

URS Corporation

ARCHITECTS • ENGINEERS • PLANNERS
 1375 EUCLID AVENUE
 CLEVELAND, OHIO 44115-1808
 (216) 622-2400
 FAX (216) 622-2428

LETTER OF TRANSMITTAL

TO: Ms. Cynthia A. Ries
 U.S. Army Corps of Engineers
 Louisville District
 Environmental Engineering Branch
 600 Martin Luther King Pl.
 P.O. Box 59
 Louisville, KY 40201-0059

DATE: February 7, 2008
PROJECT: RVAAP, Under Slab Soil Sampling
JOB NO.: 13812319
RE: Letter Report Work Plan
PROJ. MGR.: Jo Ann Bartsch

Ladies/Gentlemen:

We are sending you the following items:

<input type="checkbox"/> Shop Drawings	<input type="checkbox"/> Drawings (Prints)	<input checked="" type="checkbox"/> Attached	<input type="checkbox"/> Under Separate Cover
<input type="checkbox"/> Product Data	<input type="checkbox"/> Project Manual	<input type="checkbox"/> Proposal Request	<input type="checkbox"/> Copy of Letter
<input type="checkbox"/> Samples	<input type="checkbox"/> Tracings	<input type="checkbox"/> Change Order	<input checked="" type="checkbox"/> Computer Media
		<input type="checkbox"/> Technical Spec	<input checked="" type="checkbox"/> Other: Letter Report

Copies	Drawing Number	Date	Description	Disp.
1	NA	02/07/08	Final Letter Report Work Plan for Soil Sampling Below Floor Slabs at RVAAP	1
1	NA	02/07/08	CD containing the pdf of above	--

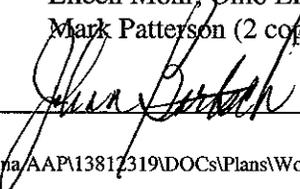
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- | | | | |
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| 3. As Requested | 6. For Construction | 9. Does Not Conform | |

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Remarks:

Copies to: Katie Elgin, OHARNG
 Eileen Mohr, Ohio EPA (2 copies each)
 Mark Patterson (2 copies each), 1 CD for Gail Harris (SpecPro) for delivery to Libraries

Signed: 

REPORT DOCUMENTATION PAGE

*Form Approved
OMB No. 0704-0188*

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4. TITLE AND SUBTITLE				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)				8. PERFORMING ORGANIZATION REPORT NUMBER	
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a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (Include area code)

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Katie Elgin OHARNG	1	1
Eileen Mohr Ohio EPA	2	2
Mark Patterson RVAAP	2	3
URS Group, Inc./Project Manager	1	--
URS Group, Inc./Technical Project Manager	1	--



February 7, 2008

Ms. Cynthia A. Ries
U.S. Army Corps of Engineers
Louisville District
Environmental Engineering Branch
600 Martin Luther King Pl.
P.O. Box 59
Louisville, KY 40201-0059

Re: Final Letter Report Work Plan for Pre-Slab Removal Tasks
Contract No.: W912QR-04-D-0025
Delivery Order No.: 0006

Dear Ms. Ries:

URS Group, Inc. has been contracted by the United States Army Corps of Engineers (USACE) to sample soils below floor slabs at Load Lines 2, 3, and 4 and to excavate and transport contaminated soils to Load Line (LL) 4 (Buildings G-1, G-1A, and G-3) at the Ravenna Army Ammunition Plant (RVAAP) under our Multiple Award Remediation Contract (MARC), Delivery Order 0006.

As part of the Scope of Work (SOW) for Task Order 0006, a Work Plan to address pre-floor slab removal field screening testing is required (Task 2A Letter work plan to address the tasks sampling activities from Table 1 and the existing soil stockpiles at LL 4). Discussions with RVAAP stakeholders have indicated that a letter report Work Plan addressing Task 2C (completion of sampling associated with Table 1 at open slab areas in LL 2, 3, and 4), Task 2D (evaluation of the sampling associated with Table 1, Task 2C), Task 2E (characterization of six piles currently staged at Load Line 4), and Task 2F (remove six piles of soil/concrete debris at Load Line 4) is sufficient to commence the work to be done in advance of the slab removal.

A detailed Work Plan addressing all SOW tasks will be prepared during the review and comment period of this letter work plan. The Work Plan is a supplement to the Revised 2001 Facility-Wide Sampling and Analysis Plan (FWSAP) for the Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio (SAIC, 2001a). The FWSAP provides the base documentation (i.e., technical and investigative protocols) for conducting a remedial investigation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at RVAAP.

