the extent of the excavation is greater than expected, one sample will be collected for every 200 square feet of excavation area.

In all cases above, samples shall be collected where field screening indicates the highest potential for soil impacts. It is assumed that five soil samples will be collected from the excavation. If the excavation is expanded to remove additional soil, additional sidewall and base of excavation samples will be collected to assure adequate coverage of the resulting excavation.

Soil samples will be collected from the excavator bucket using a stainless steel trowel or by hand with new nitrile gloves. Care will be taken to collect material that is not in contact with the backhoe bucket surface or that was greatly disturbed. Samples will be transferred directly into laboratory-provided borosilicate jars which will be promptly capped.

Sample collection information and the requested analysis will be recorded on the chain-of-custody form. Soil samples will be submitted to an Ecology-accredited laboratory for analysis. Samples will be analyzed for the constituents listed in Table 4. Laboratory reporting limits for the analytical method will be less than the applicable cleanup levels.

Sample Designation

The confirmation soil sample designation will be as follows:

- Post excavation (PEX) - sample number - sample depth (in feet).

For example, the second post-excavation sample collected from a sample depth of eight feet will be designated as PEX-2-8.0.

5.5.4 Soil Stockpile Sampling

Samples of the stockpiled soil will be collected in general conformance with Ecology guidance (Ecology 1995) as outlined below. Soil samples will be collected from the stockpiles using either a stainless steel

trowel, dedicated plastic scoop or hand filled (dedicated latex glove to be used for each sample) directly into the laboratory supplied glassware. Soil samples will be collected from varying depth intervals within the soil piles to provide a representative characterization of the entire stockpile. The sampling equipment will be decontaminated between each sampling location in accordance with the procedures outlined above.

Recommended Number of Samples for Excavated Soil

Cubic Yards of Soil	Minimum Number of Samples
0-100	3
101-500	5
501-1000	7
1001-2000	10
>2000	10 + 1 for each additional 500 cubic yards

Sample Designation

The soil stockpile sample designation will be as follows:

- Area - Soil Stockpile (SP) Sample number and date

5.5.5 Sample Handling and QA

To ensure that the sampling and analysis program yields high quality and defensible data, appropriate sample handling (i.e. identification, tracking, documentation, and shipping) procedures will be followed. All samples will be preserved on blue ice in coolers for shipment to the laboratory under chain-of-custody protocol. The QA/QC program will include the following:

- Equipment Decontamination - To ensure against cross-contamination between sampling locations, all of the sampling equipment will be decontaminated.

- Chemical data reviews will be performed by URS using the published analytical method criteria and EPA data validation guidelines to ensure the data are reliable and suitable for their intended purpose.

5.5.6 Investigation Derived Waste

The investigation work will generate soil cuttings and decontamination fluids, and may include monitoring well development and purge waters. This material will be stored in clean labeled, 55-gallon drums at a designated location on the site until analytical results have been received allowing the IDW to be profiled for disposal. It is anticipated that all IDW will be disposed of offsite at a permitted disposal facility in conjunction with the soil being excavated around the dry well.

Uncontaminated disposable PPE will consist primarily of nitrile gloves at a rate of three to eight pairs per day per person. Miscellaneous solid wastes consist of paper, plastic wrappers, aluminum cans, and other miscellaneous types of debris. Total volume is expected to be one large plastic bag per day, which will be disposed of in municipal waste containers at the site.

6.0 SCHEDULE

Discussions with Ecology personnel indicate that Ecology's review of this CAP will take between 60 and 90 days to complete. Following the receipt of comments from Ecology, the CAP will be finalized. URS anticipates that the pre-excavation soil and groundwater sampling will begin within two weeks of Ecology's approval of the CAP. URS will prepare the minor grading and drainage permit applications concurrent with the soil and groundwater investigation. Those applications will be submitted to the City of Vancouver following review and approval by JLI and VHA. Once the minor grading permit and the drainage permit for the new dry well have been received, the remedial excavation and dry well replacement work will begin. It is anticipated that the dry well removal, soil excavation, dry well replacement and site restoration will be completed within a four week period.

7.0 REFERENCES

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PBS Engineering and Environmental, 2009. Subsurface Investigation, Former Jiffy Lube, 6317 Northeast Fourth Plain Boulevard, Vancouver, Washington 98682. March.

United States Geological Survey (USGS), 1990. Orchards Quadrangle, Washington, Clark County 7.5-Minute Series.

Washington Department of Natural Resources (WDNR), 1987. Open File Report, Geologic Map of the Vancouver Quadrangle, Washington and Oregon.

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TABLES

Table 1. Summary Soil Analytical Data for Samples Collected Near Dry Well
Former JLI Facility
Vancouver, Washington

				Analytical Results (mg/kg)													
Consultant	Location	Sampel Depth (ft)	Date	Gasoline Range Petroleum Hydrocarbons	Diesel Range Petroleum Hydrocarbons	Heavy Oil Range Petroleum Hydrocarbons	Cadmium	Chromium	Lead	PCBs	Ethyl Benzene	Methylene Chloride	Toluene	1,2,4 Trimethylbenzene	Total Xylenes	Ethylene Glycol	cPAHs (TTEC)
PBS	Drywell sediments[1]	7-13	2/4/2009	90.9	**10,500**	**79,500**	**2.77**	56.1	184	<0.0205	0.259	**0.773 J**	**7.05**	0.557	1.083	<23.0	**1.341**
PBS	BH-1-13	13-14	1/2/2009	<20.7	120	765	0.576 J	29.9	40.8	<0.0638	<0.0387	**0.132 J**	<0.0387	<0.0774	<0.1161	13	0.0912
PBS	BH-5-12	12	2/2/2009	**2,670**	**14,700**	**48,600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PBS	BH-6-12	12	2/2/2009	1.46 J	<25.7	<51.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PBS	BH-7-14	14-15	2/2/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HAI	P-6	15-16	11/10/2005	<22.4	<55.9	<112	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HAI	P-7	13-14	11/10/2005	<23.6	<59.0	<118	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HAI	P-7	19-20	11/10/2005	<24.9	<62.2	<124	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTCA Method A unrestricted cleanup levels				100	2,000	2,000	2.0	2,000	250	1.0	6.0	0.02	7.0	NE	9.0	NE	0.1

Notes:
[1]Composite sample (Drywell 1 and Drywell 13)
Bold indicates value exceeding cleanup levels
mg/kg - milligrams per kilogram
NA - Not analyzed
J - Estimated concentration
< - Not detected above reporting limit shown
NE - Not established
cPAHs - Carcinogenic polycyclic aromatic hydrocarbons
TTEC - Total Toxicity Equivalency Concentration

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Table 2. Summary of Groundwater Analytical Data for Samples Collected Near Dry Well
Former JLI Facility
Vancouver, Washington

				Analytical Results (ug/L)													
Consultant	**Location**	**Sample Depth (feet)**	**Date**	**Gasoline Range Petroleum Hydrocarbons**	**Diesel Range Petroleum Hydrocarbons**	**Heavy Oil Range Petroleum Hydrocarbons**	**Cadmium**	**Chromium**	**Lead**	**PCBs**	**Ethyl Benzene**	**Methylene Chloride**	**Toluene**	**1,2,4 Trimethylbenzene**	**Total Xylenes**	**Ethylene Glycol**	**cPAHs (TTEC)**
PBS	Drywell Water	5-7	2/3/2009	25.1 J	**2,850**	**21,400**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PBS	BH-1	20	1/2/2009	<100	317	**1,840**	<5.0	**59.3**	35.5	<0.0515 J	<0.5	5.0	0.330 J	<1.0	<2.0	<0.01	0.074
PBS	BH-4	20	2/9/2009	<80	<250	<500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PBS	BH-5	20	2/9/2009	<80	**657**	**2,670**	<1.0	<1.0	<1.0	NA	1.53	5.0	2.37	1.26	3.63	NA	**1.59**
PBS	BH-6	20	2/9/2009	<80	<250	<500	<1.0	<1.0	<1.0	NA	<0.5	5.0	<1.0	<1.0	<1.5	NA	NA
PBS	BH-7	20	2/9/2009	<80	<243	<485	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HAI	P-7	19-20	11/10/2005	<40	<118	<147	<1	<1	<1	NA	<1	NA	<1	NA	<2	NA	NA
MTCA Method A unrestricted cleanup levels				1,000	500	500	5.0	50	15	0.1	700	5.0	1,000	NE	1,000	NE	0.1

Notes:
Metals results are for dissolved metals with the exception of sample BH-1.
Bold indicates value exceeding cleanup levels
ug/L - micrograms per liter
NA - Not analyzed
J - Estimated concentration
< - not detected above reporting limit shown
NE - Not established
cPAHs - Carcinogenic polycyclic aromatic hydrocarbons
TTEC - Total Toxicity Equivalency Concentration

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Table 3 Summary of PCOC Cleanup Levels for Soil and Groundwater Near Dry Well
Former JLI Facility
Vancouver, Washington

PCOCs	Analytical Method	Soil Cleanup Level (mg/kg)	Groundwater Cleanup Level (µg/L)	Basis
Gasoline-Range Petroleum Hydrocarbons	NWTPH-Gx	30 with benzene; 100 without benzene	800 with benzene; 1000 without benzene	MTCA Method A Unrestricted
Diesel-Range Petroleum Hydrocarbons	NWTPH-Dx	2000	500	MTCA Method A Unrestricted
Heavy Oil -Range Petroleum Hydrocarbons	NWTPH-Dx	2000	500	MTCA Method A Unrestricted
Toluene	EPA Method 8260C	7.0	1000	MTCA Method A Unrestricted
Methylene Chloride	EPA Method 8260C	0.2	5	MTCA Method A Unrestricted
cPAHs (TTEC)	EPA Method 8270 SIM	0.1	0.1	MTCA Method A Unrestricted
Cadmium	EPA Method 6000 and 7000 Series	2	5.0	MTCA Method A Unrestricted
Chromium	EPA Method 6000 and 7000 Series	2,000	50	MTCA Method A Unrestricted

Notes:
mg/kg – milligrams per kilogram
ug/L – micrograms per liter
PCOCs – Potential Constituents of Concern
8260C analysis will include all VOCs reported by laboratory
Metals analyses will include RCRA 8 metals
cPAHs TTEC – Carcinogenic Polycyclic Aromatic Hydrocarbons, Total Toxicity Equivalent Concentration

Table 4 Summary of Sample Chemical Analyses by Location
Former JLI Facility
Vancouver, Washington

Boring ID	Location	Sample Media	Analytical Method						
			NWTPH-Gx	NWTPH-Dx	VOCs via EPA Method 8260[1]	EDB via EPA Method 8011[2]	cPAHs via EPA Method 8270-SIM	PCBs via EPA Method 8082	RCRA-8 Metals via EPA Method 6000 and 7000 Series[3]
BH-8	dry well	soil	X	X	X	X	X		X
		groundwater	X	X	X	X	X		X
BH-9	dry well	soil	X	X	X	X	X		X
		groundwater	X	X	X	X	X		X
BH-10	dry well	soil	X	X	X	X	X		X
		groundwater	X	X	X	X	X		X
BH-11	dry well	soil	X	X	X	X	X		X
		groundwater	X	X	X	X	X		X
BH-12	former waste oil UST	soil	X	X	X	X	X	X	X
		groundwater	X	X	X	X	X	X	X
BH-13	former motor oil UST	soil		X			X		
BH-14	former motor oil UST	soil		X			X		
MW-1	dry well	groundwater	X	X	X	X	X		X
PEX-1	dry well	soil	X	X	X	X	X		X
PEX-2	dry well	soil	X	X	X	X	X		X
PEX-3	dry well	soil	X	X	X	X	X		X
PEX-4	dry well	soil	X	X	X	X	X		X
PEX-5	dry well	soil	X	X	X	X	X		X
SP-1	overburden stockpile	soil	X	X	X	X	X		X
SP-2	contaminated soil stockpile[4]	soil	X	X	X	X	X		X

Notes:
cPAHs - Carcinogenic Polycyclic Aromatic Hydrocarbons
EDB - Dibromoethane, 1-2
EDC - Dichloroethane, 1-2
MTBE - Methyl tertiary-butyl ether
NWTPH-Dx - Extended diesel range petroleum hydrocarbons; includes heavy oil and mineral oil range petroleum hydrocarbons
NWTPH-Gx - Gasoline range petroleum hydrocarbons
PCBs - Polychlorinated Biphenyls
VOC - Volatile Organic Compounds

[1]EPA Method 8260C is used to detect EDC and MTBE in soil and groundwater, and EDB in soil

[2]EPA Method 8011 is used to detect EDB in groundwater to achieve detection limits below the applicable cleanup standard

[3]Groundwater collected as grab samples from direct push probes will be filtered in the field and analyzed for dissolved metals only. Groundwater samples collected from the monitoring well will be analyzed for both total and dissolved metals.

[4]It may not be necessary to sample the material that will be removed for disposal if existing data are sufficient for profiling purposes.

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FIGURES

Source: USGS 7.5 minute quadrangle map Orchards, WA dated 1990.

N

0 0.5 1

Approximate Scale in Miles

Figure 1

Site Location Map

Job No. 33761822

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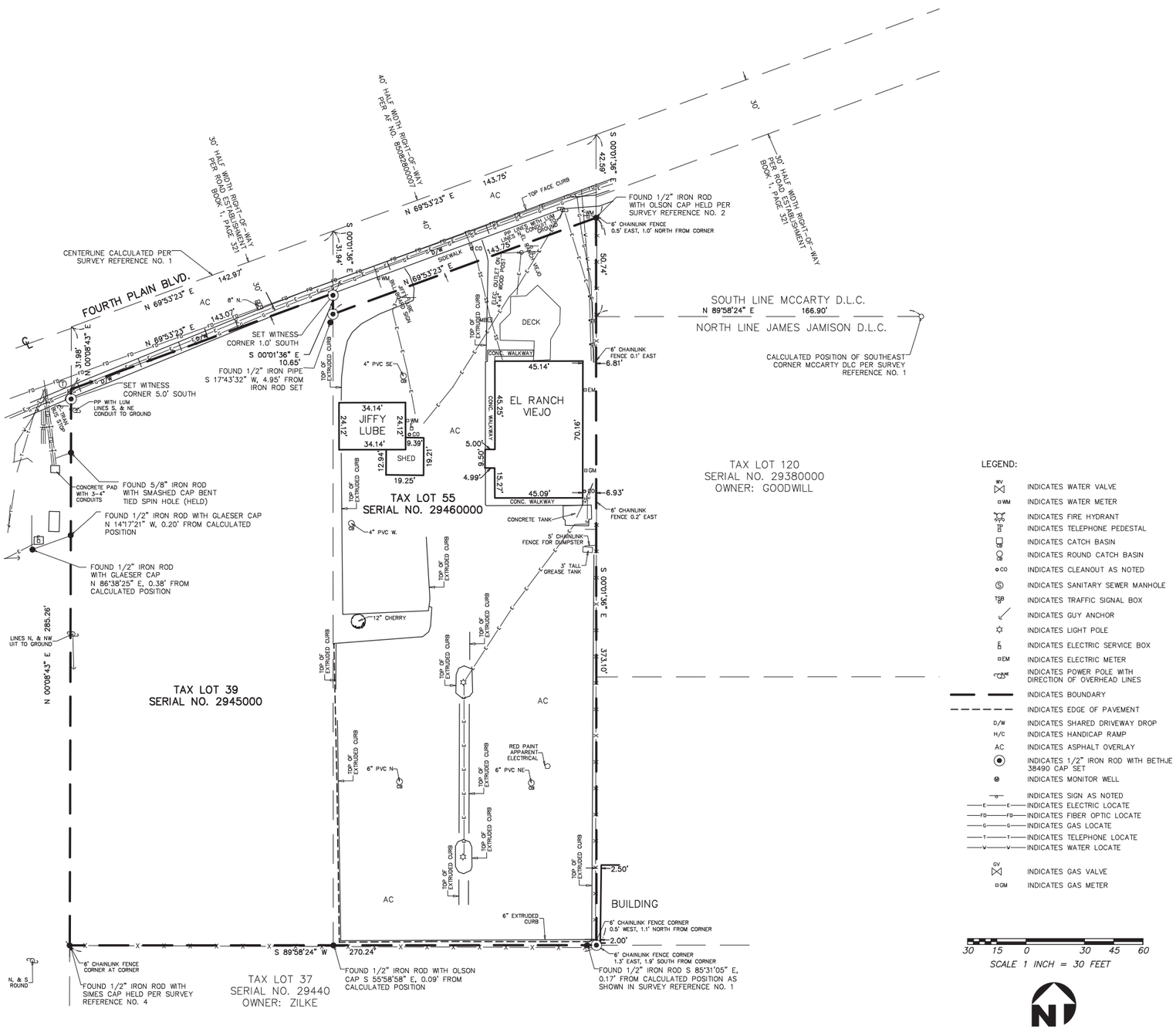
Former JLI Facility
Vancouver, Washington

BASE3A.CDR



LEGEND:

- INDICATES WATER VALVE
- INDICATES WATER METER
- INDICATES FIRE HYDRANT
- INDICATES TELEPHONE PEDESTAL
- INDICATES CATCH BASIN
- INDICATES ROUND CATCH BASIN
- INDICATES CLEANOUT AS NOTED
- INDICATES SANITARY SEWER MANHOLE
- INDICATES TRAFFIC SIGNAL BOX
- INDICATES GUY ANCHOR
- INDICATES LIGHT POLE
- INDICATES ELECTRIC SERVICE BOX
- INDICATES ELECTRIC METER
- INDICATES POWER POLE WITH DIRECTION OF OVERHEAD LINES
- INDICATES BOUNDARY
- INDICATES EDGE OF PAVEMENT
- INDICATES SHARED DRIVEWAY DROP
- INDICATES HANDICAP RAMP
- INDICATES ASPHALT OVERLAY
- INDICATES 1/2" IRON ROD WITH BETHJE 38490 CAP SET
- INDICATES MONITOR WELL
- INDICATES SIGN AS NOTED
- INDICATES ELECTRIC LOCATE
- INDICATES FIBER OPTIC LOCATE
- INDICATES GAS LOCATE
- INDICATES TELEPHONE LOCATE
- INDICATES WATER LOCATE
- INDICATES GAS VALVE
- INDICATES GAS METER

Job No. 33761822

Figure 2
Site Plan

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Former JLI Facility
Vancouver, Washington

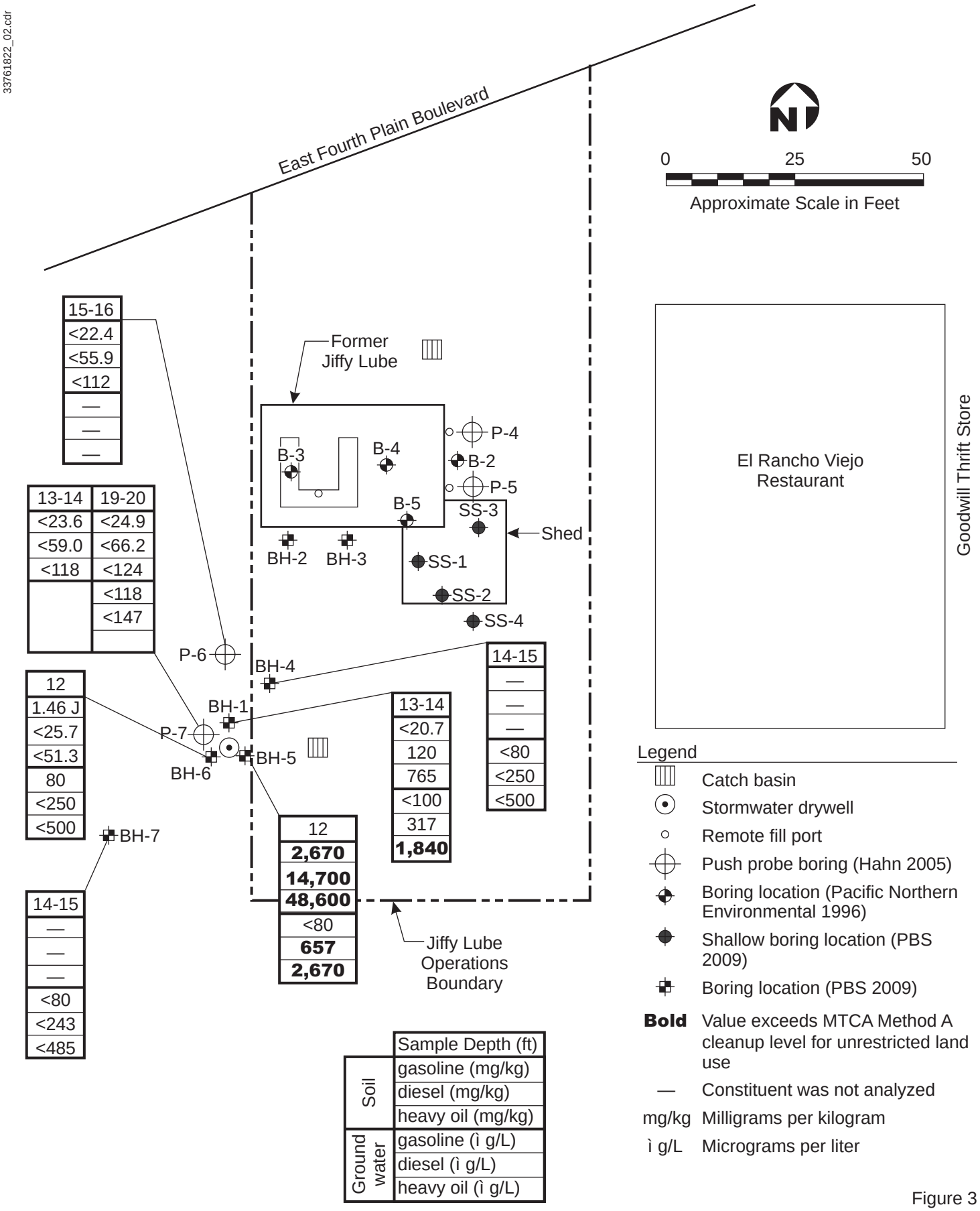

Figure 3

Site Plan and Historical Data

Job No. 33761822

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Former JLI Facility
Vancouver, Washington