The rationale for sample design is provided in Section 3.2.9 of the FWSAP. A more detailed description of the load line-specific sample design is included in the SOW issued for Delivery Order 0006 (USACE, 2007). The sample design provided in the SOW for each

URS Corporation
1375 Euclid Ave., Suite 600
Cleveland, OH 44115-1808
Tel: 216.622.2400
Fax: 216.622.2428

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Ms. Cynthia A. Ries
February 7, 2008
Page 2 of 10

load line is based on historical information such as past usage and past investigations (especially at the Joliet Army Ammunition Plant). The purpose for collecting the soil samples is to provide sufficient data such that load line building earth fill removal actions can be efficiently planned and accomplished.

The remainder of this letter details the work and the methods for performing those SOW activities that can be accomplished prior to the slab removal at RVAAP.

INTRODUCTION:

RVAAP is located in northeastern Ohio within Portage and Trumbull Counties, approximately 1.6 km (1 mile) northwest of the city of Newton Falls and 4.8 km (3 miles) east-northeast of the city of Ravenna. The facility is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP have been transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio and subsequently licensed to the Ohio Army National Guard for use as a training site. Currently, RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the confines of the Ravenna Training and Logistics Site (RTLS). RVAAP's remaining parcels of land are located completely within the RTLS. RTLS did not exist when RVAAP was operational, and the entire 21,683-acre parcel was a government-owned, contractor-operated industrial facility. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP and therefore references to the RVAAP in this document are considered to be inclusive of the historical extent of the RVAAP, which is inclusive of the combined acreages of the current RTLS and RVAAP, unless otherwise specifically stated.

The RVAAP was constructed in 1940 and 1941 for depot storage and ammunition assembly and loading. In 1950 the facility was placed on standby status until production activities were resumed in 1954 to 1957 and again in 1968 to 1972. Demilitarization activities continued until 1992. The only activities currently being carried out at RVAAP are environmental restoration, ordnance clearance, and demolition of discovered ordnance during those activities, as well as building decontamination and demolition.

The areas of concern for this work are Load Lines 2, 3, and 4. Industrial operations at these locations consisted primarily of melting and loading trinitrotoluene (TNT) and Composition B (TNT and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)) into large caliber shells. Removal of the majority of the buildings, down to floor slabs, has been completed at



Ms. Cynthia A. Ries
February 7, 2008
Page 3 of 10

these areas. A Contract Line Item has been exercised to MKM Engineers, Inc. to remove floor slabs and associated foundation walls to grade.

The extent of residual contamination in the earth fill below floor slabs is not known. The work to be covered by URS' Delivery Order 0006 is to evaluate potential contamination below these floor slabs and to excavate and transport any contaminated earth fill materials above the chemical-specific cleanup goals presented in Table 6 of the SOW. Once the evaluation has been completed, the earth fill materials exceeding the SOW chemical cleanup criteria will be transported to buildings G-1, G-1A, and G-3 at Load Line 4 for storage until final disposition decisions are made.

A soil cover system is currently being evaluated for application to the earth fill surfaces after building slab removal. The sealer would provide adequate time to allow for coordination of the BRAC demolition contractor and URS to be in full compliance with the current regulatory site guidance from the Ohio EPA for exposure of building sub slab earth fill materials. The system will require stakeholder and regulatory approval prior to application. Additionally the "spray on" soil sealing system will require budget approval from the Army Environmental Command. If approved, the system would allow the BRAC demolition contractor to perform the demolition process unimpeded. This would also allow for adherence to the ESS documents by maintaining the maximum safe distance (MSD) arcs of 1,250 feet for either contractor.

DESCRIPTION OF ACTIVITIES:

The activities that will be undertaken within this letter report Work Plan include:

- Mobilization for field effort,
- Field screening sampling at two areas within Load Lines 2 and 3,
- Multi-increment sampling at six piles at Load Line 4,
- Evaluation of the results of the field sampling,
- Evaluation of the results of multi-increment sampling of the six piles at Load Line 4, and
- Disposal of the soil/concrete debris piles.

Mobilization: Prior to field work commencing, all installation security requirements will be addressed, including notification to MKM regarding all personnel who will be on site.

The site-specific health and safety plan (HASP), in accordance with the Facility-Wide HASP (SAIC, 2001b) will be reviewed with sampling personnel. The site-specific HASP is included as Attachment A. A fixed laboratory to analyze the multi-increment samples will

Ms. Cynthia A. Ries
February 7, 2008
Page 4 of 10

be subcontracted prior to the field effort. The laboratory analyses will be in accordance with the Facility-Wide Quality Assurance Project Plan (SAIC, 2001a).

Arrangements will be made to utilize a portion of Building 1036 or 1038 for analyzing the field screening samples. The temporary field screening laboratory will be equipped with materials to conduct the field screening operations on an as needed basis to accommodate the sampling schedule. The work surfaces will be covered with plastic to avoid contamination of testing process surface areas. The acetone used for the soil test extraction will be stored in a storage cabinet (suitable for storing flammable materials) when not in use. The expended acetone/soil mix will be stored in approved 5-gallon containers with containment in the testing area. The extraction mix will be consolidated into an approved 55-gallon waste fluid drum on an as needed basis. The drum and all containers will be appropriately labeled and staged for disposal at the conclusion of the field screening task.

Decontamination: A temporary decontamination area will be constructed to facilitate decontamination of the push probes and other associated equipment and personnel. The location and layout of the field decontamination area will be determined by the Technical Project Manager and the Site Safety and Health Officer. An additional decontamination area will be located in Building 1036 and will be used to decontaminate soil sampling equipment.

All sampling equipment will be decontaminated in accordance with the procedures outlined in Sections 4.4.2.8 and 4.3.8 of the FWSAP.

Sampling Activities: Field screening sampling will be conducted at the following specific locations to evaluate the identified areas currently exposed due to partial slab removal:

- Load Line 2, Building DB-4, an area about 10 feet south and 15 feet west of the northeast corner of the building (area is about 10 feet in diameter).
- Load Line 3, Building EB-10, an area about 40 feet south of the north end, midway east and west (area is about 20 feet in diameter).

Sampling will be conducted in accordance with the Facility-Wide Sampling and Analysis Plan (SAIC, 2001a). Before any sampling is conducted, the areas will be observed and cleared by UXO personnel. No sampling will occur if any raw explosive, crystallized explosive, or obvious red colored soil is present. Two discrete surface samples at the top of the earth fill will be collected from the first area; three from the second. Similarly, five discrete samples at the same locations will be collected at a 1-foot depth. The field samples will be collected from the desired depth using a step probe. These samples will be placed in a new sealable plastic bag and transported to Building 1036/1038 where EnSys soil test kits will be used to evaluate TNT and RDX concentrations. Analysis will be in strict accordance with the procedures provided by the manufacturer (EnSys) with the kits.

Ms. Cynthia A. Ries
February 7, 2008
Page 5 of 10

During the same field effort, the six piles located at Load Line 4 will be sampled. Sampling is being conducted for waste characterization purposes. The locations of these piles are:

- At Building G-1, a pile at the northwest end of the building;
- At Building G-1A, a pile of soil and a pile of broken concrete at the northwest end of the building;
- At Building G-1A, two piles of soil at the southeast end of the building; and
- At Building G-3, one pile of soil at the east end of the building.

One, 30-increment, multi-increment sample will be collected at each of the six piles located at Buildings G-1, G-1A, and G-3. Thirty random subsamples will be collected using a step probe. The subsamples will be placed in a plastic-lined bucket and combined to make a single sample. Every effort will be made to obtain the laboratory required volume for the sample preparation without excess. The entire single sample will be placed in a sealable plastic bag, secured, labeled, and delivered to the analytical laboratory. The analytical laboratory will dry, process, and analyze each sample for explosives, metals, semivolatile organics, polychlorinated biphenyls (PCBs), pesticides, and herbicides. A discrete sample will also be collected from each stockpile for volatile organic compound (VOC) analysis. The discrete location will be selected based upon field observations and any elevated readings noted with a photo ionization detector (PID) during a health and safety analysis of the breathing zone at each stockpile. Quality control samples will not be collected for this waste characterization. Analyses will be conducted in accordance with the Facility-Wide QAPP (SAIC, 2001a).

The field screening results will be transmitted to the USACE within 24 hours of the completion of the field effort. An internal Army draft report documenting the field screening effort will be submitted within 30 days of the completion of the field investigation. Draft and final reports will be submitted to the stakeholders after the USACE review of the internal drafts.

The analytical results from the pile sampling will be received from the laboratory and reviewed for usability. Results will be transmitted to the designated disposal facility for profiling and approval. The USACE, RVAAP, and Ohio EPA will be provided copies of all data for concurrent review. An internal Army draft report documenting the field effort and evaluation of the analytical data will be submitted within 30 days of the receipt of the analytical data from the fixed laboratory. Draft and final reports will be submitted to the stakeholders after USACE review of the internal drafts.



Ms. Cynthia A. Ries
February 7, 2008
Page 6 of 10

Sample Preparation and Shipping: Samples will be prepared, packaged, and shipped in accordance with Section 6.0 of the FWSAP. Exceptions to the FWSAP procedures include:

- No tape of any kind will be placed on the volatile sample containers; and
- All VOC sample containers will be placed in either foam bubble wrap or paper towels to reduce the potential for breakage during shipping.

All sampling equipment will be decontaminated in accordance with the procedures outlined in Sections 4.4.2.8 and 4.3.8 of the FWSAP.