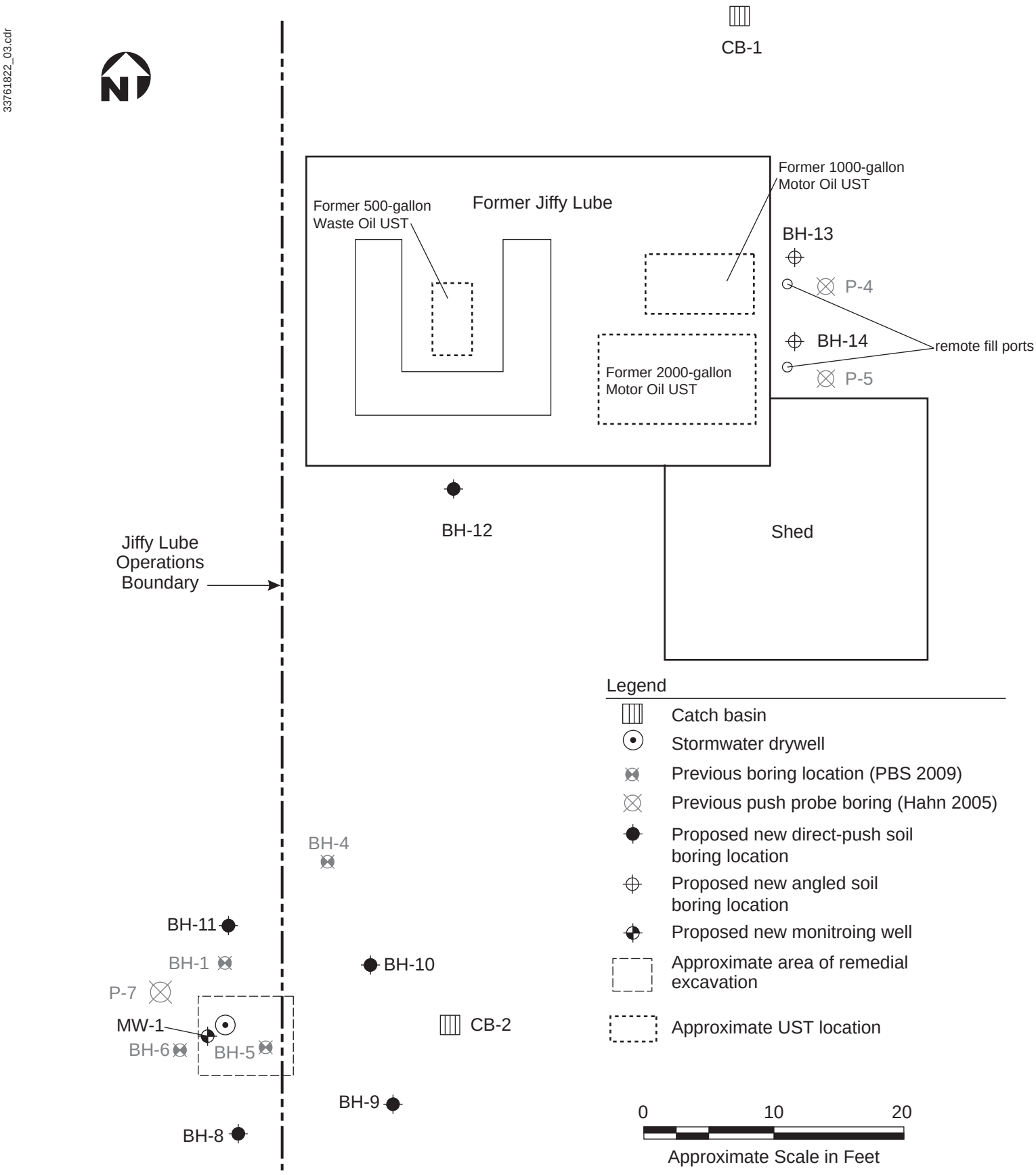

Figure 4

Site Plan, Proposed Sample Locations, and Proposed Excavation Area

Job No. 33761822

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Vancouver, Washington

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APPENDIX A

HEALTH AND SAFETY PLAN

DRY WELL DECOMMISSIONING AND CLEANUP ACTION

FORMER JLI FACILITY, VANCOUVER, WASHINGTON

HEALTH AND SAFETY PLAN

For

DRYWELL DECOMMISSIONING AND CLEANUP ACTION PLAN

Former JLI Facility
6317 NE 4th Plain Blvd
Vancouver, Washington

Jiffy Lube International, Inc.

URS Job No.: 33761822

November 2009

Disclaimer:

This Health and Safety Plan, and each of its provisions, is applicable only to, and for use only by, URS Corporation, its affiliates, and its subcontractors. Any use of this Plan by other parties, including, without limitation, third party contractors on projects where URS is providing engineering, construction management, or similar services, without the express written permission of URS, will be at that party's sole risk, and URS Corporation shall have no responsibility therefore. The existence and use of this Plan by URS shall not be deemed an admission or evidence of any acceptance of any safety responsibility by URS for other parties unless such responsibility is expressly assumed in writing by URS in a specific project contract.

HEALTH AND SAFETY PLAN
(Phone Numbers)

		PHONE
Project Manager:	**James Flynn**	**206-438-2113**
Task Manager:	**Jessica Wellmeyer**	**206.438.2319** **480.310.2372 (cell)**
Site Manager:	**Jessica Wellmeyer**	**206.438.2319** **480.310.2372 (cell)**
Site Safety Officer:	**Geoffrey Garrison**	**206.438.2128** **206.850.0748 (cell)**
Alternate Site Safety Officer:	**NA**	
Plan Preparer:	**Geoffrey Garrison**	**206.438.2128**
Preparation Date:	**November 10, 2009**	
Expiration Date:	**November 10, 2010**	

APPROVALS:

11/10/09

Jennifer Allen CIH
Health, Safety, and Environment Representative

11/10/09

Jim Flynn
Project Manager

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, Safety, and Environment Manager. A copy of this plan is to be maintained at the site at all times.

HEALTH AND SAFETY PLAN
TABLE OF CONTENTS

Section **Page**

Attachments

GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS

ºC	degrees centigrade
ºF	degrees Fahrenheit
ACGIH	American Conference of Governmental Industrial Hygienists
analyzer	field instrument described in Section 6.1
atm	atmosphere
C	ceiling
Carcinogen	a substance that can cause cancer
cc	cubic centimeter
CGI	combustible gas indicator
CNS	central nervous system
CSP	Certified Safety Professional
CRZ	contaminant reduction zone
DERA	Designated Emergency Response Authority
DOT	Department of Transportation
ESLI	End-of-Service-Life Indicator
eV	electron volts
EZ	Exclusion Zone
FID	flame ionization detector
HCL	hydrochloric acid
HEPA	high-efficiency particular arrestor
Hnu	ionizing radiation detection device
HSM	Health and Safety Manager
HSP	Health and Safety Plan
kg	kilogram
LEL	lower explosive limit
Lpm	liters per minute
m	meter
mg	milligram
mg/M^3	milligrams per cubic meter
ml	milliliter
mm	millimeter
MSDS	Material Safety Data Sheet
MSL	mean sea level
ND	not detected
NIOSH	National Institute for Occupational Safety and Health

GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS (Continued)

O_2	oxygen
OBZ	operator's breathing zone
OEL	occupational exposure limit
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
OVM	organic vapor monitor
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PEL	permissible exposure limit
PID	photoionization detector
PM	project manager
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
REL	recommended exposure limit
RHSEM	Regional Health, Safety and Environment Manager
SMS	Safety Management Standard
SSO	Site Safety Officer
SSR	Subcontractor's Safety Representative
STEL	short term exposure limit
TLV	threshold limit value
TWA	time-weighted average
UEL	upper explosive limit
URS	URS Corporation and subsidiaries
VOC	volatile organic compound
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Administration (Department of Labor & Industry)

DRYWELL DECOMMISSIONING AND CLEANUP ACTION PLAN
FORMER JLI FACILITY
VANCOUVER, WA

1.0 PLAN-AT-A-GLANCE

HEALTH AND SAFETY PLAN SUMMARY SHEET

THIS SUMMARY SHEET IS PROVIDED AS A QUICK-REFERENCE/OVERVIEW ONLY. THE REMAINDER OF THIS SITE-SPECIFIC HEALTH AND SAFETY PLAN (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:	**360-256-2000 (Southwest Washington Medical Center)**
Occupational Clinic	**360-891-4900 (Columbia River Occupational Health)**

Project Manager:	James Flynn 206-438-2113, 206-619-5952(c)
Site Safety Officer:	Geoff Garrison 206-438-2113, 206-850-0748 (c)
Health, Safety, and Environment Representative:	Jennifer Allen 206-438-2120, 206-295-2029 (c)
Regional Health, Safety, and Environment Manager:	Mark Litzinger, CIH 206-438-2199
National Response Center:	(800) 424-8802

A cellular phone will be available on site at all times.

For an emergency:

1. Call Emergency at 911.
2. Be prepared to provide the following information:
    a. Name
    b. Phone number that you are calling from
    c. Nature of incident, type of injury/emergency
    d. Location (e.g. Boeing building number)
3. Post someone at the nearest safe road to direct emergency vehicles
4. Report to the URS PM and Regional Health and Safety Manager.

HOSPITAL DIRECTIONS:

For emergencies the nearest hospital is:	For non-emergency incidents the nearest health clinic is:
Southwest Washington Medical	**Columbia River Occupational Health**
400 NE Mother Joseph Place	**2105 NE 129th St, Suite 107**
Vancouver, Washington	**Vancouver, Washington**

See Attachment A for a map of the route to the hospital and occupational health clinic.

Additional information concerning emergency procedures is located in Section 12.0.

CONSTITUENTS OF CONCERN

1. Gasoline-range petroleum hydrocarbons
2. Diesel-range petroleum hydrocarbons

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	Chemical	Heat/Cold Stress	Noise	Slip/Trip/ Fall	Lifting	Mechanical	Electrical	Explosion
1. Utility Locate	Low	Med	Low	Med	Low	Low	Low	Low
2. Drilling (soil borings)	Low	Med	Med	Med	Low	Med	Low	Low
3. Excavation of Soil	Low	Med	High	Med	Low	High	Med	Low
4. Soil and Groundwater Sample Collection	Med	Med	Low	Med	Med	Low	Low	Low
5. Mobilization/ demobilization	Low	Med	Low	Med	Med	Low	Low	Low

High - Exposure likely more than 50% of the time Med - Exposure likely 10 to 50% of the time
Low - Exposure likely less than 10% 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. Utility Locate	Steel-toed boots, hard hat, safety vest.
2. Drilling (soil borings)	Steel-toed boots, hard hat, safety vest, safety glasses, hearing protection; nitrile gloves when handling potentially contaminated materials.
3. Excavation of Soil	Steel-toed boots, hard hat, safety vest, safety glasses, hearing protection; nitrile gloves when handling potentially contaminated materials.
4. Soil and Groundwater Sample Collection	Steel-toed boots, hard hat, safety glasses, work gloves and nitrile gloves.
5. Mobilization/ demobilization	Steel-toed boots, hard hat, safety glasses, work gloves.

PROTECTIVE CLOTHING

Level D PPE is required including steel toed boots and safety glasses. If working around heavy equipment, a traffic safety vest, hard hat and hearing protection are required. Hand protection is required depending on the task. Full body chemical protective clothing is not anticipated for use on this project but will be made available if site conditions such as excessive dust or mud is generated as determined by the SSO.

Chemical Protective Clothing

Outer Coveralls:	**Tyvek® (if conditions require it to prevent contamination)**
Outer Gloves:	**Nitrile**
Inner Gloves:	**Surgical Nitrile**
Footwear:	**Steel-toed boots (steel-toed rainboots if conditions require)**
Eye protection:	**Safety glasses**

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

ENGINEERING CONTROLS TO BE USED (AS APPLICABLE)

- Excavation will not be entered by personnel.
- Adherence to site specific health and safety requirements at each location.

For more information, see Section 5.0

INSTRUMENTATION TO BE USED

__ HNu Photoionization Detector (PID) w/ 10.6 eV probe
__ Industrial Scientific Multi-gas Meter (O_2, LEL, CO, H_2S)
__ Organic Vapor Monitor (OVM), PID w/ 10.6 eV lamp OR
__ Photovac Microtip PID w/ 10.6 eV lamp
_√_ **MiniRAE PID w/ 10.6 eV lamp**
__ Combustible Gas/O_2 Indicator
__ Foxboro Organic Vapor Analyzer (OVA) Flame Ionization Detector (FID)
__ Miniram Real-time Dust Monitor
__ Other _____

For more information, see Section 6.

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
_√_ **Is not anticipated**

For more information on monitoring, see Section 6.0.

HAZ-COM MATERIALS INVENTORY

- Alconox (decontamination)
- HCL (sample preservative)

MSDS for chemicals used on site will be reviewed by personnel prior to site activities.

HEALTH AND SAFETY EQUIPMENT LIST

Required	As needed	
√		URS SMSs (relevant to project - see next page)
	√	Occupational Safety and Health Administration (OSHA) "Safety on the Job" Posters
√		Hardhats
√		Safety glasses
√		Ear plugs or muffs
	√	Cotton coveralls
√		Traffic safety vest
	√	Tyvek® coveralls
	√	Polycoated Tyvek® Q-23 coveralls
√		Steel-toed boots
	√	Chemical-resistant steel-toed boots or chemical-resistant boot covers
	√	Work gloves
	√	Nitrile outer gloves
	√	Surgical nitrile inner gloves
	√	Plastic sheeting (visqueen)
	√	55-gallon 17-H drums (for contaminated solids)
	√	55-gallon 17-E drums (for liquids)
√		Barricade tape and barricades
	√	Wash tubs and scrub brushes
√		Decontamination solution (i.e., alconox solution)
	√	Folding chairs
	√	Personal eyewash
	√	Respirator sanitizing equipment
√		First aid kit
	√	Infection control kit
√		Drinking water
	√	Gatorade or similar drink
√		Type ABC fire extinguishers
	√	Half-face respirators approved by National Institute for Occupational Safety and Health (NIOSH)
	√	Full-face respirators (NIOSH-approved)
	√	Respirator cartridges [HEPA/Organic Vapor]
√		PID w/10.6 lamp and calibration kit
	√	Combustible gas indicator (CGI) and calibration kit
	√	Garden sprayer
	√	Compressed gas horn
	√	Paper towels and hand soap
	√	Spill sorbent
	√	Plastic garbage bags
	√	Broom and/or shovel

SAFETY MANAGEMENT STANDARDS REFERENCED BY THIS HSP

SMS	TOPIC	HSP SECTION
59	Cold Stress	5.2.2
69	Manual Material Handling	5.2.4
19	Heavy Equipment	5.2.1
13	Excavation Safety	5.2.5
49	Incident Reporting	12.6
21	Housekeeping	5.2.3
32	Work Zone Traffic Control	5.2.7
34	Utility Clearances and Isolation	5.2.6
72	Behavior Based Safety	13.3

These SMSs are available on the URS Health, safety, and Environment Web site. Access the Web site from the SoURSe or through the Internet (www.urshse).

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

2.0 PLAN PURPOSE AND SCOPE OF WORK

PLAN PURPOSE

The use of this Health and Safety Plan (HSP) is limited to projects in which URS personnel are overseeing direct-push and/or hollow-stem auger drilling, performing soil sampling and groundwater sampling from borings, and overseeing subcontractor soil excavation activities. This HSP was prepared according to the requirements of the OSHA HAZWOPER standard, 29CFR1910.120 and the corresponding Washington State standard. Shell's Life Saving Rules (Section 11.1 and throughout this HSP) and Shell's ES Subsurface Investigation Protocol are also integrated into this HSP. URS will be on-site to provide oversight of subcontractor services that will include excavation of contaminated soil and associated backfill and soil management activities. Subcontractors retained as part of this project will meet URS subcontractor prequalification requirements. To complete the work, URS will implement the following tasks associated with the above referenced activities:

- Clearance of underground utilities
- Clearance of soil boring locations using air knife technology
- Observe soil boring completion
- Field screen soils and collect soil and groundwater samples
- Observe excavation of contaminated and uncontaminated soil
- Field screen soil from excavation and soil stockpiles using field instrumentation as noted in Section 6
- Backfill excavation
- Oversight of dry well construction
- Oversight of site restoration
- Document daily activities

Subcontractors are responsible for the following tasks:

- Completion of soil borings
- Excavation of soil
- Stockpiling soil onsite, segregating "clean" and "dirty" soils and placing wet soils on a water-proof and bermed layer
- Backfilling and compacting excavation with "clean" dirt stored onsite and clean fill they will bring onsite as needed
- Dry well construction

SCOPE OF WORK

Four groundwater samples will be collected from direct-push borings around the location of the impacted dry well prior to decommissioning the well and removing impacted sediment and soil. Previous investigations indicate that the impacted groundwater is isolated to an area immediately adjacent to the north and southeast of the dry well. Four additional borings will be completed north, east, and south of the previous borings to confirm the limited nature of soil and groundwater impacts around the dry well. One soil and one groundwater sample will be collected from each boring to be analyzed for petroleum hydrocarbons.

The remedial action will include the removal and disposal of sediment within and soil immediately adjacent to the dry well which contains concentrations of PCOCs exceeding applicable cleanup levels.

Confirmation soil samples will be collected from the base and sidewalls of the excavation. The soil will be stockpiled on-site or stored in roll-off boxes, profiled for disposal and then transported offsite for disposal at a permitted landfill. Clean over-burden will be stockpiled separately and samples from this stockpile will be analyzed to confirm that it is suitable for reuse onsite.

If concentrations of PCOCs in groundwater exceed applicable cleanup levels in one or more samples, the remedial excavation will be backfilled with clean fill and overburden, and a groundwater monitoring well will be installed at the location of the boring with the highest concentrations of PCOCs. The replacement dry well will be installed in an alternate location selected to ensure ongoing groundwater monitoring is not affected by infiltrating stormwater.

3.0 APPLICABILITY

The purpose of this HSP, which was developed specifically for the DRYWELL DECOMMISSIONING AND CLEANUP ACTION PLAN at the Former JLI Facility at 6317 NE 4th Plain Blvd, Vancouver, Washington, 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 HSP complies with, but does not replace, federal Health and Safety Regulations, as set forth in 29 CFR 1910 and 1926, and applicable state regulations (Washington Administrative Code (WAC) 296-62, WAC 296-843 and WAC 296-155). This HSP is to be used by URS personnel and subcontractors as a supplement to these rules, regulations, and guidance. This HSP is to be augmented by the URS Health, Safety, and Environment Program and Management System; relevant standards from that program and system are required to be available on site during all activities.

The provisions of the HSP are mandatory for all on site URS employees and subcontractors 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 HSP to maintain a safe and healthful work environment. Any proposed changes to this plan will be reviewed with a URS health, safety, and environment 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.

Subcontractors to URS will be required to follow the requirements of this plan or more stringent standards. In addition, subcontractors engaged in construction activities including drilling and excavation will provide documentation to URS which describes their plan for addressing applicable the health and safety requirements for activities that are unique to their scope of services (for example: drilling safety, excavation safety, electrical safety, etc.).