Stockpile Removal, Load Line 4: The disposal will be arranged at an off-site facility, based upon the laboratory analytical data. The waste will be profiled and manifested through the disposal facility and the RVAAP Caretaker Facility Manager. All applicable State, Federal, and local rules, laws, and regulations will be followed.

The materials will be loaded into trucks in a designated area adjacent to the stockpiles, to be determined. The designated areas will have adequate spill control measures to enable recovery of any spilled materials. The trucks will be inspected prior to loading for vehicle safety and an appropriate cover system to prevent loss of materials during transport.

The materials will be loaded onto the transport truck in a manner that distributes the load over the entire length of the truck bed. Special care will be given to the stockpiled materials that are comprised of rock and concrete. These materials could possibly damage the truck bed if not loaded properly. When the loading has been completed, the truck will be inspected for any loose stockpile materials that may have inadvertently been spilled on the exterior of the vehicle. Any identified materials will be removed and placed with the remaining stockpile materials. The truck cover will be deployed prior to departing the loading areas. Since the load out will not be conducted in an area with contaminated soils/materials, the truck itself will not require any decontamination.

All federal DOT regulations will be followed during transport to the disposal facility. The appropriate placards will be displayed and the required profile and manifest will accompany the truck to the disposal facility.

Investigation Derived Waste (IDW): All IDW, including personal protective equipment, disposable sampling equipment, and decontamination fluids, will be segregated, handled, labeled, characterized, managed, and disposed in accordance with the federal, state, local and RVAAP rules, regulations and laws and Section 7.0 of the FWSAP. The waste will be temporarily stored on the east side of Bldg. 1036 pending disposal.

The IDW will be segregated by type of medium and will be containerized as follows:



Ms. Cynthia A. Ries

February 7, 2008

Page 7 of 10

- Personal protective equipment and disposable sampling equipment will be containerized in DOT-approved, 55-gallon steel drums and staged at the temporary waste accumulation area (Building 1036) pending sample analysis.
- Water used to decontaminate large and small equipment will be containerized in poly tank(s) or DOT-approved drums and staged at the temporary waste accumulation area pending sample and waste characterization analysis.
- Decontamination and sample extraction fluids including: acid, methanol, and acetone.

IDW will be characterized as it is generated. The waste will be sampled for characterization after generation has filled a container with a particular waste stream. The characterization results, classification, and disposition of the IDW will be documented. Characterization, transportation, and disposal of the IDW will comply with Federal, State and local rules, laws, and regulations, as well as the permit requirements for the receiving facility as applicable. In the event environmental sample data indicate that an IDW stream is potentially hazardous, a Toxicity Characteristic Leaching Procedure (TCLP) sample will be collected for additional characterization purposes. All shipments of IDW off site will be coordinated through the RVAAP Environmental Coordinator. Disposition will be based on the results of the laboratory analyses for the bulk quantity in accordance with all federal, state and local rules, laws and regulations. Labeling of all IDW containers will be in accordance with Section 7.2 of the FWSAP.

SPRAY-ON SOIL STABILIZATION TASK:

The project SOW requires that the post-slab removal field screen samples be collected within seven calendar days after the floor slabs/foundation walls have been removed. Upon receipt of analytical data for the field screen samples, the SOW further requires that excavation of explosives contaminated soils be initiated within seven calendar days of making determination that excavation is necessary, and be completed within 14 calendar days of such date. The SOW also includes an alternate provision for the application of cover to exposed soil areas within two calendar days of the date upon which a determination is made that explosives contaminated soils must be removed. The removal decision is based on noted exceedances of the established cleanup goals for TNT and RDX. These timeframes were agreed between the Ohio EPA and USACE, Louisville District, during a December 10, 2007, on-site meeting at the RVAAP. These timeframes imply agreement that a potential soil exposure period of 21 days would be acceptable.

Shortly after award of the contract, use of a temporary spray-on cover material was identified as a potential means to not only minimize the length of time that underslab soil remains



Ms. Cynthia A. Ries
February 7, 2008
Page 8 of 10

exposed; but also to alleviate scheduling and coordination issues associated with explosive safety separation distance that must be maintained between the demolition and remediation contractors.

It is understood that use of the temporary spray-on cover material is contingent upon Ohio EPA approval for use of the product. In the event that use of the spray-on cover material, e.g., Posi-Shell, is approved, it is proposed that the cover be applied within seven calendar days after the floor slabs/foundation walls have been removed. The proposed application timeframe is consistent with the aforementioned acceptable soil exposure period.

Prior to application of the spray-on cover, the slab/foundation footprint will be visually inspected in order to identify impacted areas. After visual inspection (described below) the collection of field screen samples will occur.

As an alternative to the spray-on cover, a plastic cover system may be used. Visual inspection will be done as described below. The plastic cover will be an appropriate thickness to prevent tearing by materials left after slab removal. The plastic will be anchored sufficiently to prevent its removal by wind or other mechanical means. The plastic rolls will be stored with safeguards to prevent accidental rolling. If the plastic cover system is utilized, the field screen sampling may be suspended to allow the complete sampling effort to proceed.