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 its employees, subcontractors, or support personnel who may enter the site.

URS will adhere strictly to the provisions of this HSP, along with applicable regulations issued by governmental entities.

4.1 PROJECT MANAGER (URS) – JAMES FLYNN

The PM will 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 the following.

- Seeing that appropriate PPE and monitoring equipment are available and properly used by all onsite URS employees.
- Establishing that URS personnel are aware of the provisions of this HSP, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies.
- Establishing that all URS onsite personnel have completed a minimum of 40 hours of health and safety training, have appropriate medical clearance, as required by 29 CFR 1910.120 (WAC 296-843), and have been fit tested for the appropriate respirators, if applicable.
- Seeing that URS personnel are aware of the potential hazards associated with site operations.
- Monitoring the safety performance of all URS personnel to see that required work practices are employed.
- Correcting any URS work practices or conditions that may result in injury or exposure to hazardous substances.
- Preparing any accident/incident reports for URS activities (see Section 12.6).
- Seeing to the completion of Safety Plan Compliance Agreements by URS personnel (See Attachment B).
- Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- Seeing that utility clearances are obtained prior to the commencement of work (see Section 5.2.7).
- Seeing that the appropriate SMSs are appended to this HSP and are available on site (see "Plan-at-a-Glance").
- Reviewing and approving this project HSP.

4.2 SITE SAFETY OFFICER (URS) – GEOFFREY GARRISON

The SSO's duties may be carried out by the PM or another qualified URS Site Manager. The SSO is responsible for the following.

- Implementing the project HSP and reporting any deviations from the anticipated conditions described in that plan to the PM and, if necessary, the RHSM.
- Determining that monitoring equipment is used properly by URS personnel and calibrated in accordance with manufacturer's instructions or other standards and results are properly recorded and filed.
- Checking with a URS Health, Safety, and Environment Representative to assure URS personnel have current medical clearance and training.
- Assuming any other duties as directed by the PM or RHSM.
- Coordinating with a URS health, safety, and environment professional to identify URS personnel on site for whom special PPE, exposure monitoring, or work restrictions may be required.
- Conducting safety meetings for all site personnel in accordance with Section 13 of this HSP.
- Conducting daily site inspections prior to the start of each shift. All inspections must be documented (preferably in a bound field logbook).
- Providing ongoing review of protection level needs as project work is performed and informing the PM of the need to upgrade/downgrade protection levels, as appropriate.
- Seeing that decontamination procedures described in Section 10.0 are followed by URS personnel.
- Establishing monitoring of URS personnel and recording the results of exposure evaluations.
- Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- Maintaining the visitor log.

4.3 REGIONAL HEALTH, SAFETY AND ENVIRONMENT MANAGER (URS)

The RHSM is responsible for:

- Determining the need for periodic audits of the operation to evaluate compliance with this plan
- 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:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees;
- 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;

- Implementing the procedures set forth in the HSP and reporting any deviations from the procedures described in that HSP to the SSO or PM for action;
- 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; and
- Reviewing the project HSP and signing the Safety Plan Compliance Agreement.

4.5 SUBCONTRACTOR'S SAFETY REPRESENTATIVE

Subcontractors are requested to designate an on-site employee (preferably a manager) who will serve as the Safety Representative (SSR) for their company. In this capacity, the SSR is responsible for providing health and safety oversight of their personnel participating on the project team. In addition, the SSR will perform routine work area inspections, conduct safety meetings, provide safety orientations for new employees and investigate incidents involving their employees. The SSR will attend periodic safety meetings with the URS SSO.

5.0 JOB HAZARD ANALYSIS

5.1 CHEMICAL HAZARDS

Two categories of chemical hazards are associated with site activities:

- Site constituents; and
- Chemicals used to conduct the site work.

Site constituents are those that exist at the site and are the cause for conducting site activities. The chemicals that are brought on site 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. Health hazards for constituents exceeding the MTCA Method A unrestricted cleanup level, or known components of diesel fuel and motor oil, are presented here in terms of the following types of occupational exposure limits.

- PEL Permissible Exposure Limit (OSHA Standard)
- TLV Threshold Limit Value (American Conference of Governmental Industrial Hygienists [ACGIH] Guidance)
- REL Recommended Exposure Limit (NIOSH Guidance)
- STEL Short Term Exposure Limit
- C Ceiling

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

STEL is defined as the concentration to which workers can be exposed for short time periods without irritation, tissue damage, or narcosis sufficient to be likely to cause impairment of self-rescue or to precipitate accidental injury. The STEL is a 15-minute TWA that will 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 will not be exceeded at any time in any workday. Ceiling limits are used by OSHA, ACGIH, and NIOSH for chemical exposure criteria.

Table 5-1 Summary of Site Constituent Health Hazards

Chemical Name	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Methylene Chloride	**PEL: 25 ppm REL: Ca TLV: 50 ppm STEL: 125 ppm IDLH: 2300 ppm Skin: No**	**Colorless liquid with chloroform-like odor (gas above 104 deg. F)**	**INH ABS ING CON**	**Suspect carcinogen (in animals: lung, liver, salivary and mammary gland tumors). Causes irritation of eyes and skin, drowsiness, narcosis.**
cPAHs (carcinogenic polycyclic aromatic hydrocarbons)	**EPA has classified some PAHs – called cPAHs – as probable human carcinogens as a result of *sufficient* evidence of carcinogenicity in animals and *inadequate* evidence in humans**	**Generated by incomplete combustion of organic matter including oil, wood, and coal. Found in materials such as creosote, coal, coal tar, and used motor oil.**	**ING CON**	**Suspect carcinogen; no obvious acute signs or symptoms of exposure**
Toluene	**PEL: 200 ppm 300 ppm (C) REL: 100 ppm TLV: 50 ppm STEL:500 ppm (10 min. maximum peak) IDLH: 500 ppm Skin: Yes**	**Colorless liquid with a sweet, pungent benzene-like odor. LEL: 1.1% UEL: 7.1% IP: 8.82 eV VP: 21 mm FI.P: 40°F**	**INH ABS ING CON**	**Irritation of eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; muscle fatigue, insomnia; dermatitis, liver, kidney damage.**
Gasoline	**PEL: N/A REL: Ca TLV: 300 ppm STEL: 500 ppm IDLH: (CA) Skin: No**	**Clear liquid with a characteristic odor. LEL: 1.4% UEL: 7.6% IP: N/A VP: 38-300 mm FI.P.: -45 °F**	**INH ABS ING CON**	**Irritation of eyes, skin, mucous membranes; dermatitis; headache, lassitude, blurred vision, dizziness, slurred speech, confusion, convulsions; possible liver, kidney damage; chemical pneumonitis (aspiration of liquid).**
Naphthalene (component of Diesel)	**PEL: 10 ppm REL: 10 ppm TLV: 10 ppm STEL: 15 ppm IDLH: 250 ppm Skin: Yes**	**Colorless to brown solid with an odor of mothballs. LEL: 0.9% UEL: 5.9% IP: 8.12 eV VP: 0.08 mm FI.P.: 174 °F**	**INH ABS ING CON**	**Irritation of eyes; headache, confusion, excitement, malaise; nausea, vomiting, abdominal pain; irritation of bladder; profuse sweating; jaundice; dermatitis, optical neuritis, corneal damage.**
Fuel Oil #2 (OSHA/NIOSH as petroleum distillates; ACGIH as diesel fuel)	**PEL: 500 ppm REL: 350 mg/m^3 (C) 1800 mg/m^3 TLV: 100 mg/m^3 STEL: N/A IDLH: 1100 ppm Skin: Yes**	**Colorless liquid with a gasoline- or kerosene-like odor LEL: 1.1% UEL: 5.9% IP: N/A VP: 40 mm FI.P.: -40 to -86 °F**	**INH ING CON ABS**	**Irritation of eyes, nose, throat; dizziness, drowsiness, headache, nausea; dry cracked skin; chemical pneumonitis (aspiration of liquid).**

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 site activities is

anticipated to be minimal. Monitoring of vapors will be performed per Section 6.0. If unanticipated airborne levels are encountered, personnel will evacuate from the immediate area until further characterization of the volatile components and inhalation exposure can be made. 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 that 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 Material Safety Data Sheets (MSDSs) for the hazardous materials listed in Section 1.0 are included in Attachment C. The SSO will make copies of these MSDSs available to any subcontractors on this project.

5.2 PHYSICAL HAZARDS

Physical hazards at this work site include:

- Heavy Equipment – drill rig, truck, excavator
- Weather related issues, including cold stress
- Noise from the operation of site equipment
- Slip-trip-fall types of accidents
- Back injuries resulting from improper lifting
- Being caught in or struck by moving equipment
- Electrocution or explosion hazards associated with drilling or excavation activities without proper utility clearance, such as contact with overhead or underground power lines or pipelines

5.2.1 Heavy Equipment

Operation of heavy equipment during site activities presents potential physical hazards to personnel. Issues associated with heavy equipment operations are addressed in SMS 019 NA, 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) including traffic safety vests, steel-toed shoes, safety glasses or goggles, and hard hats must be worn.
- 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.
- 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.

In addition to the above precautions, the heavy equipment operator will be required to follow these additional safety guidelines:

- Make sure all personnel in the area are aware of the activities and dangers.
- Evacuate the area that will be impacted of all unnecessary personnel.
- Observe the overhead areas to assess the potential for objects that may fall.

URS employees are not to operate heavy equipment unless they have properly trained to operate the equipment.

5.2.2 Weather Related Hazards

The potential exist for weather related hazards at the site including lightning, heat stress, and cold stress.

Weather conditions will be an important consideration in planning and conducting field operations. Lightning may accompany storms, creating an electrocution hazard during outdoor operations. Extremely hot or cold weather can cause physical discomfort, loss of efficiency and personal injury. Since this work is anticipated to be performed in winter or early spring, cold stress is of particular importance.

Lightning:

Weather conditions will be monitored and work suspended during electrical storms.

> **30/30 Rule:** The 30/30 Rule states that people should seek shelter if the "Flash-To-Bang" delay (length of time in seconds between a lightning flash and its subsequent thunder), is 30 seconds or less, and that they remain under cover until 30 minutes after the final clap of thunder.

A 30 second lead time is necessary prior to a storm's arrival because of the possibility of distant strikes. A 30 minute wait after the last thunder is heard is necessary because the trailing storm clouds still carry a lingering charge. This charge can and does occasionally produce lightning on the back edge of a storm, several minutes after the rain has ended.

Studies have shown most people struck by lightning are struck not at the height of a thunderstorm, but before and after the storm has peaked. This shows many people are unaware of how far lightning can strike from its parent thunderstorm. DO NOT wait for the rain to start before seeking shelter, and do not leave shelter just because the rain has ended.

Temperature Stress:

Heat stress emergencies can be brought on by working during hot weather or inside hot areas, or even when working in certain types of clothing or PPE. Heat stress occurs when the body loses its ability to regulate it own temperature. Heat stress can begin with mild symptoms, but can begin to threaten a

person's life quickly. Please review SMS 018 NA and read the following to understand more about heat stress.

1- HEAT RASH: 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 un-evaporated 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.

2- HEAT CRAMPS: Heavy sweating with inadequate electrolyte replacement causes heat cramps. 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.

3- HEAT EXHAUSTION: 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.

4- HEAT STROKE: 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 occurs. 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.

5- HEAT STRESS PREVENTION: The best approach to avoiding heat-related illness 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 90o F and workers are wearing "Level D" coveralls or work clothes. A car or van is an oven, not a rest area. 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 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 drink 8 to 16 ounces. 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.

6- COLD STRESS: Frostbite and hypothermia are two kinds of emergencies that can be brought on by cold or wet weather or conditions. Frostbite is the freezing of body parts exposed to the cold and hypothermia is when the body cools to unsafe levels because it loses its ability to keep warm. Both emergencies can begin with mild symptoms, but can begin to threaten body parts (limbs) or a person's life quickly.

1- FROSTBITE: Signs of frostbite include loosing feeling in the area affected; and/or the skin appears waxy, is cold to the touch, or discolored (i.e., flushed, blue, white, or yellow). In the event a person exhibits these symptoms gently handle the affected area, DO NOT rub the affected area. Place the affected area in warm water (approximately 100oF to 105oF) until it appears red and feels warm. Loosely bandage the affected area with a dry sterile dressing. Place sterile gauze between toes and/or fingers to keep them apart. Do not break any blisters. Watch the person for signs of shock and transport them to the nearest medical facility or call 911.

2- HYPOTHERMIA: Signs of hypothermia include shivering, numbness, glassy stare, apathy, weakness, impaired judgment, and loss of consciousness. In the event a person exhibits these symptoms immediately call for assistance (911) and care for life threatening problems. Move the person to a warm dry place, remove wet clothing and dry them, and gently warm them by wrapping in blankets or putting on dry clothing. If

needed you should apply other sources of heat such as heat packs, warm water bottle making sure to place a barrier (blanket, towel, dry clothing) between the heat source and the individual. If nothing is available, your own body warmth can also assist in warming the other person. Do not warm the individual too quickly. Be extremely gentle with the individual and continue to check for breathing and pulse. If required, give rescue breathing and CPR.

Remember that in both cases it is important the individual receive proper medical care as soon as possible.

To prevent these emergencies requires planning ahead. Because overexposure is the most common cause of these types of emergencies, it is recommended that a person follow the guidelines presented below:

- avoid being outside during the hottest or coldest part of the day
- adjust your work activity according to the temperature
- take frequent breaks
- drink plenty of fluids
- dress appropriately for the anticipated weather conditions

Dressing appropriately for cold environments involves wearing layers of clothing. Layers of clothing can help keep the body warm by trapping warm air between layers and insulating the body. Layering of clothing also allows the wearer to regulate their body temperature by removing clothes when warm and putting them back on when cold.

In cold weather it is recommended an individual wear a minimum of three layers of clothing:

Underwear (inner) layer – should supply basic insulation and pull moisture away from the skin, should be of natural fibers if activity is light and synthetic fibers for heavier physical exertion; such as thermal underwear (long pants and long sleeved shirts)

Insulation (middle) layer(s) – should supply additional insulation even if wet, such as wool sweater, wool pants, down vest or jacket (if not wet weather)

Shell (outer) layer – should be wind and waterproof yet allow perspiration to escape, should be large enough to allow additional layers of clothing underneath

It is also recommended the individual wear a hat, gloves, insulating socks, insulating and waterproof boots, and other clothing which will assist the individual in keeping warm.

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. Equipment operators and all URS personnel within 25 feet of operating equipment or near an operation that creates noise levels high enough

to impair conversation will 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. Subcontractor personnel exposed to noise at or above the action level should be participating in a Hearing Conservation Program administered by their employer.

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, and avoid getting closer than 2 feet to the edge of an unsloped 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 may be spread in muddy areas to reduce slipperiness. Workers should watch where they are walking and walk only in areas of good stability. Additional information can be found in SMS 021, a copy of which is to be available on site.

5.2.5 Lifting Hazards

The following guidelines will be followed whenever lifting equipment such as portable generators, coolers filled with samples, and any other objects that are of odd size or shape or that weigh over 40 pounds. Safe lifting procedures are described in SMS 069, a copy of which is to be available on site. The procedures include the following.

- Get help when lifting heavy loads. Lift portable generators 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 that are in good condition and 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.
- Keep the heavy part of the load close to your body to help maintain your balance.

5.2.6 Motor Vehicles

Automobiles will be utilized for the project and at the work site, except areas where travel will be via foot. For automobile travel, all employees must read and comply with the driving requirements in SMS 057.

5.2.7 Excavation Safety

The excavation of trenches during site activities presents potential physical hazards to personnel. Issues associated with excavation operations are addressed in SMS 013.

The following precautions must be observed when excavations are being completed:

- Wear PPE, such as steel-toed shoes, safety glasses or goggles, traffic safety vests, and hard hats,.
- Keep all non-essential personnel out of the work area.
- Excavation greater than 4 feet will not be entered unless the excavation is adequately shored and inspected by a competent person or shored to the specification of a professional engineer.
- Excavation will be fenced to prevent the public from entering if left unattended for any period of time

5.2.8 Underground Utilities

All proximal underground utility locations must be located by either URS or the drilling contractor prior to the commencement of drilling or excavation activities. The proper utility company personnel should certify the deactivation of utilities in writing. See URS SMS 34 NA for additional information.

5.2.9 Overhead Hazards

Overhead power lines pose a danger of shock or electrocution if the power line is contacted or severed during site operations. Prior to conducting work in areas where overhead lines could be impacted, the appropriate utility company will be notified and information will be obtained regarding the line voltage and the minimum separation distance required for work in this area. Utility company personal should perform any work directly associated with overhead utilities.

Drilling 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, 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/service has provided a signed certification of the outage; or
- The minimum clearance from energized overhead lines is established as presented in the following table, or the equipment will be repositioned and blocked so that no part, including cables, can come within the minimum clearances listed in the table.

Minimum Distances from Power Lines	
Nominal System (kilovolt, 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)

If the minimum clearance option is chosen, a dedicated "spotter" employee must be used at all times to visually estimate the clearance and sound an audible alarm if minimum clearance distances are approached. See SMS 034 NA for further information.

Fire suppression equipment (a 20 lb ABC fire extinguisher or fire hose) is to be present at all times during site operations in areas where fire potential exists.

5.2.10 Dust

High winds and excavation activities can result in airborne hazards. If excavation operations generate sustained visible dust, the excavation contractor should apply a water mist to the site to reduce dust generation.

5.2.11 Work Area Protection

Project operations may be undertaken in a roadway or parking area, causing motor vehicles and heavy equipment to pose a hazard. The remedial excavation contractor will supply necessary personnel for any activities which require coning and flagging of the work area. Consideration should be given to parking work vehicles within the coned area between the work area and oncoming traffic. Procedures for work zone traffic control are provided in SMS 032.

Excavations and borings will not be left unattended. The site will be fenced to prevent members of the public from entering the site before excavations or borings have been backfilled.

6.0 EXPOSURE MONITORING PLAN

Heat stress, cold stress, noise, and chemical exposures may be encountered at this site. Heat stress and cold stress monitoring and prevention are addressed in Section 5.2.2. Noise levels will not be monitored; URS personnel will wear hearing protection as described in Section 5.2.3.

6.1 CHEMICAL EXPOSURE MONITORING

Volatiles will likely be present at this site based on data from previous investigations. A photoionization detector such as a MiniRae PID will be used to monitor volatiles in the work area. Action levels and response criteria are presented below. Monitoring will be initiated in the event that a hazardous atmosphere is suspected or if free product requires handling. All readings are to be recorded in the field logbook.

TABLE 11-1 ACTION LEVELS

Analyzer Reading	Location	Duration	Action	Personal Protective Equipment
15 to 50 ppm	Point of Operations/ Release Source point	_____	Continue periodic monitoring.	Minimum Site Ensemble (Hardhat, Steel-toed boots, eye protection, hearing protection)
> 10 ppm	Operator's Breathing Zone (OBZ)*	>1 minute	Provide respiratory protection; establish decontamination area for respirator cleaning.	Add Half-face respirators with organic vapor cartridges
> 25 ppm	OBZ*	>1 minute	Suspend work activities and allow vapors to dissipate. Contact Regional Health and Safety Manager.	N/A

***Operators Breathing Zone (OBZ) refers to the 1 foot radius area surrounding the workers head**

6.2 PERSONAL EXPOSURE MONITORING

It is not anticipated that personal exposure monitoring will be performed; however, if it is required a URS industrial hygienist will perform quantitative personal monitoring of personnel at the greatest risk of exposure (i.e., those working in the EZ). The industrial hygienist will determine who to sample based on site conditions at the time of the sampling.

Personnel will be monitored in accordance with NIOSH Methods. A laboratory accredited by the American Industrial Hygiene Association will perform analyses; results will be reported and records will be maintained in accordance with OSHA criteria.

6.3 BACKGROUND READINGS

All direct-reading instrument readings will be evaluated relative to background readings, 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 to determine the level of "background"

readings from such things as local vehicle traffic or emissions from nearby operations unrelated to the site. Site readings will be evaluated against these background readings (i.e., 20 parts per million [ppm], it is evaluated as 20 ppm above background). The SSO will consult with the industrial hygienist regarding the potential health hazards associated with background readings above 5 ppm.

6.4 DATA LOGGING

All monitoring data, including background readings, will be logged in the field logbook. The results of daily instrument calibrations can be logged either on a form developed for the field effort or in the field logbook. All monitoring instruments will be calibrated in accordance with the manufacturers' instructions prior to the start of each shift. Calibration also will 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, and the PM or RHSM will be contacted for further guidance.

7.0 PERSONAL PROTECTIVE EQUIPMENT

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

- Safety glasses with side shields (or impact-resistant goggles)
- Steel-toed boots or chemical-resistant steel-toed boots
- Work gloves and/or chemical-resistant gloves
- Hearing protection within 25 feet of noisy equipment
- Traffic safety vest when heavy equipment is in use
- Hardhat when heavy equipment is in use

As site conditions change, additional PPE may be required. Section 1.0 describes the PPE to be used. Procedures for the use and selection of PPE are provided in SMS 029.

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 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.

To obtain optimal 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; and
  - Poorly functioning closures**.**
- Inspect reusable garments, boots, and gloves prior to and during use for:
  - Visible signs of chemical permeation, such as swelling, discoloration, stiffness, or brittleness; and
  - Cracks or any signs of puncture or abrasion.

Reusable garments exhibiting any of these characteristics will be discarded.

7.2 DURATION OF WORK TASKS

The SSO will establish the duration of work tasks in which personnel use PPE ensembles that include chemical protective clothing (including uncoated Tyvek®). 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. Recommended rest breaks are as follows:

- Fifteen minutes midway between shift startup and lunch;
- Lunch break (30 to 60 minutes); and
- 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 washing the hands and face with soap and water.

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). always must 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 have been used by the preparer of this HSP 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 a hazardous substance that can attack the body through the skin.*

Airborne contaminants have been evaluated based on the suspected contaminants of concern. The concentration of the airborne chemical hazard will be evaluated using direct-reading instruments to determine what type of respirator will be used. Use of respirators is not anticipated, however the following respiratory protection program elements are included in this plan should use become required.

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) (WAC 296-841 and 842). Should the use of respirators become necessary, 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 SMS 042.

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

Respirator wearers will perform a user seal check each time they put on the respirator. For air-purifying respirators, the positive user seal check is performed by removing the exhalation valve cover, 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 assignments require the use of respirators are trained in accordance with 29 CFR 1910.134 during an initial 40-hour and annual refresher training for hazardous waste operations.

Hands-on training in inspecting and donning a respirator, including user seal checks, also is 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.

A particulate respirator cartridge will be changed out when the wearer has difficulty breathing through the cartridge. The fit of a chemical gas or vapor respirator will be rechecked, and the cartridges will be changed, if the wearer detects chemical odor or feels chemical irritation on the skin, both of which are indicators of leakage or cartridge breakthrough. Where available, an End-of-Service Life Indicator (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. The inspection procedure for air-purifying respirators (full-face piece and half-face piece cartridge respirators) follows.

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); and

- 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; and
- Excessively worn serration on the headstraps, which may permit slippage.

Examine the two inhalation valves and the 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; and
- 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; and
- Cracks or dents in the outside case or threads of the 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. Visitors' respirators or respirators assigned to several individuals 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. The procedures for cleaning respirators follow.

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

8.7 MAINTENANCE OF RESPIRATORS

Routine respirator maintenance, such as replacing missing valves, gaskets, and nosecups, must only be performed by trained respirator users or a respirator manufacturer's representative. Only approved replacement parts must be used. The 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 because of the potential for damage from other material or equipment.

8.9 ADDITIONAL INFORMATION

Additional information on the URS Respiratory Protection Program is located in SMS 042.

9.0 SITE CONTROL

9.1 GENERAL

Excavation activities are to be conducted within a secure fenced area. Barricade tape and/or barricades may be used to delineate a work zone for safety purposes around the work area as needed. A short piece of barricade tape may be affixed to a secure upright (e.g., a drill rig mast or a vehicle antenna) to serve as a wind direction telltale.

At the end of the shift, all boring/sampling holes 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 SSO will verify that all site visitors are accounted for. 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 HSP.

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

9.2 WORK ZONES

Work zones are not anticipated to be used for this project; however, if dust or volatiles becomes an issue, monitoring instruments may be used to determine if work zones are needed.

- Exclusion Zone (EZ) – A circle (as practical) around the work area will be defined before work starts. The encircled area will constitute the EZ. 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 EZ may be altered to accommodate site conditions and to ensure contaminant containment.
- Contaminant Reduction Zone (CRZ) – A corridor leading from the EZ will be defined; it 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 that contaminated disposable equipment can be placed inside and covered. Surface/soil contamination in this area will be controlled using plastic sheeting. No one will be permitted into the CRZ or EZ unless he/she is in full compliance with the requirements of this HSP.
- 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

A formal decontamination area is not anticipated. If site conditions necessitate the implementation of formal decontamination procedures, the following steps (if applicable) will be followed whenever personnel leave the EZ/work area.

- Remove all equipment, sample containers, and notes to the CRZ. Obtain decontamination solutions and decontaminate the tools (shovels, auger flights, etc.) by brushing them under a water rinse. A high-pressure steam cleaner also may be used for decontamination. All waste and spent decontamination solutions will be properly contained.
- Scrub boots with a stiff bristle brush and water. Washtubs and chairs will be provided.
- Remove outer gloves (and boot covers, if used).
- Remove Tyvek® coveralls; discard in provided container.
- Remove hardhat and eye protection.
- Remove respirator.
- Remove inner gloves.
- Wash hands and face.

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

All spent decontamination fluids (rinse waters, etc.) will 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 as commercially available bottled water. Sources of non-potable water will be labeled clearly.

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

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

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.

10.3 DECONTAMINATION OF TOOLS

When all work activities have been completed, contaminated tools used by URS personnel will be 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 that 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 brush; washing will be 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 SITE RULES

- Valid work permits must be obtained and understood
- 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.
- Alcohol consumption is prohibited during work hours. Excessive drinking is strongly discouraged at all times while the team is in the field. Use of prescription medications that impair judgment or affect motor skill and all illegal drugs are also prohibited. For additional information, please review the URS Substance Abuse Policy. Behavior that could endanger the health or safety of any individual of the field team will not be tolerated. Any individual violating these requirements will be subject to disciplinary action that may include termination.
- If formal work zones are established, all personnel will enter designated work areas only through the CRZ, if applicable. All personnel leaving an EZ/work zone must exit through the CRZ and pass through the decontamination station, as described in Section 10.0.
- Personnel will wash their hands and faces thoroughly with soap and water prior to eating, drinking, or smoking.
- Personnel will 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., the ground, etc.)
- All field crew members should remain alert to potentially dangerous situations in which they should not become involved (i.e., note the presence of strong, irritating, or nauseating odors, etc.).
- Only those vehicles and the equipment required to complete work tasks should be permitted within the EZ/work zone (drill rigs, excavators, and similar items). A seatbelt must be worn at all times while driving. All non-essential vehicles should remain within the support zone. Safety-critical equipment may not be overridden or disabled without authorization from the PM.
- Containers, such as drums, will be moved only with the proper equipment and will be secured to prevent dropping or the loss of control during transport.
- Field survey instruments, such as PIDs, will be covered with plastic or similar coverings to minimize the potential for contamination.
- No matches or lighters are permitted in the work area/EZ or CRZ.
- Contaminated protective equipment, such as respirators, hoses, boots, and disposable protective clothing, will not be removed from the work area/EZ or decontamination area until it has been cleaned or properly packaged and labeled.
- Spills should be prevented, to the extent possible. Should a spill occur, any liquid should be contained, if possible.
- Splashing of contaminated materials should be prevented.

- Field crew members should 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.
- The number of personnel and equipment in the EZ should be minimized, but only to the extent consistent with workforce requirements for safe site operations.
- All wastes generated by URS activities at the site will be disposed of as directed by Shell.
- All personal protective equipment will be used as specified and required.
- The buddy system will be used at all times when working in remote areas.
- 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 will be employed:

- All sampling equipment will be cleaned before proceeding to the site.
- At the sampling site, sampling equipment will be cleaned after each use.
- Work in "cleaner" areas will be conducted first, where practical.
- All unauthorized personnel will remain outside the EZ at all times.

11.3 SAMPLE SHIPMENT/HAZARDOUS MATERIALS SHIPMENT

If samples to be collected during the course of this project fall under criteria that define them as hazardous materials under Department of Transportation (DOT) regulations 49 CFR Parts 171-177 (see URS guidelines for determination), then they must 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 of 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 can be called for assistance. Shell must be contacted in the event of an emergency at their facility.

12.1 PLACES OF REFUGE

In the event of a site emergency requiring evacuation, all personnel will evacuate to the pre-designated area a safe distance from any health or safety hazard. The assembly area may have to be re-designated by the SSO in the event that the area of influence of an emergency affects the primary assembly area. Once personnel are assembled, the SSO will do a head count. The SSO will evaluate the assembly area to determine whether it is outside of the influence of the situation; if it is 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 will 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 site personnel with specific evacuation instructions via the site emergency radio, if necessary, specifying the actual site conditions.

12.2 FIRE

No smoking, matches or lighters are permitted in the work area. In addition, the following special precautions must be taken for hot work.

- Before any flame-producing devices (i.e., cutting torches or welding irons) are used in the work area, the SSO must be contacted. A detailed inspection of the work area will be conducted to determine whether potential fire sources exist; if they do, they must be removed to at least 35 feet away before work can commence.
- Fire extinguishers must be located at the work area when cutting or 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 at its station for at least 15 minutes after the hot work is completed.

A 20 pound Type ABC fire extinguisher will be available on site to contain and extinguish small fires. The local or facility fire department will be summoned in the event of any fire on site.

12.3 COMMUNICATION

Cell phones will be used to alert site personnel of emergencies and to summon outside emergency assistance. Where cell phones or voice do not work, an alarm system (i.e., sirens, horns, etc.) will be set up to alert employees of emergencies. Radio communication also may be used to communicate with

personnel in the EZ. 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.

12.4 EMERGENCY RESPONSE PROCEDURES

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

- First aid/CPR providers
- Communicator

  The role of the communicator is to maintain contact with appropriate emergency services and to provide 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 will be located as close to the scene as possible 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) will 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. Responsibilities also include reviewing and revising site safety and contingency plans as necessary.

  In the event of an emergency, follow the procedures outlined in Figure 12-1. Notify site personnel of the situation, survey the scene to determine whether 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.

12.5 MEDICAL EMERGENCY RESPONSE PLAN

At least one URS employee and one employee from each subcontractor on site will hold a current certificate in American Red Cross Standard First Aid. This training provides six and one-half hours of instruction in adult CPR and basic first aid. If a medical emergency exists, personnel should:

- 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 the injured/ill person is in is dangerous or unsafe and ONLY if the rescuers are appropriately protected from potential hazards that might be encountered during the rescue.
- When emergency services personnel arrive, communicate all first aid activities that have occurred.
- Transfer responsibility for the 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;

- Eyewash;
- Emergency telephone numbers list; and
- Portable radios for emergency communications in remote areas.
- Drugs, inhalants, or medications will not be included in the first aid kit.

12.6 INCIDENT REPORT

ALL site injuries and illnesses must be reported to the SSO and PM immediately following first-aid treatment. Additionally, Jennifer Allen ***(206-438-2120)*** or the Regional HSE Manager (206-438-2199) must be contacted prior to the employee leaving the site for treatment. Injury management must be coordinated with the URS medical department at **1-866-326-7321)**. 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 recurrence. Any injury, illness, property damage, or significant near miss must be reported using URS Form 49-1 as soon as possible, but at least within 24 hours when the employee sees a medical care provider (see SMS 049).

12.7 OPERATION SHUTDOWN

In certain extremely hazardous situations, the SSO or PM may request that site operations be temporarily suspended while the underlying hazard is corrected or controlled. During operations shutdowns, all personnel will be required to stand upwind to prevent exposure to fugitive emissions. The SSO, with concurrence from the RHSM, 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, which are 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 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 HSE Manager –	***Mark Litzinger 206-438-2199***
Office HSE Representative	***Jennifer Allen 206-438-2120***
Project Manager	***James Flynn 206-438-2113, 206-619-5952(c)***
EPA Response Center (if reportable quantity is exceeded)	***(800) 424-8802***

Figure 12-1
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		
Submit a copy of the document to the Health and Safety Manager		

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 SSOs; and
- 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 OSHA/WISHA hazardous waste operations regulations. 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 provided 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 PPE;
- PPE 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; and
- 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 also will be conducted whenever new personnel report to the site.

13.2 SITE INSPECTIONS

The URS Site Manager or SSO is to conduct a daily site inspection prior to the start of each shift. It is the responsibility of the PM or Site Manager to resolve discrepancies immediately, contacting the RHSEM 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.

13.3 BEHAVIOR BASED SAFETY OBSERVATIONS

A behavior based observation may be documented using the form SMS 72-1. Observations may be made by the SSO, PM, other site employees, or subcontractors. Completed forms are intended to be used to spot trends and serve as an aid for health and safety briefings to communicate positive work practices and areas in need for improvement. See SMS 72 for additional information.

14.0 RECORDKEEPING

The PM and SSO are responsible for site recordkeeping. Prior to the start of work, they will review this HSP; if no changes are needed, they will sign the approval form (PM) or acceptance form (SSO) and forward a copy to the RHSM.

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.

The SSO will conduct a Site Safety Briefing in accordance with Section 13.0 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 RHSM.

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.

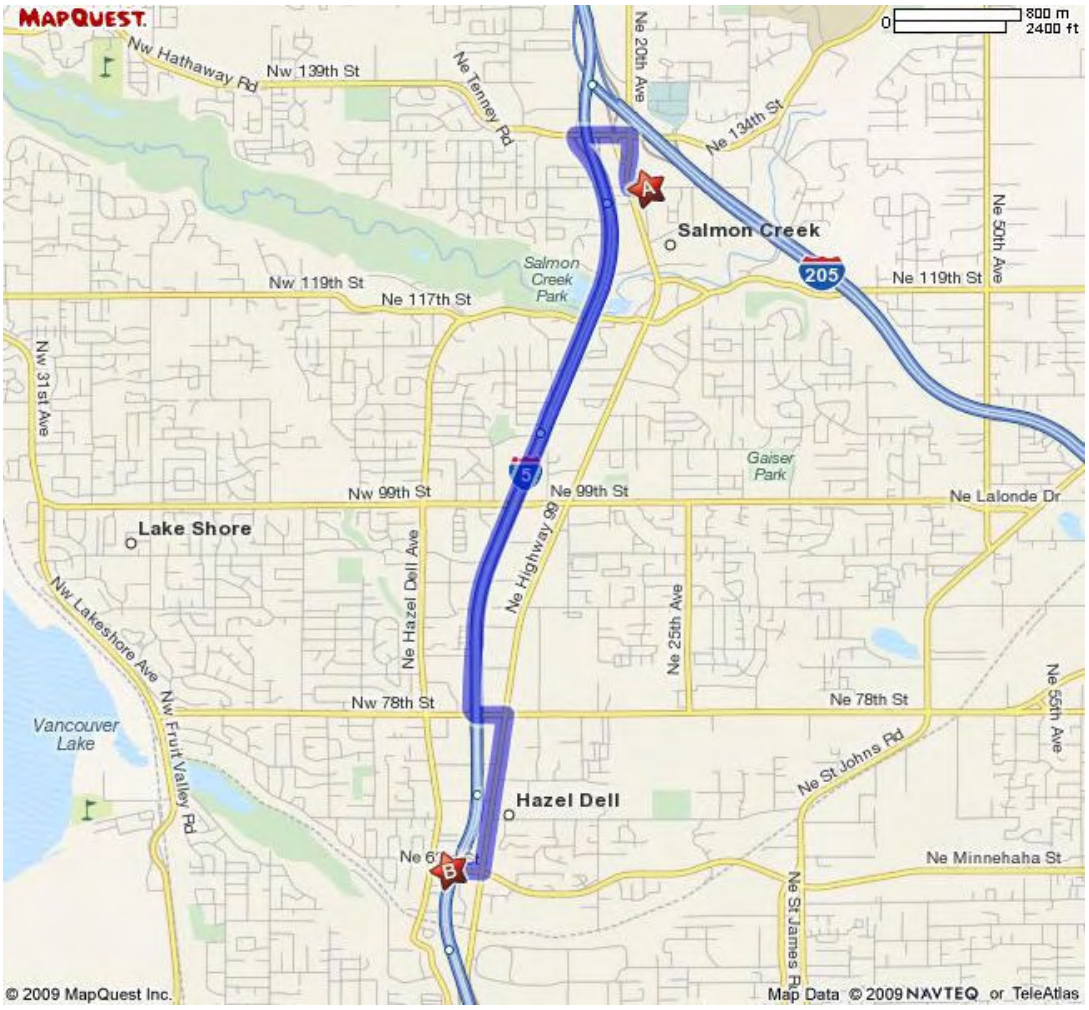
ATTACHMENT A

HEALTH CLINIC AND HOSPITAL ROUTE MAPS

Directions:

FROM	TO
6317 NE 4th Plain Blvd Vancouver, Washington	Columbia River Occupational Health 2105 NE 129th St. Vancouver, WA - (360) 891-4900

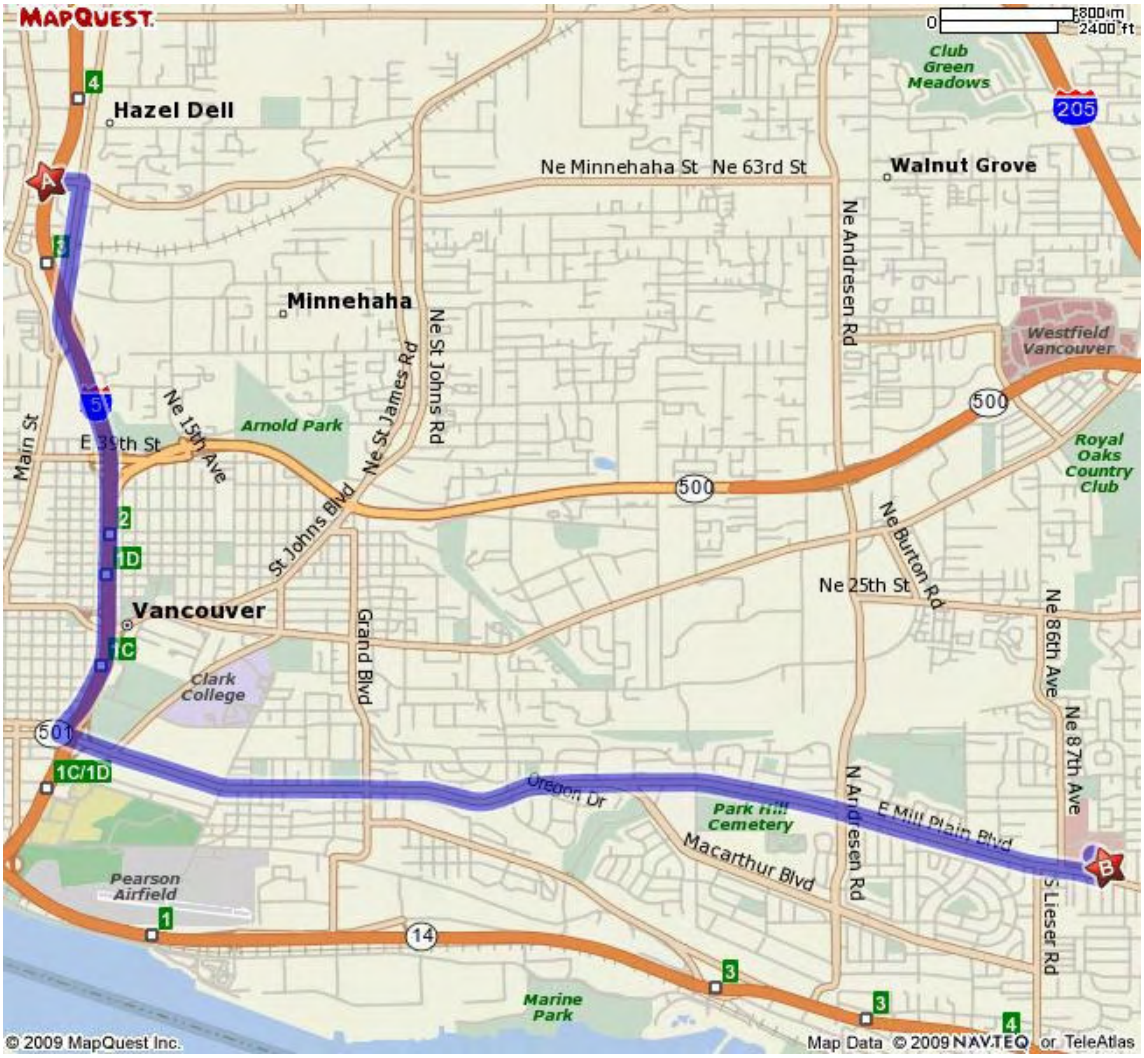
1. Head east on E 4th Plain Blvd toward NE 65th Ave
2. Turn left at NE Andresen Rd
3. Slight right to merge onto WA-500 E toward Camas/I-205
4. Take the I-205 N ramp to Seattle
5. Continue toward I-205 N and merge onto I-205 N
6. Take exit 36 for NE 134th St toward Wsu Vancouver
7. Turn left at NE 134th St
8. Take the 1st left onto NE Hwy 99/Pacific Hwy
9. Take the 2nd left onto NE 129th



Directions:

FROM	TO
6317 NE 4th Plain Blvd Vancouver, Washington	Southwest Washington Medical Center 400 NE Mother Joseph Place Vancouver, WA 98664 - (360) 256-2000

1. Head east on E 4th Plain Blvd toward NE 65th Ave
2. Take the 2nd right onto NE Andresen Rd
3. Turn left at NE 25th St
4. Continue on NE Burton Rd
5. Turn right at NE 86th Ave
6. Continue on NE 87th Ave
7. Turn left toward NE Mother Joseph Pl
8. Turn left at NE Mother Joseph Pl



ATTACHMENT B

MATERIAL SAFETY DATA SHEETS

ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2005/03/09

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A : ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Solid

Appearance & odor: Almost odourless.
White granular powder.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): Not applicable.