In order to minimize the extent of areas requiring plastic cover, an alternate tiered approach to assess contamination has been identified. The tiered approach will entail collection of the field sample prior to placement of plastic as follows:

- Tier 1: If raw or crystallized explosive is observed within the building footprint, then the field screen sample will be collected from a location as close as safely possible before the plastic is placed. Plastic will be placed over the entire building footprint.
- Tier 2: If pink, green, or otherwise stained soil (or other indicators of contamination) is observed within the building footprint, then the field screen sample will be collected from that area. If multiple areas appear impacted based on visual observation, then the sample will be collected from the area that appears to be most impacted. If the field screen sample reveals no exceedance of the TNT/RDX cleanup goals, then no plastic will be applied. If there are cleanup goal exceedances, then the plastic will be applied to all areas showing signs of visible impact. Areas that require cover will be field-determined with approval from Ohio EPA and USACE.

Ms. Cynthia A. Ries

February 7, 2008

Page 9 of 10

- Tier 3: If no visible indicators of contamination are observed, then the field screen sample will be collected from a field-determined, biased location within the footprint or from the middle of the building footprint. If the field screen sample reveals no exceedance of the TNT/RDX cleanup goals, then no plastic will be applied. If there are cleanup goal exceedances, then the plastic will be applied to the areas that are impacted. Since visual indicators are not addressed within this Tier, areas that require cover will be field-determined with approval from Ohio EPA and USACE.

If plastic is used as a cover material, accumulations of rain water will be pumped off as needed to maintain the cover integrity. Provided that contaminated soil has not contacted the surface of the plastic cover, accumulations of rain water will be discharged to a nearby vegetated area at a controlled rate, and in accordance with all other RVAAP-specified requirements.

If plastic is used as a cover material, it may be reused as cover at a subsequent footprint location, provided that it has not been in contact with contaminated soil.

Prior to application the spray materials will be analyzed as required to supplement the manufacturer data sheets. Prior to application of the spray-on cover, the slab/foundation footprint will be visually inspected in order to identify impacted areas. Identified areas will be handled as per the SOW (USACE, 2007). The inspection criteria will include both soil staining and bulk explosive product. Any odors will also be noted in the inspection.

- Photo documentation of the area with particular emphasis on any areas with visual signs of potential explosive impact.
- Observed areas of potential impact will be identified with grade stakes so that the area can be relocated after application of the spray cover.
- Field sketch of entire building footprint with potential impacted areas and photographic details.
- A GPS survey will be conducted to further define the location of the potentially impacted area. The survey will be conducted using a sub-meter GPS unit for accuracy.

The spray-on soil stabilization cover application equipment will be washed out after each application. The wash out fluids will be temporarily stored in poly tanks staged at each Load Line. The tank contents will be analytically characterized after total accumulation and disposed at an off-site facility in accordance with all State, Federal, and local rules, laws, and regulations.



Ms. Cynthia A. Ries
February 7, 2008
Page 10 of 10

REFERENCES

SAIC. 2001a. Facility-Wide Sampling and Analysis Plan for the Ravenna Army Ammunition Plant, Ravenna, OH. Prepared by SAIC for The US Army Corps of Engineers, Louisville District.

SAIC. 2001b. Facility-Wide Safety and Health Plan for the Ravenna Army Ammunition Plant, Ravenna, OH. Prepared by SAIC for The US Army Corps of Engineers, Louisville District. 2001.

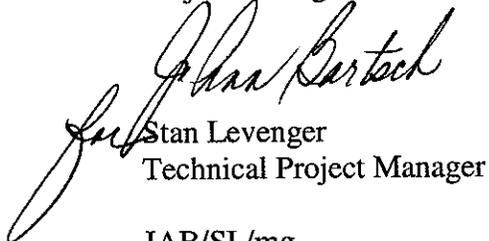
USACE. 2007. US Army Corps of Engineers. Ravenna Army Ammunition Plant Scope of Work, Sampling of Soils Below Floor Slabs at LLs-2, 3, 4 and Excavation and Transportation of Contaminated Soils to Load Line 4, The US Army Corps of Engineers, Louisville District. 11 December 2007.

Very truly yours,

URS Group, Inc.



Jo Ann Bartsch
Project Manager



Stan Levenger
Technical Project Manager

JAB/SL/mg

Enclosures

cc: file 13812319

COMMENT RESPONSE TABLE

DOCUMENT PREPARER: URS Corporation

DOCUMENT TITLE: Draft Letter Report Work Plan for Pre-Slab Removal Tasks

DOCUMENT REVIEWER: Eileen T. Mohr

DATE TRANSMITTED: 02/03/08

CMT. #	PAGE #/ LINE #	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
DRAFT LETTER WORKPLAN				
1		In future document submissions, please ensure that the response to comment (RTC) table is reviewed, discussed and approved prior to revising and submitting the report, workplan, etc. This saves time in the document review and approval process.	No changes required on this document.	Noted. Future comment response submissions will be sent in advance and discussed before submitting the revised document.
2		For this submission only, the number of print and electronic copies submitted to Ohio EPA NEDO is acceptable.	No changes required on this document.	Noted. No text change required.
3	Pg 6, lines 9-10	Change text to read: "All applicable State, Federal and local rules, laws, and regulations."		Text changed as requested as follows: <i>All applicable State, Federal, and local rules, laws, and regulations will be followed.</i>
4	Pg 6, line 25	Ensure that the east side of Building 1036 is approved by the Ravenna Army Ammunition Plant (RVAAP) for temporary storage of materials pending disposal. As the ultimate generator of the materials, it is the RVAAP's responsibility to ensure that all applicable rules, laws, and regulations are followed.	No changes required on this document.	Noted. The east side of Bldg 1036 is the RVAAP designated temporary storage area for waste being generated. Communications with Mr. James McGee (RVAAP Caretaker Site Manager) have been conducted to verify that there have been no changes to this protocol.
5	Pg 7, lines 7-9	Ensure that the delay in characterizing any of the generated investigation-derived wastes (IDW) is approved by RVAAP representatives. As the ultimate generator of the materials, it is RVAAP's responsibility to ensure that all applicable rules, laws, and regulations are followed.	No changes required on this document.	Noted. The waste will be sampled for characterization after generation has filled a container with a particular waste stream. In other words, the characterization will occur as soon as the containers are full. This has been discussed with the RVAAP Caretaker Site Manager, Mr. James McGee. The text has been revised as follows: <i>IDW will be characterized as it is generated. The waste will be sampled for characterization after generation has filled a container with a particular</i>

COMMENT RESPONSE TABLE

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DOCUMENT REVIEWER: Eileen T. Mohr

DATE TRANSMITTED: 02/03/08

CMT. #	PAGE #/ LINE #	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
				<i>waste stream.</i>
6	Pgs 7-8, lines 40 - 31	<p>This section of the text discusses the potential use of Posi-Shell. If approved for usage, the Ohio EPA requests the following changes in the proposed sequence of events in the draft workplan. Subsequent to the removal of the slabs, and prior to use of Posi-Shell (if approved), the inspection/documentation criteria detailed in lines 17-31 (pg 8) in the draft workplan are conducted. Additionally, the field (EnSys) samples are obtained for the TNT/RDX analyses. Then the Posi-Shell (if approved) is applied within seven (7) calendar days after the slabs have been removed.</p> <p>The main difference in this approach is the collection time for the EnSys samples. Since personnel will need to be in the area to spray on (potentially) the Posi-Shell, there should be little to no difficulty in collecting the field samples prior to applying the Posi-Shell since the same explosives safety distance would apply irregardless of the tasks being conducted. There are enough already approved methods out there (including EnSys instructions) that the "full-blown" workplan does not need to be in place prior to the screening samples being obtained and analyzed.</p>		<p>Based on a conversation between USACE and Ohio EPA on February 5, 2008, the work plan will be revised to include the requested change in the proposed sequence for sampling, if Posi Shell is used. In addition, the Work Plan will also include covering the slab area with plastic as another alternative. If the plastic alternative is utilized, the sampling sequence presented in the text below is proposed.</p> <p>The following revised text was inserted:</p> <p><i>Prior to application of the spray-on cover, the slab/foundation footprint will be visually inspected in order to identify impacted areas. After visual inspection (described below) the collection of field screen samples will occur.</i></p> <p><i>As an alternative to the spray-on cover, a plastic cover system may be used. Visual inspection will be done as described below. The plastic cover will be an appropriate thickness to prevent tearing by materials left after slab removal. The plastic will be anchored sufficiently to prevent its removal by wind or other mechanical means. The plastic rolls will be stored with safeguards to prevent accidental rolling. If the plastic cover system is utilized, the field screen sampling may be suspended until sufficient slabs are removed to allow the complete sampling effort to proceed.</i></p> <p><i>In order to minimize the extent of areas requiring</i></p>

COMMENT RESPONSE TABLE

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DOCUMENT REVIEWER: Eileen T. Mohr