Vapour density (air=1): Not applicable.

By weight: Not available.

Evaporation rate (butyl acetate = 1): Not applicable.

Boiling point (°C): Not applicable.

Freezing point (°C): Not applicable.

pH: (1% aqueous solution).
9.5

Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10

Solubility in water (%): 100 - > 10% w/w

Coefficient of water\oil dist.: Not available.

VOC: None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: None

Section 5 : REACTIVITY DATA

Chemical stability: Stable under normal conditions.

Conditions of instability: None known.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizers.

Hazardous decomposition products: See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of Acute Exposure

Eye contact: May cause irritation.

Skin contact: Prolonged contact may cause irritation.

Inhalation: Airborne particles may cause irritation.

Ingestion: May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

Effects of chronic exposure: Contains an ingredient which may be corrosive.

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available for mixture, see the ingredients section.

Exposure limit of material: Not available for mixture, see the ingredients section.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Medical conditions aggravated by exposure: Not available.

First Aid

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak/Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves/Type:

Neoprene or rubber gloves.

Respiratory/Type:

If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye/Type:

Safety glasses with side-shields.

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

To return to the page you just left,
select the "back" button on your browser.

HYDROCHLORIC ACID, 33 - 40%

MSDS Number: H3880 --- *Effective Date: 11/17/99*

1. Product Identification

Synonyms: Muriatic acid; hydrogen chloride, aqueous
CAS No.: 7647-01-0
Molecular Weight: 36.46
Chemical Formula: HCl
Product Codes:
J.T. Baker: 5367, 5537, 5575, 5800, 5814, 5839, 6900, 7831, 9529, 9530, 9534, 9535, 9536, 9537, 9538, 9539, 9540, 9544, 9548
Mallinckrodt: 2062, 2612, 2624, 2626, 5587, H611, H613, H987, H992, H999, V078, V628

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Hydrogen Chloride	7647-01-0	33 - 40%	Yes
Water	7732-18-5	60 - 67%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG DAMAGE.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:
Corrosive! Inhalation of vapors can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure, and death.
Ingestion:
Corrosive! Swallowing hydrochloric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea. Swallowing may be fatal.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and discolor skin.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth. Long term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye disease may be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Extreme heat or contact with metals can release flammable hydrogen gas.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
If involved in a fire, use water spray. Neutralize with soda ash or slaked lime.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving hydrochloric acid. Stay away from ends of tanks. Cool tanks with water spray until well after fire is out.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB(R) or TEAM(R) 'Low Na+' acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
5 ppm Ceiling
-ACGIH Threshold Limit Value (TLV):
5 ppm Ceiling

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Colorless, fuming liquid.
Odor:
Pungent odor of hydrogen chloride.
Solubility:
Infinite in water with slight evolution of heat.
Density:
1.18
pH:
For HCL solutions: 0.1 (1.0 N), 1.1 (0.1 N), 2.02 (0.01 N)
% Volatiles by volume @ 21C (70F):
100

Boiling Point:
53C (127F) Azeotrope (20.2%) boils at 109C (228F)
Melting Point:
-74C (-101F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
190 @ 25C (77F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A strong mineral acid, concentrated hydrochloric acid is incompatible with many substances and highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites, and formaldehyde.
Conditions to Avoid:
Heat, direct sunlight.

11. Toxicological Information

Inhalation rat LC50: 3124 ppm/1H; oral rabbit LD50: 900 mg/kg (Hydrochloric acid concentrated); investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Hydrogen Chloride (7647-01-0)	No	No	3
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater.
Environmental Toxicity:
This material is expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 475LB

International (Water, I.M.O.)

Proper Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 475LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Hydrogen Chloride (7647-01-0)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Hydrogen Chloride (7647-01-0)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Hydrogen Chloride (7647-01-0)	5000	500*	Yes	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Hydrogen Chloride (7647-01-0)	5000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2R
Poison Schedule: No information found.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG DAMAGE.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Store in a tightly closed container.
Remove and wash contaminated clothing promptly.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
No changes.
Disclaimer:
****
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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

ATTACHMENT C

URS SAFETY MANAGEMENT STANDARDS

URS SAFETY MANAGEMENT STANDARD

Excavation

1. Applicability

This standard applies to operations where URS Corporation and subsidiary companies perform trenching and excavation activities, and/or where URS employees are exposed to hazards associated with trenching and excavation activities.

2. Purpose and Scope

The purpose of this standard is to protect personnel from the hazards associated with excavation and trenching activities.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Competent Person

Where potential employee exposure to hazards associated with the excavation (e.g., entrapment, falls greater than 4 feet (1.2 meters), cave-ins, etc.) can reasonably be anticipated, an excavation-competent person must be on site. The excavation-competent person:

1. Has formal documentation of training as an excavation-competent person.
2. Must be physically located at the excavation site at all times while work is in progress.
3. Is responsible for conducting daily inspections of excavations, adjacent areas, and protective systems prior to each shift.
4. Is responsible for inspection after every rainstorm or other potentially hazard-producing event.
5. Must have knowledge of soils and soil classification.
6. Understands design and use of protective systems.
7. Understands the requirements of the applicable regulations.

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

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

10. If URS hires a subcontractor to perform excavation or trenching activities, the subcontractor will be required to assign an excavation-competent person to the project. Documentation of this person's qualifications will be maintained in the project safety file.

B. Preliminary Planning

1. Underground and aboveground utilities, adjacent structures or retaining walls, spoil layout, truck routes, and emergency procedures must be identified before work begins.

2. When the excavation or trench approaches the estimated location of underground utilities, the exact location will be determined by methods identified in SMS 034 – Utility Clearance and Isolation.

C. Access/Egress

1. Entry into an excavation or trench should not be made unless absolutely necessary.

2. If personnel enter an excavation or trench that is 4 feet (1.2 meters) deep or more, ladders, steps, ramps, or other safe means of access and egress must be provided, and located at intervals of 25 feet (7.6 meters) or less of lateral travel. If a ladder is used, the ladder must extend 3 feet (0.9 meter) above the original surface of the ground.

3. In excavations and trenches that employees may be required to enter, excavated or other material must be effectively stored and retained at least 2 feet (0.6 meter) or more from the edge of the excavation. As an alternative to this clearance requirement, barriers or other effective retaining devices may be used in lieu thereof in order to prevent excavated or other materials from falling into the excavation.

4. Surface crossing of trenches by personnel or vehicles should not be made unless absolutely necessary. When necessary, the following conditions must be met:

a. Vehicle crossings must be designed by and installed under the supervision of a registered professional engineer.

b. Walkways or bridges must have a minimum clear width of 20 inches (50.8 centimeters [cm]), be equipped with standard guardrails, and extend a minimum of 24 inches (61 cm) past the surface edge of the trench.

D. Soil Classification

When sloping, benching, or installed protective systems are used, soil classification of each rock and soil deposit must be classified by a competent person. Soil and rock will be classified as one of the following: stable rock, Type A soil, Type B soil, or Type C soil. The classification will be based on the results of at least one visual analysis and one manual analysis, such as soil plasticity dry strength, thumb penetration, pocket penetrometer, or hand-operated shear vane. In the event that soil classification requires additional technical expertise, the competent person will consult with a registered professional engineer. (See Supplemental Information A – Soil Classification.)

E. Protective Systems

1. Employees in excavations deeper than 4 feet (1.2 meters) must be protected by means of properly designed protective systems.

2. Protective systems for excavations or trenches deeper than 20 feet (6.1 meters) must be designed and stamped by a registered professional engineer.

3. Protective systems must have the capacity to resist all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

   a. Sloping and Benching

   - When personnel are required to work in trenches or excavated areas, all slopes must be excavated to at least the angle of repose, or otherwise safely supported to prevent cave-ins.

   - The determination of the angle of repose and design of the supporting system must be based on careful evaluation of pertinent factors such as: depth of cut;

possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, overlying material, or stored material; and vibration from equipment, blasting, traffic, or other sources. (See Supplemental Information B – Angles of Repose – Simple Slopes.)

- The slopes and configurations of sloping and benching systems for excavations 4 feet (1.2 meters) to 20 feet (6.1 meters) deep will be selected and constructed by the employer or his designee, and must be in accordance with the following requirements.

- Soil must be analyzed by a competent person to determine the soil or rock type. The maximum allowable slope for each soil or rock type is identified in the table below.

Soil or Rock Type	Maximum Allowable Slope (Horizontal: Vertical)
Stable Rock	Vertical 90°
Type A	¾:1 or 53°
Type B	1:1 or 45°
Type C	1½: 1 or 34°

- Soil classification is not required if 1½:1 (Horizontal:Vertical) or 34° slope is used. If this slope is greater than 1½:1 (Horizontal:Vertical) or 34°, a soil classification must be made. The excavation must comply with one of the following three options.

  – Option I – Maximum allowable slope, and allowable configurations for sloping and benching systems will be determined in accordance with the conditions and requirements in Supplemental Information A – Soil Classification; and Appendix B – Sloping and Benching.

  – Option II – Designs of sloping or benching systems will be selected by using tabulated data based on soil conditions. These tables must be calculated and prepared by a registered professional engineer. The plan must be stamped by a registered professional

engineer, and this information must be documented and filed on site.

– Option III – A registered professional engineer must design the sloping and benching system and stamp the plan. This information must be documented and filed on site.

Excavations with sloping and benching in excess of 20 feet deep must be designed and stamped by a registered professional engineer.

b. Timber and Aluminum Hydraulic Shoring for Trenches

Designs of support systems, shield system, and other protective systems will be selected and constructed by the employer or their designee, and must be in accordance with one of four options.

- Option I – Designs using Appendices A, C, and D (see 29 Code of Federal Regulations [CFR] 1926 Subpart P). Shoring in trenching will be determined using conditions and requirements of Supplemental Information A – Soil Classification; Appendix C – Timber Shoring; and Appendix D – Aluminum Hydraulic Shoring.

- Option II – Designs of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data will be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer (i.e., trench jacks, hydraulic). This information must be filed on site.

- Option III – Designs using other tabulated data. Designs of support systems, shield systems, or other protective systems will be selected from and be in accordance with tabulated data. This information must be filed on site.

- Option IV – Design by registered professional engineer. Support systems, shield systems, and other protective systems not using Option I, II, or III must be approved and stamped by a registered professional engineer.

c. Alternatives to Timber Shoring

- Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they must be designed, constructed, and maintained in a manner that will provide protection equal to or greater than the sheeting or shoring required for the trench.

- Trench boxes require placement using portable lifting equipment such as backhoes or other tractor-like devices. The job hazard analysis will consider the hazards of lifting and placement of the trench boxes, including the proper use of chains, stability of the mobile equipment, swing radius protection for load, and load rating for the lifting device.

- Trench shields and boxes must either be pre-manufactured with listed load ratings, or designed, stamped, and constructed under the direction of a registered professional engineer.

d. 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.

e. Excavations must be clearly identified and barricaded to keep unauthorized individuals out.

f. Walkways, runways, and sidewalks must be kept clear of excavated material or other obstructions, and no sidewalks should be undermined unless shored to carry a minimum live load of one 125 pounds per square foot.

g. If it is necessary to place heavy objects or operate heavy equipment on a level above and near any excavation, the side of the excavation must be sheet piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.

F. Hazardous Atmospheres and Confined Spaces

1. In excavations or trenches greater than 4 feet (1.2 meters) deep where an oxygen deficient (<19.5 percent) or flammable (>10 percent Lower Explosive Limit [LEL]) or other potentially toxic environment could be expected to exist, the atmosphere of the excavation must be monitored before workers enter the excavation. Air monitoring must be conducted before personnel enter an excavation or trench, and then periodically to ensure that the atmosphere remains safe. Monitoring will be conducted at three vertical depths of the excavation to detect potentially stratified gas layers (e.g., propane has a density 1.55 times that of normal air and will accumulate in the lower depths of an open trench).

2. The frequency of air monitoring will be increased if equipment used in or near the excavation or trench may alter the atmosphere where personnel are working. All air monitoring must be documented and maintained in the project safety files.

3. Attended emergency rescue equipment, such as a breathing apparatus, a safety harness and line, basket stretcher, etc., must be readily available where adverse atmospheric conditions may exist or develop in an excavation or trench.

4. Excavations or trenches may qualify as confined spaces. When this occurs, compliance with SMS 010 – Confined Spaces, is required.

G. Water Accumulation

1. Employees will not work in excavations where water is accumulating unless adequate precautions have been taken to protect employees. Personnel must exit excavations and trenches during rainstorms.

2. De-watering equipment must be installed and monitored by a competent person.

3. Diversion ditches, dikes, or other suitable means will be used to prevent water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation.

4. Excavations and trenches must be inspected by a competent person after each rain event and before personnel are permitted to re-enter the excavation or trench.

H. Excavation and Trenching Permit

1. An Excavation/Trenching Permit (Attachment 013-1 NA) must be completed prior to all excavation or trenching activities.

2. The Excavation and Trenching Permit must be completed and signed by all applicable parties as indicated on the permit.

3. Excavation and Trenching Permits may be valid for up to 1 week.

I. Daily Inspections

1. Daily inspections must be made (Attachment 013-2 NA) of excavations and trenches. Where potential employee exposure to hazards associated with the excavation (e.g., entrapment, falls greater than 4 feet (1.2 meters), cave-ins, etc.) can reasonably be anticipated, these inspections must be made by a competent person.

2. Inspections must be conducted daily before the start of work, after every rainstorm, after other events that would increase hazards such as snowstorm, thaw, earthquake, or dramatic change in weather, and when fissures, tension crack, sloughing, undercutting, water seepage, bulging at the bottom or other similar conditions occur.

3. If evidence of possible cave-ins or slides is apparent, all work in the excavation or trench must cease until the necessary precautions have been taken to safeguard the personnel.

J. Excavating at Potential MEX/UXO Sites

1. If the project site is suspected of munitions and explosives of concern (MEC) or unexploded ordinance (UXO) contamination, the UXO team will conduct a reconnaissance and MEC/UXO avoidance to provide clear access routes to each site before excavation crews enter the area.

2. MEC/UXO sites with planned excavation activities will not be conducted until a complete plan for the site is prepared and/or approved by the URS UXO Safety Officer. MEC/UXO avoidance

must be conducted during excavation operations on known or suspect MEC/UXO sites (SMS 039).

K. Training/Briefings

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

5. Documentation Summary

The following information will be maintained in the project file:

A. Competent person qualifications.

B. Excavation and Trenching Permit(s).

C. Daily inspections by an excavation-competent person.

D. Air monitoring records.

6. Resources

A. U.S. Occupational Safety and Health Administration (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

4. Appendix E, Alternatives to Timber Shoring

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

C. SMS 010 – Confined Space Entry

D. SMS 034 – Utility Clearance and Isolation

E. SMS 039 – Munitions Response / Munitions and Explosives of Concern

F. Attachment 013-1 NA – Excavation/Trenching Permit

G. Attachment 013-2 NA – Daily Excavation/Trench Inspection Form

7. Supplemental Information

A. Soil Classification

B. Angle of Repose – Simple Slopes

URS SAFETY MANAGEMENT STANDARD
Heavy Equipment Operations

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies where heavy equipment is in operation by URS employees or subcontractors.

2. Purpose and Scope

The purpose of this standard is to require that heavy equipment is operated in a safe manner; that the equipment is properly maintained; and that ground personnel are protected. Heavy equipment includes construction and mining equipment such as backhoes, excavators, skid steers, graders, loaders, dozers, tractors, cranes, drills, and draglines.

In addition to this standard, refer to SMS 038 – Cranes and Derricks; and SMS 056 – Drilling Safety.

Military related vehicles and equipment (e.g., tanks) are not covered under this standard.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Authorized Operators

1. Evaluate operators through documented experience (resume), and as appropriate, a practical evaluation of skills. Supplemental Information A through G, or a similar method, may be used for evaluating operators.

2. Allow only qualified operators to operate equipment. Trainees may operate equipment under the direct supervision of a trainer.

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 seatbelts at all times in all equipment and trucks.

6. Except where allowed by the manufacturer, prohibit personnel other than the operator from riding in or on the equipment unless additional seating (with seatbelts) is provided by the manufacturer. In some cases, a trainer may ride in a cab not equipped with additional seating when training activities are being conducted.

7. Operators must maintain three points of contact whenever mounting and dismounting a piece of equipment.

8. Brief operators on the following rules of operation:

    a. Operators are in control of their work area.

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

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

    d. Operators must not use mobile phones while operating heavy equipment.

B. Ground Personnel

1. Require that URS ground personnel or ground personnel interacting with URS heavy equipment operations have received training, and comply with the following rules of engagement:

    a. Wear high-visibility protective vests when in work areas with any operating equipment.

    b. Stay outside of the swing zone or work area of any operating equipment.

    c. No standing or working in the equipment operator’s blind spots.

    d. 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, placed it in neutral, grounded engaging tools, and set brakes.

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

e. Ground personnel must never walk, or position themselves between, any fixed object (e.g., working face, highwall) and operating equipment, or between two operating pieces of equipment.

C. Equipment

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

2. Require that operators have read or been trained on 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, road trucks, and drills are exempt from ROPS requirements, but must have a cab that provides protection from overhead hazards.

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

5. Prohibit the use of equipment that has or had cab glass (per the manufacturer's specifications) that is cracked, broken, or missing.

6. Require that backup alarms are functional on all trucks and equipment. Tracked excavators must have bi-directional 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 or equivalent (when applicable) when not in use.

9. Require fire extinguishers to be placed on all vehicles or equipment as required, and inspected by the operator prior to each shift. Monthly inspection and service records will be maintained in the project office, if not kept on the extinguishing equipment.

10. Require that all haulage vehicles, whose payload is loaded by means of cranes, power shovels, loaders, or similar equipment, has a cable shield and/or canopy adequate to protect the operator from shifting or falling material. If protection is not available for the operator, the operator must leave the vehicle and wait in a designated safe location until it is loaded.

11. Require that a locking device be provided that will prevent the accidental separation of towed and towing vehicles on every fifth-wheel mechanism and two-bar arrangement.

12. Require that trip handles for tailgates of dump trucks and heavy equipment be arranged so that when dumping, the operator will be in the clear.

13. Except in extreme cold weather environments, require that motors and engines are shut off during fueling or maintenance operations. Ensure proper grounding/bonding between equipment and fuel vehicle prior to fueling operations.

D. Subcontractor Equipment

1. Require that no unsafe vehicles or equipment be allowed in construction areas. Where compliance is refused, the project manager or his or her designate should be notified immediately.

2. Require that subcontractor employees follow established safety procedures in operation, inspection, and maintenance of vehicles and equipment.

3. Require that URS supervisors visually observe the subcontractors' vehicles and equipment, and report any unsafe conditions or practices to the project manager. Equipment not in compliance with applicable safety standards is prohibited.

E. Safe Operation

1. All vehicles transporting material or equipment on public roads must comply with local laws pertaining to weight, height, length, and width. Obtain any permits required for these loads.

2. Prohibit operating Company-owned, leased, or rented vehicles or equipment while under the influence of alcohol or illegal drugs.

3. Require seatbelts to be worn for all operators, drivers, and passengers for company owned or leased vehicles and equipment.