DATE TRANSMITTED: 02/03/08

CMT. #	PAGE #/ LINE #	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
				<p><i>plastic cover, an alternate tiered approach to assess contamination has been identified. The tiered approach will entail collection of the field sample prior to placement of plastic as follows:</i></p> <ul style="list-style-type: none"> • <i>Tier 1: If raw or crystallized explosive is observed within the building footprint, then the field screen sample will be collected from a location as close as safely possible before the plastic is placed. Plastic will be placed over the entire building footprint.</i> • <i>Tier 2: If pink, green, or otherwise stained soil (or other indicators of contamination) is observed within the building footprint, then the field screen sample will be collected from that area. If multiple areas appear impacted based on visual observation, then the sample will be collected from the area that appears to be most impacted. If the field screen sample reveals no exceedance of the TNT/RDX cleanup goals, then no plastic will be applied. If there are cleanup goal exceedances, then the plastic will be applied to all areas showing signs of visible impact. Areas that require cover will be field-determined with approval from Ohio EPA and</i>

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				<p style="text-align: center;"><i>USACE.</i></p> <ul style="list-style-type: none"> • <i>Tier 3: If no visible indicators of contamination are observed, then the field screen sample will be collected from a field-determined, biased location within the footprint or from the middle of the building footprint. If the field screen sample reveals no exceedance of the TNT/RDX cleanup goals, then no plastic will be applied. If there are cleanup goal exceedances, then the plastic will be applied to the areas that are impacted. Since visual indicators are not addressed within this Tier, areas that require cover will be field-determined with approval from Ohio EPA and USACE.</i> <p><i>If plastic is used as a cover material, accumulations of rain water will be pumped off as needed to maintain the cover integrity. Provided that contaminated soil has not contacted the surface of the plastic cover, accumulations of rain water will be discharged to a nearby vegetated area at a controlled rate and in accordance with all other RVAAP-specific requirements.</i></p> <p><i>If plastic is used as a cover material, it may be reused as a cover at a subsequent footprint location, provided that it has not been in contact with contaminated soil.</i></p>

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7	Pg 8, lines 34-35	Ensure that staging of poly tanks at the individual Load Lines is acceptable to RVAAP.	No changes required on this document.	Noted. This has been discussed with the facility Caretaker. Satellite accumulation for nonhazardous waste is acceptable.
8	Pg 8, lines 36-37	Change text to read: "...all applicable State, Federal and local rules, laws, and regulations."		Noted. Text modified as requested. Text changed as follows: <i>The tank contents will be analytically characterized after total accumulation and disposed at an off-site facility in accordance all applicable State, Federal, and local rules, laws, and regulations.</i>
9	Question:	Were the comments from the Ohio Army National Guard (OHARNG) addressed in the draft letter workplan? (The CRTs for the OHARNG do not appear in this document.)		The comments from the OHARNG on the initial draft of the Letter Report Work Plan (January 18, 2008) were addressed in the version dated (January 25, 2008). The comment response table was forwarded to OHARNG with that version.
	Pg. 3, Line 31	Additional comment received 2/6/08.	Please change last bullet to read: Evaluation of the results of multi-increment sampling of the six piles at Load Line 4	The bullet now reads: <i>Evaluation of the results of multi-increment sampling of the six piles at Load Line 4, and</i>

DRAFT HEALTH AND SAFETY PLAN (HASP):

10	General	<p>Spelling/Grammar Issues:</p> <ul style="list-style-type: none"> a. (Title page, line 11): change Plan to Plant. b. (Pg 11, line 5): change 5,6 to 5.6. c. (Pg 11, line 17): put a period after TNT. d. (Pg 12, line 18): remove "the" at the end of this line. e. (Pg 17): in the chart for acetone, change "s" to "EnSys." f. (Pg 25, line 34): remove the period before the > symbol. g. (Pg 26, line 5): remove extra semi-colon. h. (Pg 40, line 24): change kist to kit. 		<p>a-j: The entire HSP has been spell-checked to locate and fix all typographical/grammar errors.</p> <p>k. The degree symbols in the Daily Safety Inspection sheet have been manually fixed since that form was not available to us in a revisable electronic form.</p>
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		i. (Pg 40, line 31): change Sant to Stan. j. (Pg 40, line 32) : remove extra period. k. (Pg C-5) daily safety inspection sheet: make sure that the degree symbol appears.		
11		Ensure that at an appropriate point in the HASP that it is clear that this plan tiers under and supplements the facility-wide HASP.		Noted. The following has been added in Section 3.0: <i>This HSP tiers under the Facility-Wide Safety and Health Plan prepared for environmental investigations at RVAAP (prepared by SAIC, March, 2001).</i>
12		Add in a section on biological hazards at an appropriate point in the text.		Noted. Section 5.3 on biological hazards has been added.
13		Add in a section on weather emergencies at an appropriate point in the text.		Noted. Section 12.9 on weather emergencies has been added.
13	Pg 4	Add PCBs to the COC list.		Noted. PCBs have been added as #6 in the COC list.
14	Pg 6, line2	Specify that potable water will be used.		Noted. The bullet now reads: <ul style="list-style-type: none"> • <i>Water spray for dust suppression (potable water will be used).</i>
15	Pg 11, lines 1-13	Use the OHARNG-crafted language in this section that describes the history of the installation.		The insert provided by OHARNG for the letter report work plan has been copied into this section. The text follows: <p><i>RVAAP is located in northeastern Ohio within Portage and Trumbull Counties, approximately 1.6 km (1 mile) northwest of the city of Newton Falls and 4.8 km (3 miles) east-northeast of the city of Ravenna. The facility is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP have been</i></p>