4. Do not drive equipment into an unsafe area. This includes areas of construction where unnecessary tire, steering, or body damage could result, or where soil conditions are not adequate to support the equipment.

5. Do not smoke on, in, or within 50 feet (15 meters) of vehicles hauling fuel oils, gasoline, or explosives.

6. Do not ride with arms or legs outside of the truck body, in a standing position on the body, on running boards, or seated on side fenders, cabs, cab shields, rear of truck bed, or on the load.

7. Do not drive any vehicle at a speed greater than is reasonable and proper, with due regard for weather, traffic, intersections, width, and character of the roadway, type of motor vehicles, and any other existing condition.

8. Oilers, apprentices, and other operators will not be allowed to operate equipment unless authorized by the project manager or general superintendent.

9. Do not operate any equipment beyond its safe load or operational limits.

10. Keep all employees clear of loads about to be lifted, or suspended loads.

11. Outfit equipment operated in hazardous atmosphere environments with the proper safety equipment (e.g., spark arrestors).

F. Inspection and Maintenance

1. Require operators to inspect equipment daily (or before each shift), using Attachment 019-1 NA or equivalent.

2. Prohibit use of equipment deemed to be unsafe, as determined by daily inspection, until required repairs or maintenance has been completed.

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

4. During maintenance and repair, require that:

    a. Motors are turned off, unless required for performing maintenance or repair.

    b. All ground-engaging tools are grounded or securely blocked.

    c. Controls are set in a neutral position.

    d. Brakes are set.

    e. Electrically driven equipment is installed with provision for tagging and locking out the controls while under repair.

    f. Manufacturer's requirements for maintenance and repair are followed.

5. Provide and use a safety tire rack, cage, or equivalent protection when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.

5. Documentation Summary

The following information will be maintained in the project file:

A. Operator qualifications.

B. Daily Equipment Inspection Logs, Attachment 019-1 NA, or equivalent.

C. Site briefing documentation for operator rules and ground personnel "rules of engagement".

6. Resources

A. U.S. Occupational Safety and Health Administration (OSHA) Standard – Motorized Vehicles and Mechanized Equipment – 29 Code of Federal Regulations (CFR) 1926, Subpart O

B. U.S. Mine Safety and Health Administration – 30 CFR 48 – Training and Retraining Miners

C. U.S. Mine Safety and Health Administration – 30 CFR 56 Subpart H – Loading, Hauling, and Dumping

D. U.S. Mine Safety and Health Administration – 30 CFR 56 Subpart M – Machinery and Equipment

E. U.S. Mine Safety and Health Administration – 30 CFR 77 Subpart E – Safeguards for Mechanical Equipment

F. U.S. Mine Safety and Health Administration – 30 CFR 77 Subpart K – Ground Control

G. U.S. Mine Safety and Health Administration – 30 CFR 77 Subpart Q – Loading and Haulage

H. National Association of Demolition Contractors – Safety Manual

I. SMS 038 – Cranes and Derricks

J. SMS 056 – Drilling Safety

K. Attachment 019-1 NA– Equipment Inspection Form

Note: The above regulatory resources are for U.S. operations only.

7. Supplemental Information

A. Backhoe Operator Skill Evaluation

B. Scraper Operator Skill Evaluation

C. Bulldozer Operator Skill Evaluation

D. Dump Truck Operator Skill Evaluation

E. Roller/Compactor Skill Evaluation

F. Front-End Loader Skill Evaluation

G. Grader Operator Skill Evaluation

URS SAFETY MANAGEMENT STANDARD

Housekeeping

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to ensure proper housekeeping in office locations, on construction sites, and fixed work facilities to prevent cross contamination of hazardous materials, fires, and injuries resulting from slips, trips and falls.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility or site.

4. Requirements

A. General

1. Require tools, materials, extension cords, hoses, and other equipment to be stowed at the end of the day. These materials must not be strewn about the site in a manner that may cause tripping or other hazards while in use.

2. Clear general waste, scraps, debris, and rubbish from work areas, passageways, and stairs in and around the facility on a daily basis. Do not throw or drop materials from upper levels to lower levels or to the ground unless disposal areas are provided and the area below is barricaded or secured.

3. Provide metal or other approved containers in adequate numbers to handle waste and rubbish disposal.

4. Garbage (including solid or liquid wastes), refuse, and hazardous waste such as caustics, acids, and toxic materials must be stored in approved and covered containers. Containers must be appropriately labeled as to contents. SMS 009 – Corrosive and Reactive Materials and SMS 017 – Hazardous Waste Operations, provide additional information on hazardous materials.

5. Store supplies in locations away from walkways and in a manner that will not trip workers. Maintain stored materials in safe, neat stockpiles for ease of access and to prevent collapse or falling.

6. Keep weeds and vegetation away from stockpiled materials and walkways.

7. Maintain flooring, stairways, gangways, access ways, and walkways in a clean, dry, and smooth condition.

8. Ensure that oil, grease, water, ice, or other hazardous materials that may cause slipping or fire hazards are removed promptly.

B. Regularly inspect the work area for slip and trip hazards.

1. Office and trailer locations – Inspect work areas at least quarterly. Use the inspection sheet provided as Attachment 021-1 NA.

2. Field sites – Inspect sites at least biweekly. Use the inspection sheet provided as Attachment 021-1 NA.

3. Field sites performing aircraft and vehicle maintenance – Inspect the sites weekly if sanding, drilling, grinding, and/or painting operations are conducted. Use the inspection sheet provided as Attachment 021-2 NA.

4. For European operations, the Workplace Inspection Checklist - Attachment 021-3 NA must be completed monthly.

C. Thoroughly investigate all injuries resulting from slips, trips, and falls on site. Correct those housekeeping conditions contributing to injuries.

D. For operations involving work with hazardous materials (including metals associated with aviation maintenance activities), the manager directing activities of the facility or site will assure that:

1. Eating, drinking, and smoking areas are removed from the work areas. Hand washing stations shall be available nearby for employees entering the eating and smoking areas.

2. Resting, eating and smoking areas will be kept clean.

3. Work areas will be cleaned to remove accumulated contaminants. Working surfaces, including workbenches, desks, and other lateral working surfaces, will be wiped down daily with an appropriate cleaner (soap, solvent, or oxidizing agent). Walking surfaces will be cleaned to remove accumulated contaminants weekly or more often.

5. Documentation Summary

The following information will be maintained in the project file:

A. Completed Inspection Sheets.

6. Resources

A. U.S. Occupational Safety and Health Administration (OSHA) Standard – Sanitation – 29 Code of Federal Regulations (CFR) 1910.141

B. U.S. OSHA Standard – Walking and Working Surfaces – 29 CFR 1910.22.

E. SMS 009 – Corrosive and Reactive Materials

F. SMS 017 – Hazardous Waste Operations

G. Attachment 021-1 NA – Housekeeping Inspection Sheet

H. Attachment 021-2 NA – Special Housekeeping Inspection Sheet - Sanding, Drilling, Grinding, and Painting

I. Attachment 021-3 NA – Workplace Inspection Checklist

URS SAFETY MANAGEMENT STANDARD

Work Zone Traffic Control

1. Applicability

This standard applies to those activities of URS Corporation and its subsidiary companies involving work performed on roads, highways, and similar areas where motor vehicles may be a hazard, and where URS is responsible for traffic control.

2. Purpose and Scope

This standard is intended to protect personnel from the hazards associated with work performed on or next to highways and roads.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

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. Where project operations will be performed on or adjacent to roadways, plan work to interfere as little as possible with traffic, and to provide and maintain ingress and egress for all residences and places of business that may be impacted.

C. When required by local regulations or when there is a potential to disrupt traffic, a traffic control plan, in detail appropriate to the complexity of the project, must be prepared by a competent person and understood by all responsible parties before activities begin. Any changes in the traffic control plan should be approved by an official trained in safe traffic control practices.

1. Competent persons are those who are knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed, and who have the authority to propose and implement corrective measures to eliminate hazardous situations associated with temporary traffic control.

2. Design traffic control plans to meet requirements set forth in Part 6 of the *Manual on Uniform Traffic Control Devices* (MUTCD), as well as those rules set by state, county, and cities in which work is

performed. At a minimum, the plan will include information on the following, as needed:

a. Pedestrian and worker safety;

b. Temporary traffic control elements, including (but not limited to) temporary traffic control zones, advance warning zones, transition areas, activity areas, termination areas, tapers, buffers, detours, etc.;

c. Flagger controls, including high-visibility safety apparel, hand-signaling devices, and flagger procedures;

d. Temporary traffic control zone devices, including (but not limited to) signs, illuminated/flashing panels, warning devices, channelizing devices, drums, barricades, pavement markings; and

e. Temporary traffic control zone activities, including scope of work, duration, location, and portions of the roadway/shoulder affected.

D. Submit the traffic control plan to the applicable road authority for approval.

E. A Worksite Traffic Control Supervisor, certified by the American Traffic Safety Services Association (ATSSA) or an equivalent organization will be responsible for initiating, installing, and maintaining all traffic control devices. The Worksite Traffic Control Supervisor will also directly supervise all project flaggers.

1. Certified flaggers must attend an 8-hour work-zone traffic control course as taught by an ATSSA certified instructor (or equivalent).

F. Execute the traffic control plan developed for the job site.

G. Require all personnel exposed to the risks of moving roadway traffic or construction equipment to wear hardhats, safety glasses, sleeved shirts, long pants, work boots, and the appropriate class of high-visibility safety apparel. Safety apparel background material must be either fluorescent orange-red or fluorescent yellow-green, with accompanying reflective material of orange, yellow, white, silver, or yellow-green, or fluorescent versions of these colors.

H. Wear high-visibility clothing as follows:

1. Class 1 safety apparel (as defined by American National Standards Institute/International Safety Equipment Association [ANSI/ISEA]) for activities that permit the worker:

    a. Full and undivided attention to approaching traffic;

    b. Ample separation between the worker and vehicle traffic; and

    c. Optimum visibility in uncomplicated backgrounds where vehicle and equipment speeds do not exceed 25 miles per hour (mph) (40 kilometers per hours [kph]).

2. Wear Class 2 safety apparel for activities where:

    a. Greater visibility is required due to bad weather;

    b. There are complicated backgrounds;

    c. Employees are performing tasks that draw their attention away from approaching traffic;

    d. Vehicle speeds exceed 25 mph (40 kph); and

    e. Work activities take place closer to the vehicle traffic.

3. Wear class 3 safety apparel for activities where:

    a. Workers are exposed to higher vehicle speeds (generally 50 mph [80 kph] or more) or reduced sight distances;

    b. The worker and vehicle operators have a high task load; and

    c. The worker must be visible through the full range of body motions as a person at a minimum of 1,280 feet (390 meters).

4. Refer to SMS 029 – Personal Protective Equipment, for additional information on high-visibility clothing requirements, including suggested apparel for each class.

F. Perform inspection and maintenance of the Traffic Control devices using Attachment 032-1 NA daily, or at the beginning of each shift.

5. Documentation Summary

The following information will be maintained in the project file:

A. Copies of traffic control plans used on site.

B. Training certificates for Traffic Control Supervisors and flaggers.

C. Inspection records (Attachment 032-1 NA).

6. Resources

A. Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) – 2003 Edition

B. American Traffic Safety Services Association

C. ATTSA Flagger Train-the-Trainer Program

D. ANSI/ISEA 107-2004 – Standard for High-Visibility Safety Apparel

E. SMS 029 – Personal Protective Equipment

I. Attachment 032-1 – Traffic Control Device Inspection Checklist

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

1. Applicability

This standard applies to URS Corporation and its subsidiary companies 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 the following:

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.

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; however, 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.C.2.b. (See note for operations in the United Kingdom).

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

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 and state 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 presented in the following table, or the equipment will be repositioned and blocked so that no part, including cables, can come within the minimum clearances listed in the table.

Minimum Distances from Power Lines	
Nominal System (kilovolt, 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 operations in the United Kingdom, 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 appropriate URS representative prior to the start of the task that may impact the utility.

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 surveys.

2. Contact utility companies or the state/regional utility protection service at least two (2) working days prior to excavation activities to advise them of the proposed work and to ask them to establish the location of the underground utility installations prior to the start of actual excavation. One Call utility location service is available throughout the United States by calling 811. Where these services are unavailable (e.g., private properties), contract with an independent utility locating service to perform an evaluation of subsurface utilities.

3. Obtain utility clearances for subsurface work on both public and private property. Clearances are to be in writing and 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 URS representative must notify the utility company, utility protection service, or the utility locating service to inform them that the markings have been destroyed.

5. Do not conduct mechanical-assisted subsurface work (e.g., work using a 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. Nondestructive clearance techniques (e.g., vacuum extraction or other hand clearing means) are required prior to drilling/excavating in higher risk locations, including chemical plants, retail service stations, or other locations with complex underground utility systems.

7. Subsurface work within five feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure must be done by nondestructive clearing techniques to the point where the obstruction is visually located and exposed. Once the obstruction location is confirmed in this manner, mechanical-assisted work may begin.

8. Reference SMS 013 – Excavation Safety for additional information regarding subsurface operations.

E. Training

Conduct a 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

The following documentation will be maintained in the project file:

A. Documents requesting utility clearance.

B. Documents confirming utility clearance.

C. Training/briefing documentation of each isolation.

6. Resources

A. Utility Locating Services (typically under "Utility" in the Yellow Pages)

B. National Institute for Occupational Safety and Health (NIOSH) Alert – Preventing Electrocutions from Contact Between Cranes and Power Lines

C. One Call Utility Locating List

D. National Utility Locating Contractor's Association

E. United Kingdom – Health and Safety Executive GS6

F. SMS 013 – Excavation Safety

URS SAFETY MANAGEMENT STANDARD
Injury / Illness / Incident Reporting & Notifications

1. Applicability

This standard applies to the operations of URS and EG&G Divisions of URS Corporation (URS) and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to provide guidance for the timely reporting of work-related injuries, illness, and incidents. This procedure also defines incident notification procedures for URS employees. For incidents involving motor vehicles, the reporting and notification requirements of SMS 057 – Vehicle Safety Program – may also apply.

For significant incidents (e.g., fatality, serious injury, injury to members of the public), SMS 066 – Incident Investigation – is also required.

Note that this standard will also be used for investigation of critical injuries as defined by Canadian provincial regulations. See Supplemental Information A for definitions of critical injuries.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Reporting: All employees must 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 or illness to any URS employee or subcontractor, even if the injury does not require medical attention.
2. An injury to a member of the public, or clients, occurring on a URS-controlled work site.
3. Illness resulting from suspected chemical exposure.
4. Chronic or re-occurring conditions such as back pain or cumulative trauma disorders (e.g., 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, rented, or leased vehicle (including personal vehicles used for company business).
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. Incidents that could result in adverse public media interest concerning URS or a URS project.
13. Any incident that could or does result in an actual investigation by state, federal, provincial, or local regulatory or law enforcement agencies.
14. Any other significant occurrence that could impact safety, including a near-miss.

    Note: A near-miss is defined as an incident having the potential to cause significant injury or property damage as listed above, but did not. Examples of a near-miss include:

    a. A worker steps off a ledge, falls 3 feet (1 meter) to the floor, and is uninjured.
    b. A crane drops a 1,000-pound (454-kilogram) beam during a lift. Nobody is hurt, and no equipment is damaged.
    c. A work crew is conducting a survey along the highway. A vehicle leaves the roadway (driver asleep) and the vehicle enters the survey area at 50 miles per hour (80 kilometers per hour). The vehicle misses an employee by 3 feet (1 meter); the driver recovers control of the vehicle and leaves the area.

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. Contact appropriate emergency services and obtain appropriate medical attention, as required or directed by your supervisor. For additional information, refer to SMS 065 – Injury and Claims Management.

d. Record information pertaining to the incident (e.g., time, date, location, name and company of person(s) involved, witnesses, description of event, and actions taken) and initiate Attachment 049-1 NA – Incident / Near Miss Report. (Note: The international operations of URS Division will complete an on-line Incident Report instead, using the appropriate Health, Safety, and Environment (HSE) and Quality Improvement database).

e. Submit this information to your supervisor and/or Project Manager within 24 hours of the incident.

f. Assist with incident investigation as directed by management.

g. Implement corrective actions as directed by management.

h. *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.

i. *Do not* make statements pertaining to guilt, fault, or liability.

2. Line/Project Management Responsibilities (U.S. and Mexico Operations)

   a. For instances involving employee or subcontractor death or hospitalization, or equipment damage to Company or customer equipment valued at more than $100,000 (USD), immediately notify by telephone or other direct means URS/EG&G Operations and the HSE team in the order listed below. If any level of contact is unsuccessful, continue down the list in sequence. After notification has been made, a detailed follow-up, via email, is required.

      i. Appropriate corporate leadership for the affected program up to the Regional Business Unit (RBU) or

Strategic Business Unit (SBU) Vice President for the affected Operations.

ii. The URS Occupational Health Manager (OHM).

iii. Appropriate RBU and SBU HSE Manager for the affected Operation.

Follow-up notification should be made by forwarding Attachment 049-1 NA to the OHM within 24 hours. See Attachment 049-1 NA for methods of distribution. Also, assure copies of the report are distributed as outlined on the form. For the international operations of URS Division, this follow-up notification is not required.

URS/EG&G Division HSE Management will make notification to federal and state authorities as appropriate.

b. For minor incidents involving only first aid treatment, minor damage to vehicle or equipment, etc., make notifications to a supervisor and OHM immediately and submit Attachment 049-1 NA to the OHM. See Attachment 049-1 NA for methods of distribution. Also, assure copies of the report are distributed as outlined on the form.

c. For a near-miss incident, complete Attachment 049-1 NA and submit to the OHM as soon as reasonable. Also, ensure copies of the report are distributed as outlined on the form.

d. Review circumstances (i.e., who, what, when, where, and how) of the incident with applicable employee(s) to determine apparent causes and to develop recommended corrective actions.

e. Discuss with department or project staff the circumstances surrounding the incident and corrective actions taken.

3. Line/Project Management Responsibilities (Canadian Operations)

a. If notified of an incident that is a critical injury (see Supplemental Information A for definition), serious accident, or other significant consequence:

i. Immediately contact URS Canada Human Resources at (905) 882-4401.

ii. Review circumstances (i.e., who, what, when, where, and how) of the incident with applicable employee(s) to determine apparent causes and to develop recommended corrective actions.

iii. Follow up notification by completing, signing, and delivering/faxing Attachment 049-1 NA to URS Canada Human Resources within 24 hours.

iv. URS Canada Human Resources will make notification to provincial authorities as appropriate.

b. If notified of an incident that is not a critical injury, nor a serious accident or other significant consequence:

i. Review circumstances (i.e., who, what, when, where, and how) of the incident with applicable employee(s) to determine apparent causes and to develop recommended corrective actions.

ii. Complete, sign, and deliver/fax Attachment 049-1 NA to URS Canada Human Resources within 24 hours.

iii. URS Canada Human Resources will make notification to provincial authorities as appropriate.

c. If notified of a near-miss incident:

i. Review circumstances (i.e., who, what, when, where, and how) of the incident with applicable employee(s) to determine apparent causes and to develop recommended corrective actions.

ii. Complete, sign, and deliver/fax Attachment 049-1 NA to URS Canada Human Resources as soon as practicable.

d. Discuss with department or project staff the circumstances surrounding the incident and corrective actions taken.

4. Local Office, Project, and/or Certified HSE 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 or the near-miss report for completeness and accuracy. Ensure the reports are distributed properly.

d. Ensure notifications are made in a timely manner.

e. Ensure that the injured employee is properly counseled/advised as directed by SMS 065 – Injury and Claims Management. Communicate with the OHM.

f. Note that "Certified" HSE Representatives are those who have received special training in occupational safety and health and have been certified by the Ontario Workplace Safety and Insurance Board. Certified HSE Representatives should be used at larger Canadian project sites where joint worker/employer safety committees are developed.

5. Occupational Health Manager

a. Report work-related injuries and illness to workers' compensation carrier.

b. Ensure that the employee's injury is managed in accordance with SMS 065 – Injury and Claims Management. Provide guidance for the affected office, project, and/or Certified HSE Representative.

c. Periodically disseminate near-miss reporting summary information to the Regional, RBU/SBU, and Division HSE Managers.

6. URS Human Resources (Canadian Operations Only)

a. Receive incident notifications from staff.

b. For incidents involving critical injuries, serious accidents, or other significant consequences:

i. Verbally notify the Office Manager immediately, via cell phone if necessary.

ii. Notify the Certified HSE Representatives (management and worker) as soon as possible (where necessary).

iii. Notify the OHM as soon as possible. Notification to the OHM should in no case occur later than the end of the work shift.

iv. Follow up notification by receiving from staff and forwarding Attachment 049-1 NA to the OHM within 24 hours. Also, assure copies of the report are distributed as outlined on the form.

c. For minor incidents involving only first aid treatment, minor damage to vehicle of equipment, etc.:

i. Notify the OHM as soon as reasonable during normal business hours.

ii. Receive from staff and forward Attachment 049-1 NA to the OHM within 24 hours.

Ensure copies of the report are distributed as outlined on the form.

d. Report work-related injuries and illness to the Workplace Safety and Insurance Board or appropriate workers' compensation carrier and other provincial or federal authorities as appropriate.

e. Ensure, in conjunction with the Office HSE Representative, that the employee's injury is managed in accordance with SMS 065 – Injury and Claims Management. Provide guidance for the affected Certified or Project HSE Representative.

f. Periodically disseminate near-miss reporting summary information to the Regional and Division HSE Managers.

7. Division HSE Management

a. Notify URS management of any significant occurrence, including lost-time injuries, deaths, or other serious result or circumstance.

b. The OHM will review all reported incidents to determine OSHA reporting and recording requirements with input from the appropriate Division HSE Manager. For a determination of recordability in those infrequent instances where there is not a clear answer, the Vice President of HSE will make the final determination. All decisions will be based strictly on current U.S. Occupational Safety and Health Administration (OSHA) regulations.

c. Official records (including required reports and logs for all reported incidents) will be maintained at one central location by the OHM.

d. Each January, the OHM will prepare and distribute the appropriate government injury/illness reports to each URS and EG&G establishment. These reports will summarize all required government information for incidents that occurred during the preceding calendar year.

5. Documentation Summary

File Attachment 049-1 NA in the appropriate safety files. Note that the international operations of URS Division will use the appropriate HSE and Quality Improvement database.

6. Resources

A. Occupational Health Managers (OHMs)

URS Division	EG&G Division
Jeanette Schrimsher, RN COHN-S	**BJ (Johnson) Heinrich, RN, BSN, COHN-S**
(866) 326-7321 (Toll Free-U.S.)	(866) 344-1415 (Toll Free-U.S.)
(512) 656-0203 (Cell)	(877) 878-9525 (Toll Free-International)
(512) 419-6413 (Confidential Fax)	(512) 656-8502 (Cell)
	(512) 419-5252 (Confidential Fax)

B. SMS 057 – Vehicle Safety Program

C. SMS 065 – Injury and Claims Management

D. SMS 066 – Incident Investigation

E. Attachment 049-1 NA – Injury/Near Miss Report Form

URS SAFETY MANAGEMENT STANDARD

Cold Stress

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where field crews are working outdoors in damp and cool (below 50 degrees Fahrenheit [°F] or 10 degrees Celsius [°C]) conditions or anytime temperatures are below 32°F or 0°C.

2. Purpose and Scope

The purpose of this standard is to protect project personnel from hypothermia and frostbite.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

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. If possible, schedule heavy work during the warmer parts of the day. Implement a work-warming regimen by taking breaks out of the cold.

C. Observe and monitor weather conditions such as ambient temperature, wind speed, and precipitation while in the field. If needed, use Supplemental Information B to determine wind chill.

D. Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. Adequate insulating dry clothing will be required in air or wind chill temperatures below 40 °F (4.4 °C).

   1. Wear at least 3 layers of clothing to help prevent cold stress. It is important to preserve the air space between the body and the outer layer of clothing to retain body heat.

   2. Wear an outer layer to break the wind and allow some ventilation (e.g., Gortex® or nylon).

3. Wear a middle layer of down, wool, or similar materials to provide insulation.

4. Wear an inner layer of cotton or synthetic weave to allow ventilation.

5. Wear a hat or hardhat liner. Up to 40 percent of body heat can be lost when the head is left exposed.

6. Wear insulated boots or other insulated footwear, and insulated gloves to help reduce the chance of frostbite.

7. Keep a change of dry clothing available in case work clothes become wet.

8. Do not wear tight clothing. Loose clothing allows better ventilation.

9. Skin should not be left exposed on a continuous basis when air temperature or chill factors are below -17°F (-27°C).

10. Drink plenty of liquids, avoiding caffeine and alcohol, which are vasoconstrictors. It is easy to become dehydrated in cold weather.

E. Use the following work practices:

1. Use Supplemental Information C to establish work/rest cycles in cold weather.

2. Drink plenty of warm liquids. It is easy to become dehydrated in cold weather.

3. Avoiding caffeine and alcohol. Alcohol will accelerate loss of body heat.

4. Eat high calorie snacks to help maintain body metabolism.

5. If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold.

6. Work in pairs to keep an eye on each other and watch for signs of cold stress.

7. NEVER IGNORE SHIVERING. Persistent or violent shivering is a clear warning that you are on the verge of hypothermia.

8. Avoid exhaustion.

F. When possible, use the following engineering controls:

1. Provide shelter to escape cold, wind, and precipitation

2. Provide a source of heat (such as warm packs or portable heaters).

3. Use insulating materials on equipment handles when temperatures drop below 30°F (-1°C).

G. Watch for symptoms and signs of hypothermia. Work in pairs to keep an eye on each other and watch for signs of cold stress.

H. Treat cold stress illness as follows:

1. Hypothermia: Prompt treatment of hypothermia is essential. Once the body temperature drops below 95°F (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, removing wet clothing, applying external heat (such as a pre-warmed sleeping bag, electric blanket, or body-heat from other workers), and obtaining follow-up medical attention.

2. Frost Bite: The initial treatment for frostbite includes bringing the individual to a warm location, removing 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 Supplemental Information A.

I. Hypothermia in Water:

Loss of body heat to the water is a major cause of deaths in boating and working near water incidents. 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 2 to 3 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 minutes	Under 15 to 45 minutes
32.5 to 40°F (0 to 4°C)	15 to 30 minutes	30 to 90 minutes
40 to 50°F (4 to 10°C)	30 to 60 minutes	1 to 3 hours
50 to 60°F (10 to 16°C)	1 to 2 hours	1 to 6 hours
60 to 70°F (16 to 21°C)	2 to 7 hours	2 to 40 hours
60 to 70°F (16 to 21°C)	3 to 12 hours	3 hours to indefinite
Over 80°F (27°C)	Indefinite	Indefinite

SOME POINTS TO REMEMBER:

1. Wear your PFD. Review SMS 027 – Work Over Water, SMS 053 – Marine Safety and Boat Operations and SMS 095 – Barge Operations.

2. If the water is less than 50°F (10°C), wear a wet suit or dry suit for work in water (e.g., wading), or if a significant potential to fall in water exists.

3. 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.

4. Keep a positive attitude about your rescue. This will increase your chances of survival.

5. 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:

1. Recognition of the signs and symptoms of cold injury or impending hypothermia;

2. Proper re-warming procedures and appropriate first aid treatment;
3. Proper use of clothing;
4. Proper eating and drinking practices; and
5. Safe work practices appropriate to the work that is to be performed.

5. Documentation Summary

The following documentation will be maintained in the project file:

A. Cold stress training records.

6. Resources

A. U.S. Occupational Safety and Health Administration (OSHA) Fact Sheets – "Protecting Workers in Cold Environments"

B. OSHA Publication 3156 – Quick Reference Card

C. SMS 027 – Work Over Water

D. SMS 053 – Marine Safety and Boat Operations

E. SMS 095 – Barge Operations

7. Supplemental Information

A. Signs of, and Treatment for, Cold Stress-Related Illnesses

B. Wind Chill Index (units in °F and miles/hour, and units in °C and Kilometers/hour)

C. Work/Warm-up Schedule for Outside Workers based on a Four-Hour Shift

URS SAFETY MANAGEMENT STANDARD

Manual Material Handling

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where personnel perform manual handling of materials. For this procedure, manual material handling (MMH) is defined as the movement of items by lifting, lowering, pushing, pulling, carrying, holding, or restraining.

2. Purpose and Scope

The purpose of this standard is to prevent common injuries caused by the practice of MMH. Immediate or short-term effects include lacerations, bruises, and muscle fatigue. Long-term effects include chronic pain, frequently in the lower back but also in limb joints and ligaments.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project.

4. Requirements

A. General

1. Prior to lifting, lowering, pushing, pulling, carrying, holding, or restraining an object of any significant size or weight, employees must evaluate the object and the required task to determine whether they can handle the object safely.
2. If the employee has any doubt about whether he or she can safely move the object alone, the employee should obtain additional manual or mechanical help.
3. Healthy employees with no physician-imposed restrictions should be able to lift and carry a maximum of 50 pounds (23 kilograms) using proper lifting and carrying techniques. Physical and workplace factors may reduce this recommended weight limit (RWL) significantly and should be considered prior to attempting lifts of this magnitude. Examples of physical and workplace factors may include the following:
    a. Physical size of an object.
    b. Slippery container surface or poor grip ability.
    c. Sharp edges.
    d. Slippery floors or obstacles on the floor.
    e. Cold or hot objects surfaces.
    f. Distance and route of travel.

4. An employee's personal "safe" MMH capability is defined as the employee's personal capability to manually lift, carry, push, or pull an object alone. This "safe" limit must consider the employee's past experience and training with MMH, health status, and any other personal or environmental characteristics affecting the employee's ability to perform these tasks. An employee's "safe" MMH capability is typically at or below the calculated RWL. In some cases, a trained and physically conditioned employee may exceed the MMH capability limit, but only after a complete hazard review of the task has determined an acceptable risk for minimizing injury.
5. An MMH task that exceeds an employee's personal "safe" MMH capability or RWL should be brought to the attention of the applicable manager or safety supervisor for the project.
6. If, due to a medical or health condition, the employee's physician or the employee has set a personal "safe" MMH capability, then appropriate medical documentation must be provided to the applicable manager to define these limits. The manager and appropriate safety supervisor should evaluate the tasks to which that employee is assigned and recommend a specific course of action to limit the potential for injury. This should include periodic monitoring of the employee and his/her work environment.
7. A recommended RWL can be calculated using the factors described in Supplemental Information A. The weight limit derived from these calculations is considered to be a load that over 99% of men and over 75% of women can safely handle without application of engineering or administrative controls. **Implementation of the calculations in Supplemental Information A should be attempted only with the assistance of a safety professional knowledgeable in the application of these factors. The calculations are intended to determine RWLs for repetitive lifting scenarios rather than occasional lifts.**
8. Prior to any manual lift, it is suggested that the employee warm up his or her muscles and joints using a combination of stretching and flexing.

B. Preplanning

1. Where MMH will be a necessary function of the task, the manager and/or safety supervisor should perform a thorough evaluation of the activities to determine ergonomic solutions to reduce or eliminate conditions that can cause or contribute to MMH injuries.

2. If a heavy object is to be moved to another location, the safest transport route should be determined prior to the activity.
3. The area around the object and the route over which it will be transported should be checked for slip, trip, and fall hazards. Hazards should be removed prior to initiation of the task.
4. The object to be moved should be inspected for grasping or handling hazards, such as slivers, sharp edges, grease, water, etc. Eliminate or abate any identified hazards where possible. Safe grasping or handling points on the object should be determined. Whenever possible, containers with carrying handles should be used for objects because they increase the manual grip strength for holding the object, thus providing better control and reduced muscle fatigue.
5. The distance to be traveled and the length of time that a grip on the object must be maintained should be considered before moving objects. If the travel distance is greater than 10 feet (3 meters) at maximum RWL, the employee should consider using an alternative method, rather than manually carrying the object.

C. Lifting/Lowering Guidelines

1. Reduce or eliminate manual lifting and lowering tasks where possible. Determine whether there are ways to abate the safety and ergonomic hazards associated with manual lifting.
2. The recommended technique for two-handed manual lifting/lowering involves five maneuvers:
    a. Get a firm footing. Keep your feet apart for a stable base. Put one foot slightly in front of the other.
    b. Bend your knees. Do not bend at the waist. When grasping the object, a firm grip should be obtained before lifting/lowering.
    c. Lift/lower with your legs. Lift/lower the load slowly and in a straight line, avoiding sudden movements.
    d. Keep the load close to the body. Generally, the closer the load is to the body, the less force it exerts on your back.
    e. Keep your back straight, your head and shoulders up, and your stomach muscles tights. Do not add the weight of your body to the load. Avoid twisting.

3. When a turn or change of direction is necessary, the object should be lifted or lowered into a carrying position, then the whole body should be turned with the feet, avoiding any trunk twisting motion.
4. Objects to be lifted to shoulder height should first be lifted to waist height, then rested on a level surface so the grasping position can be changed prior to lifting to a higher level.
5. Employees should never lift a load above their head.

D. Carrying/Holding Guidelines

1. Manual carrying is an inefficient way of transporting materials in the work place. Where possible, reduce or eliminate manual carrying tasks.
2. Never carry a load above the head.
3. Carry an object close to the body using both hands. One-handed carries are awkward and tend to unbalance the employee.
4. Do not carry objects that are so large they will obstruct visibility.
5. Do not change grips on an object while carrying or holding an object. Rest the object on a secure surface prior to changing grip.
6. If an object is of a size, shape, or mass that it requires two people to carry, use two people of similar size and physique. Two-person lifts should be planned and coordinated before performing the lift. Lift the item in unison.
7. Avoid carrying objects on stairs, particularly where the line of sight may be obstructed or the object can interfere with leg movement. All travel on stairs requires use of a handrail at all times, so only carry objects that can be safely handled with one hand. Always maintain handrail contact when carrying an object up or down stairs.

E. Pushing/Pulling Guidelines

1. Check the condition of the floor, ground, or other surface prior to pushing or pulling an object across it.
2. Be aware of the “break out” force of the object; this is the force at which a push or pull overcomes the frictional force between the surface and object. Adjust posture to avoid losing balance when this point is reached.
3. Get assistance when moving or guiding a large load.
4. Where possible, always push rather than pull a load.

5. Never load the cart or load-carrying device in such a manner that visibility is obstructed in the path of travel.
6. When pushing or pulling an object on an inclined surface, be certain that you can control the load and direction of travel before proceeding. Obtain additional support to control the load if necessary.
7. Never leave carts or loads in an area that will present a hazard to other workers. Make sure carts or transport devices are secured in position before leaving them unattended.

F. Workplace Design

1. Store heavy or bulky materials at heights between the knee and shoulder to avoid the need to stretch or bend. Use step stools to access objects above shoulder height.
2. Pack or arrange items to be lifted to avoid shifting of weight in the package. If a box has hand cutouts (e.g., file archive boxes) do not load the box so full that the handles cannot be used for carrying the box.
3. Design work areas to avoid the need to lift, carry, push, or pull heavy or bulky materials for extended distances.
4. Design workplaces with the following in mind:
    a. Lifts from the floor should be avoided.
    b. The torso should never twist while handling loads.
    c. Asymmetrical or unbalanced one-handed lifts should be avoided.
    d. Loads should not be lifted with sudden movements.
    e. Loads should not be lifted over obstacles.
    f. Loads should not be lifted at extended forward or sideway reaches.
    g. Uncomfortable or static postures should not be necessary throughout the work cycle.
    h. Environmental factors (e.g., task lighting, dry work surfaces, heat or cold stress) should be considered.

G. Training

1. Personnel who may have MMH as part of their duties are required to receive training that includes the following topics:

a. Showing personnel how to avoid unnecessary physical stress and strain during MMH operations.
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 MMH activities.
3. Assistance with training or training materials is available through the HSE staff.

5. Documentation Summary

The following documentation will be maintained in the project file:

A. Training rosters.
B. Other proof of completion of MMH training.

6. Resources

A. National Institute for Occupational Safety and Health (NIOSH) – Work Practices Guide for Manual Lifting http://www.cdc.gov/niosh

B. Canadian Centre for Occupational Health and Safety http://www.ccohs.ca/oshanswers/ergonomics/

C. Oregon OSHA – Ergonomics of Manual Materials Handling http://www.cbs.state.or.us/external/osha/pdf/workshops/206w.pdf

D. North Carolina Department of Labor – A Guide to Manual Materials Handling and Back Safety http://www.nclabor.com/osha/etta/indguide/ig26.pdf

7. Supplemental Information

A. Recommended Weight Limit (RWL) Calculations

URS SAFETY MANAGEMENT STANDARD
Behavior-Based Safety

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to describe the URS approach to implementing our behavior-based safety program.

Behavior-based safety is a process that provides a higher level of safety excellence by promoting proactive involvement, building ownership, and fostering communication that relates to employee safety. A primary concept is that most accidents are due to at-risk behavior, and behavioral changes may be made that significantly reduce accident potential.

3. Implementation

Implementation of this procedure is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Definitions

1. At-Risk Behavior: Individual actions that increase the chance of injury, despite knowledge of the hazard. An example is excessive speed while driving.

2. Activators: Items that are intended to produce desired behaviors. URS activators for safety include, but are not limited to, policy statements, safety management standards (SMS), training, safety slogans, posters and signs, health and safety plans, safe work plans, safety meetings, and rules and regulations.

3. Behaviors: Visible actions on the part of individuals and can be characterized as safe (following health and safety plans, using work practices that minimize risk, coaching others on safe behavior, having safety as a priority over speed and convenience, etc.), or at-risk.

4. Consequences: Result of safe and at-risk behaviors, and can therefore be positive or negative. Examples of consequences include self-approval, reprimand, peer approval, penalty, feedback, inconvenience, and comfort. The most effective consequences are positive, immediate, and certain.

B. Values of Behavior-Based Safety

1. Employees hold safety as a core value.

2. Each employee feels responsible for the safety of their coworkers as well as themselves, and takes action accordingly.

3. Each employee is willing and able to “go beyond the call of duty” on behalf of the safety of others.

C. Roles for Safe Behavior

1. Supervisor’s Role:

   a. Provide clearly defined safety expectations and encourage/reinforce the implementation of safety observations using the SMS 072-1 NA checklist or equivalent.

   b. Provide consequences for observed behaviors throughout the course of the work shift.

2. Co-Worker Role

   a. Intervene when observing at-risk behavior.

   b. Provide positive feedback for safe behavior.

   c. Volunteer to be observed.

C. Identification of At-Risk Behaviors

Observations and review of incident and near miss data will be used by URS Safety Officers to help identify at-risk behavior.

1. Employee observations.

   a. Observation checklists, either project-specific or Attachment 072-1 NA, will be used as a tool to help identify safe and at-risk behaviors and why the behavior(s) occurred.

   b. Employees will be instructed on using the checklists.

   c. Checklists will be included in the site-specific health and safety plan or the safe work plan.

   d. The checklists will include the expected safe behaviors.

e. Peers will complete the checklist for applicable work tasks.

f. Checklists may change throughout the project to include additional behaviors.

E. Feedback to Employees

1. Observers will immediately provide one-on-one feedback to the observed, noting both safe and at-risk behaviors.

2. Observer and observee will discuss the identified barriers to safe behavior, and potential solutions.

3. Near-Miss and Incident Reports will be reviewed to identify at-risk behaviors and corrective actions.

4. Management and Health, Safety, and Environment staff will verify compliance with this standard.

F. Feedback Follow-up

1. Observation checklists will be collected and discussed at periodic safety meetings.

2. The manager will review the trends for at-risk and safe behavior, and report the trends to the employees.

3. Project-specific trends are analyzed and areas of additional action are identified.

5. Documentation Summary

The following documentation will be maintained in the project file:

A. Behavior-Based Safety Checklists.

6. Resources

Attachment 072-1 NA – Behavior-Based Safety Checklist

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APPENDIX B

STANDARD OPERATING PROCEDURES

(SOPs)

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ATTACHMENT B-1
PROCEDURE FOR DECONTAMINATION

OVERVIEW

The purpose of this procedure is to ensure that all non-dedicated sampling, field screening, and water filtering equipment that contacts the sample material is clean and does not cause cross contamination between samples.

MOBILIZATION

Assemble the appropriate equipment.

- Alconox detergent (or equivalent)
- Potable water
- De-ionized water
- Three 5-gallon or larger buckets
- Two brushes
- 5-gallon garden sprayer
- Plastic sheeting
- Sealing plastic bags

Drilling contractor provided equipment

- Steam cleaner
- Visqueen plastic
- Containment for steam cleaning water and removed soil

DECONTAMINATION

1) Drilling and well installation equipment:

- Set up a decontamination station at the location(s) designated by client.
- Verify that the drilling contractor has required equipment at the designated decontamination area and *thoroughly* cleans the equipment (inside and outside) with a high-pressure steam cleaning unit (water at 200 °F and 1500 psi) prior to use at each boring/well location. All augers, drill steel, and drill casing should be decontaminated prior to use in each boring. Cleaned equipment should be placed on a Visqueen covered surface following decontamination. Samplers can also be steamed clean in lieu of the decontamination procedure outlined below.
- Verify proper containment of water and soils generated by steam cleaning.
- Document decontamination procedures in the daily field report.

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ATTACHMENT B-1
PROCEDURE FOR DECONTAMINATION

2) Sampling equipment during sampling:

- Rinse thoroughly with potable water.
- Scrub with Alconox/water wash to remove any visible dirt.
- Rinse with potable water.
- Double-rinse with deionized water.
- Replace wash and rinse water prior to sampling near each SWMU/AOC, or more often if warranted.
- Store in a clean area on Visqueen plastic sheeting during sampling.
- Wrap in plastic for storage unless equipment will be used immediately.
- Document decontamination procedures in the daily field report.

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ATTACHMENT B-2
PROCEDURE FOR FIELD INSTRUMENT CALIBRATION

OVERVIEW

The purpose of instrument calibration is to ensure that the instruments used for field screening and field measurements are functioning correctly and accurately. Verify that the instrument case contains the operations manuals supplied by the manufacturer and see the calibration procedures in the operations manuals for calibration and for troubleshooting procedures. A summary of the general calibration procedures for various instruments is provided below. Manufacturer's specific procedures should be followed if these differ from the general procedure outlined below.

Note: Verify that the instrument is charged and running correctly before going out in the field. Recharge instruments with rechargeable batteries every night. Check instruments with replaceable batteries and replace batteries if necessary. **Make sure there is an extra charged battery and set of replaceable batteries each day the equipment is used.**

CALIBRATION PROCEDURES

1) pH Meter

- Turn on the instrument and allow to warm.
- Determine and record the temperature of each buffered solution.
- Place the probe in the pH 7.0 buffer solution and set the temperature-adjust knob to the temperature of the buffer solution.
- Adjust the unit output to 7.0 using the zero control.
- Rinse the probe with deionized water and place the probe in the pH 4.0 buffer solution.
- Adjust the unit output using the slope control.
- Verify the slope is adjusted correctly by rinsing the probe with deionized water and placing the probe in the pH 10.0 buffer solution.
- Store the probe in pH 4.0 solution when not in use.
- Record all readings in the daily field report.

Frequency. Conduct pH meter calibration at the beginning of each day. Periodically throughout the day, make one-point calibration checks using the pH 7.0 buffer solution. If the check indicates that the calibration has changed, repeat the two-point calibration and record results in the daily field report.

2) Conductivity Meter

- Turn on the instrument and allow to warm.
- Set the adjust knob to zero.
- Place the probe in the calibration solution.
- Adjust the unit output to the conductivity of the calibration solution using the calibration control knob.
- Record all readings on the field report form.

Frequency. Conduct conductivity meter calibration at the beginning of each day and record all readings on the field report form. Make calibration checks periodically throughout each day and record all readings in daily field report.

3) Water-Level Indicator and Immiscible Product Interface Probes

- Turn on the switch to "on".
- Lower the probe into a bucket of water and verify the audible indicator for water goes on when the probe enters the water.
- In order to check whether an interface probe is detecting non-aqueous phase fluids (e.g., LNAPL or DNAPL), lower the probe into a bucket of water with a thin layer of oil added to it to verify the audible indicator for LNAPL goes on when the probe enters the oil. An alternative method is to test the probe in an oil/water separator with visible oil or another container containing hydrocarbons, if available.

Frequency Check water level indicator/interface probe at the beginning of each day and document this in daily field report.

4) Photoionization Detector (PID)

The PID will be calibrated according to the manufacturer's procedures. " Zero air" and "span gases" are used to calibrate the instruments. The zero air is introduced to the PID in order to determine the "background" signal. The concentration of the span gas is then selected and introduced to the instruments. The instrument makes all of the necessary calculations to arrive at a "calibration constant". The manufacturer's manual will be located in the instrument carrying case for reference for calibration and troubleshooting procedures.

Frequency Conduct meter calibration at the beginning of each day and periodically throughout each day or more frequently when apparent anomalous readings are obtained. Record all readings in the daily field report and on the calibration form in the project health and safety plan.

5) Dissolved Oxygen Meter

- Turn the meter on and place the probe in water.
- Expose the probe to air.
- Turn the calibration knob until the display reads 20.9% oxygen. This is the average composition of clean air.
- Record the calibration readings in the daily field report.

Frequency Calibrate at the beginning of each day and during the day as appropriate if potentially anomalous reading are obtained. Record all readings in the daily field report form.

6) Oxidation-Reduction Potential Meter

- Turn the meter on, place the probe in the calibration fluid, and check the reading to confirm it is within the calibration range.
- Record the calibration reading in the daily field report.

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ATTACHMENT B-3
PROCEDURE FOR SOIL SAMPLING

OVERVIEW

The purpose of the procedures for collecting soil samples is to ensure that the samples are representative of the physical and chemical conditions encountered in each boring. Selected samples will be tested and analyzed to: (1) evaluate the presence and, if present, nature and extent of dangerous constituents in soil and (2) determine the hydrologic and other physical properties of soils encountered. Therefore, it is important to obtain undisturbed samples, if feasible. In addition, the samples shall be collected in a manner that does not cause cross-contamination of samples.

MOBILIZATION

Review the SAP and HSP and work plan. Coordinate each sampling event with the site contact. Perform utility drawings review and arrange underground utility survey. Notify the laboratory of sample collection and delivery dates. Verify containers received from laboratory and preservations are appropriate relative to analytical methods. Arrange for concrete coring, if needed, and drilling/hydraulic probing contractor. Assemble appropriate equipment as follows:

- Decontamination Equipment per Attachment B-1
- Field copies of the workplan, including the SAP and HSP
- Dames & Moore U-type or equivalent split spoon sampler, hand auger and core sampler, and associated equipment
- 3-inch or 6-inch long thin-walled stainless steel sleeves, plastic end caps, pre-cut Teflon end sheets, and duct tape; and/or laboratory provided, glass sample jars
- Photoionization detector (PID) or organic vapor analyzer (OVA) and calibration gases
- pH meter and calibration fluids (if applicable)
- Tape measure and water level indicator
- Sample labels and field forms (geologic boring logs, daily field report, chain of custody, etc. as outlined in Attachment B-3)
- Insulated cooler, ice, packing material, duct tape, sealing plastic bags, sample custody seals
- Personal protection equipment per the HSP

Decontamination and Field Instrument Calibration
See procedures for decontamination (Attachment A-1) and field equipment calibration (Attachment A-2). Calibrate field equipment prior to initiating drilling and sampling and decontaminate sampling equipment as required. Record calibration data in the daily field report.

SAMPLE COLLECTION

- Check the Work Plan to determine the sampling interval and methodology to be used at each area.
- Prior to collecting each soil sample, screen for the presence of organic vapors at the top of the open borehole, auger flight, or drill/probe casing using the PID/OVA and record the highest and sustained measurements on the geologic log. The cuttings and worker's breathing zone will also be screened for organic vapors a minimum of once for every 5 feet drilled.
- For samples collected during drilling, count and record the number of blows per six inch increment of sampler driven (applicable for HSA and rotary drilling techniques). The number of blow counts during the *last 12 inches* of sampling indicate the density of the material.
- Record the recovered length of the sample. Open the split barrel or extrude the sample as appropriate and screen for organic vapors with the PID/OVA. Record reading on the geologic log. Collect samples as outlined below.

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ATTACHMENT B-3
PROCEDURE FOR SOIL SAMPLING

Samples for Volatile Organic Compounds (VOCs) – Place sample material for analysis of VOCs into laboratory provided glassware as soon as possible and before otherwise disturbing the sample material.

Homogenization – If a disturbed sample is to be collected, first place sample material in a new or decontaminated container (e.g., stainless steel bowl) and completely homogenize using a new or decontaminated tool (e.g., stainless steel spoon or spatula). Then place the soil in the appropriate sample jar with a clean tool. Pack the jar as tightly as feasible to minimize headspace in the jar. Label each sample as outlined above and place the sample in a cooler containing ice.

Field Screening Sample – Place remaining soil not saved in a sealed plastic bag labeled with the borehole number and depth of sample. After allowing the sample to volatilize for at least 5 minutes, insert the PID probe into the bag, obtain a headspace reading for volatile organics, and record the reading on the geologic log. Retain samples until the completion of the borehole drilling to allow geologic correlation purposes.

GEOLOGIC LOGGING

Describe the following soil characteristics of each sample using the Unified Soil Classification System (USCS, ASTM D 2488-84) on the geologic log (Attachment A-3B). **Note**: Use of the following order facilitates preparation of the final computer generated log:

- Soil group symbol (e.g., SM, SP, etc.)
- Color (per Munsell color chart)
- Group name (e.g., silty sands, poorly-graded sand, etc.)
- Particle size range (e.g., fine to medium)
- Moisture content (dry, moist, wet)
- Density (based on blows required to drive sampler) of granular soils or stiffness of clays
- Plasticity of fines
- Texture or structure (e.g., laminated)
- Geologic name (e.g., fill, glacial till, etc.).
- Staining, odor, or other evidence of dangerous constituents (if appropriate).
- Additional pertinent comments.

For example: SM, Dark Gray, Silty Fine Sand with trace of fine gravel (moist) (very dense) (glacial till) (discontinuous orange staining and strong odor)

DECONTAMINATION

Decontaminate the sampler and other sampling equipment prior to collection of each sample in accordance with the procedure outlined in Attachment A-1.

BOREHOLE ABANDONMENT

After borehole completion, verify that the drilling contractor seals the borehole per the SAP. Record the borehole abandonment method and approximate amount of grout material on the geologic log.

SAMPLE HANDLING

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ATTACHMENT B-3
PROCEDURE FOR SOIL SAMPLING

- **Sample packing** - Place the sample containers in an ice chest cooled with sufficient ice to maintain the samples at or below 4ºC. The frozen ice packs shall be placed within sealed plastic bags and placed below, within and on top of the samples. The ice chest shall remain closed except when placing samples in or removing sample. There should be foam or other appropriate packing material on the base of the ice chest, between sample containers, and on top of the sample containers to prevent breakage of glass sample jars. The packing shall be sufficient to prevent excessive movement of the containers which could affect sample integrity. The ice chest shall remain in the sampler's possession at all times until delivery to the laboratory or secure temporary storage.
- **Use of chain of custody form** - Be sure to complete *all* areas of the COC form (which is printed in triplicate) consistent with the documentation procedure described in Attachment B-5. Place the COC form in a sealed plastic bag and place it in the ice chest with the samples listed on the form for transport to the laboratory.
- **Sample custody** - Keep samples in your possession. If the samples are left unattended (i.e., in a locked vehicle), place chain-of-custody seals on the cooler to ensure the cooler has not been opened.
- **Sample shipping** - Each day, or as necessary, hand deliver or arrange for transport of the soil samples to the contract laboratory.
- **Disposal of investigative waste materials** - handle the drill cuttings and decontamination water in accordance with the SAP.

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ATTACHMENT B-4
PROCEDURE FOR GROUNDWATER SAMPLING

OVERVIEW

The purpose of the groundwater sampling procedures is to ensure that representative samples of groundwater are provided for analysis and that the act of sampling does *not* contribute to further contamination at the site or cross-contamination of samples. The purpose of collecting groundwater levels is to calculate groundwater elevations and estimate flow direction. Groundwater elevations will be used to evaluate groundwater flow direction for an area of the site if at least three wells are present

CAUTION

Take care opening sample bottles. Some of the sample bottles may contain concentrated acid preservatives which will burn your skin and damage your clothing. The bottle labels should identify the preservative or they may have a red or yellow sticker on them which indicates "preservative". *If you do spill the preservative, immediately flush with water for at least five minutes and implement other appropriate actions per the project Health and Safety Plan.*

MOBILIZATION

Review the work plan, SAP and HSP. Coordinate the sampling event with the appropriate client contact and arrange for containers for purge water. Notify the laboratory of sample collection and delivery dates and request sample bottles. Verify containers received from laboratory and preservations are appropriate relative to analytical methods. Assemble appropriate equipment as follows:

- Decontamination equipment per Attachment B-1
- Field copies of the work plan, SAP and HSP
- Electronic water level indicator and/or Interface probe (for measuring potential immiscible product layers)
- Folding ruler or measuring tape (marked in 0.01 foot increments)
- Sampling and purging equipment (e.g., peristaltic pump, disposable tubing, and filters)
- Sample containers (with preservatives added as appropriate)
- Indelible marker
- Field screening equipment: PID specific conductivity meter, pH meter, calibration solutions and gases, thermometer, extra batteries
- Tool kit
- Appropriate disposable gloves and other personal protective equipment per the HSP
- Keys to well locks and wrench for surface monuments
- Calculator
- Sample labels and field forms: well construction forms, COC forms, daily field report, water sampling forms
- Packaging material: insulated coolers, ice, packing material, duct tape, sealing plastic bags, sample custody seals

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ATTACHMENT B-4
PROCEDURE FOR GROUNDWATER SAMPLING

CALIBRATING THE FIELD SCREENING INSTRUMENTS

Prior to initiating purging and sampling, calibrate the field instruments per the procedures for field instrument calibration (Attachment B-2).

INSPECTING THE WELL

On the field report, record the well identification number, condition of the surface monument and surface seal, and any conditions of surrounding ground surface which could impact well integrity (e.g., ponded water, stained ground surface, cracked asphalt, etc.). Also record the nature of any observed problems on the daily field report form and report them to the project manager.

OPENING THE WELL

Remove the locking and protective caps. Sample the air in the well head for organic vapors using a PID. Record measurements on the daily field report and groundwater collection form.

MEASURING FLUID LEVELS IN A WELL

Note: measure fluid levels for all wells in an area within a 24-hour period. Measure levels in a well prior to purging and prior to sampling.

- Turn the meter on and place in the well.
- Fluid level measurements from the top of the casing should always be taken from the same side of the casing (usually the North side) in all wells so that groundwater elevations are consistently calculated each time.
- Lower the probe to the liquid surface in the well and monitor the audible output to determine if the probe detects water, or LNAPL on the groundwater surface if an interface probe is used, and record the depth to the nearest 0.01 foot below the top of the well casing.
- If LNAPL is detected, lower the probe and monitor the audible output to determine when the probe detects the groundwater surface in the well and record the depth to the nearest 0.01 foot.
- Lower the probe below the groundwater surface and then slowly raise the probe to check the depth to groundwater and, if present, LNAPL surface.
- Repeat procedure until measurements can be duplicated.
- Record final measurements on the groundwater sampling form, well construction detail form, or daily field report, as appropriate. Calculate the water elevation by subtracting the measured depth in feet from the reference elevation of the well.
- Decontaminate the probe and portion of the cable which was in contact with the fluids prior to use in each well using the procedure for decontamination (Attachment A-1).

COLLECTING SAMPLES

Groundwater samples will be collected from shallow wells with low flow techniques using a peristaltic pump and disposable polyethylene tubing. The end of the tubing will be placed near the center of the well screen interval and the groundwater will be pumped at a rate of less than 1 liter per minute. As groundwater is purged from the well it will be monitored for temperature, pH, conductivity, dissolved oxygen, and turbidity using an electric water quality monitor (or equivalent). Groundwater samples will be collected once these parameters have stabilized reflecting ambient groundwater has been drawn into the well. **Note: Do not allow preserved sample containers to overflow.**

If a well is purged to dryness, sampling may be initiated upon 70% recovery. If water does not sufficiently recover

within 30 minutes, it will be considered "dry" and will not be sampled.

FILTERING OF SAMPLES

Samples for dissolved metals analyses will be filtered in the field. Place a new 0.45 micron filter onto the sample hose coming off the peristaltic pump and collect the metals sample aliquot directly into a HDPE bottle with nitric acid for preservative. The sample bottle should be clearly marked *dissolved metals*.

LABELING OF SAMPLES

Label each sample container according to the sample number, date, and time of collection in accordance with the project sampling scheme. Upon completion of labeling, place the sample in a cooled ice chest for storage and transport to the laboratory. Record date, time, and sample appearance on the daily field report and water collection form. Record all other required sampling information on the water sampling form.

SAMPLE HANDLING

- **Sample packing** - Place the sample containers in an ice chest cooled with sufficient ice to maintain the samples at or below 4 degrees Centigrade. The frozen ice packs shall be placed within sealed plastic bags and placed below, within and on top of the samples. The ice chest shall remain closed except when placing samples in or removing sample. There should be foam or other appropriate packing material on the base of the ice chest, between sample containers, and on top of the sample containers to prevent breakage of glass sample jars. The ice chest shall remain in the sampler's possession at all times until delivery to the laboratory or secure temporary storage.
- **Use of chain of custody form** - Be sure to complete *all* areas of the COC form (which is printed in triplicate) consistent with the documentation procedure described in Attachment B-5. Place the COC form in a sealed plastic bag and place it in the ice chest with the samples listed on the form for transport to the laboratory.
- **Sample custody** - Keep samples in your possession. If the samples are left unattended (i.e., in a locked vehicle), place chain-of-custody seals on the cooler to ensure the cooler has not been opened.
- **Sample shipping** - Each day, or as necessary, hand deliver or arrange for transport of the water samples to the contract laboratory.
- **Disposal of investigative waste materials** - handle the purge and decontamination water in accordance with the SAP.

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ATTACHMENT B-5
PROCEDURE FOR FIELD DOCUMENTATION

OVERVIEW

Each field team will maintain a daily field report and complete other logs and sampling forms to provide a daily record of events and document data and sample collection. All notes in the daily field report and other logs and forms should be clear, concise, and legally defensible. The use of each type of data record is described below, and examples of the logs and forms are included.

DAILY FIELD LOG

All documentation in daily field reports will be in ink. If an error is made, make corrections by crossing a line through the error and entering the correct information. Date and initial corrections. No entries will be obliterated or rendered unreadable. Sign and date each page.

Daily entries

- Job name and number
- Date
- Time
- Meteorological conditions
- Field personnel present
- Documentation of site safety meeting
- Level of personnel protection
- List of on-site visitors and the level of personal protection
- Field observations and conditions
- Building or general location being investigated
- Identification of sampling points consistent with project labeling scheme on area plan
- Description of reason for modifying sample locations on plan
- References to photographs (if applicable)
- Number of samples taken and general time of sample collection at each location
- Number of QA/QC samples taken
- Telephone contacts made regarding project and general purpose of discussion
- Visitor's names, affiliation, time of visit and purpose
- Unique field observations, difficulties, or modifications to specified scope or methods
- Documentation of decontamination
- All calibration measurements made (e.g., pH, temperature, specific conductance, etc.)
- Sample distribution (i.e., storage at site, direct delivery to contract analytical laboratory)
- Shipping date, method of shipment, destination, and the shipment identification number (if samples shipped)
- Summary of daily activities
- Other pertinent information.

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ATTACHMENT B-5
PROCEDURE FOR FIELD DOCUMENTATION

GEOLOGIC LOG

Record the boring/monitoring well identification number, drilling contractor and method, field geologist/engineer's observations, description of soils encountered, USCS classification of soils, field screening measurements for soils, sample collection depths, and sample identification numbers on this log. In addition, notes regarding the drilling operation including site conditions, drilling rate, blow counts required to drive samples, assessment of drilling cuttings, depth to groundwater if encountered, borehole sealing material, and other pertinent subsurface conditions shall be recorded on the geologic log. All project information on the log shall also be completed and the preparer shall initial and date the log. Furthermore, if a well is constructed within the boring, this form will include the details of the materials used to construct that well and depth of placement of those materials.

GROUNDWATER SAMPLING DATA SHEET

Document groundwater water sampling procedures and data collected during well purging on the Groundwater Sampling Data Sheet. Be sure to complete all areas of the form and properly label the samples in accordance with the project sample labeling scheme. The sampler shall date and sign the form.

SAMPLE LABEL

A laboratory provided sample label will be placed on all samples collected. The label will be completed with the following information:

- Project number and name
- Date and time of sample collection
- Boring or monitoring well number
- Sample identification number and depth (soils only)
- Sample type (soil, groundwater, etc.)
- Sampler's initials

CUSTODY SEALS

When securing a cooler for sample shipment to the laboratory, seal the cooler with a laboratory provided signed custody seal to document that the cooler has not been tampered with during shipping.

CHAIN OF CUSTODY FORM

Use a standard URS COC or one provided by the laboratory. Complete *all* areas of the COC form in triplicate. Retain one copy of the COC and provide it to the project manager for the master job file. Send two copies of the COC with samples shipped to the laboratory. If samples are hand delivered, obtain the signature of the receiving personnel and leave the second copy with the laboratory. The third copy is placed in the job file. The laboratory will provide a copy of the final COC with the analytical reports.