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				<i>transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio and subsequently licensed to the Ohio Army National Guard for use as a training site. Currently, RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the confines of the Ravenna Training and Logistics Site (RTLS). RVAAP's remaining parcels of land are located completely within the RTLS. RTLS did not exist when RVAAP was operational, and the entire 21,683-acre parcel was a government-owned, contractor-operated industrial facility. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP and therefore references to the RVAAP in this document are considered to be inclusive of the historical extent of the RVAAP, which is inclusive of the combined acreages of the current RTLS and RVAAP, unless otherwise specifically stated.</i>
16	Pg 11, lines 24-25	Remove the reference to "no measurable explosive contamination." There were measurable concentrations.		Noted. The sentence now reads as follows: <i>The extent of residual contamination in the earthfill below the floor slabs, and associated remediation, has not been determined to any degree of confidence.</i>
17	Pg 11, line 28	Remove the reference to Load Line 1.		"1" has been removed from the referenced sentence.
18	Pg 11, line 32	The extent of any excavation will be determined based upon the achieving the agreed-upon clean-up goals.		Agreed. The sentence has been revised to read: <i>Excavations are anticipated to be no more than 4 feet.</i>
18	Pgs 17-18	On the table that appears on these pages, please ensure that personnel working under this HASP will be familiar with the abbreviations.		URS personnel are trained to be familiar with these terms. Some of the health effect abbreviations have been spelled out for clarity.
19	Pg 25,	Specify that potable water will be used.		Note. The sentence now reads as follows:

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	line 8			<i>If site operations....a water mist (using potable water) will be applied.</i>
20	Pg 30, line 18	It is unclear as to why URS would have visitor respirators and/or respirators shared by various personnel. There should be assigned respirators to assigned personnel. Especially in the case of visitors, why would you lend them a respirator when it may not be known if they have the proper training and medical clearance?		The reference to visitors has been removed. All URS employees will have their own respirators.
21	Pg 32, lines 24-26	Please ensure that the RVAAP operating contractor has copies of all required 40 hour training, 8 hour refreshers etc. on file for URS and sub-contractor personnel.		This is a requirement of the Facility-Wide Safety and Health Plan; therefore, it will be done. The certificates will be filed with the operating contractor before field work commences.
22	Pg 36, lines 6-7	Please re-state URS's position regarding alcohol consumption. As currently stated, it contradicts the first sentence on line 6.		The second sentence of this bullet has been deleted.
23	Pg 41, lines 13-16	Please note that the Ohio EPA also has stop-work authority under the June 2004 Directors Final Findings and Orders.		Noted. The following text has been added. <i>The Army reserves the right to stop work for any violations of the HSP. The Ohio EPA also has stop-work authority under the June 2004 Director's Findings and Orders.</i>
24	Pg 42	Add in the Ohio EPA spill number (1-800-282-9378).		The Ohio Spill Number (1-800-282-9378) has been added to the list of numbers in Section 12.8
25	Pg 43	On the emergency checklist, please ensure that all personnel know that Post 1 is the first point of contact.		The emergency checklist has been edited to include Post 1 as the first point of contact. <i>Post 1</i> has been added to the Plan-at-a-Glance, pg. 3.
26	Pg 44, lines 10-12	Please ensure that the RVAAP operating contractor has copies of all required 40 hour training, 8 hour refreshers etc. on file for URS and sub-contractor personnel.		Noted. The following has been added: <i>The RVAAP operating contractor will be given copies of all required 40-hour HAZWOPER training, 8-hour refresher training and First Aid/CPR documentation for any URS employees and any subcontractor personnel on site.</i>

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MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) AVOIDANCE PLAN:				
27	Pg 1-1, line 11	Remove reference to CHAAP.		Noted. The reference to CHAAP has been changed to RVAAP.
28	Pg 1-1, line 17-18	Remove reference to groundwater monitoring as this is not one of the proposed tasks.		It is recognized that there is not a groundwater component in the current SOW. The reference to groundwater was originally put in the document by the UXO staff to cover any future possible contingencies so that future reviews and addenda could be minimized. However, based upon this comment the reference to groundwater has been removed. In addition, the reference to trenching activities has been removed.
29	Pg 4-1, lines 23-24	Change text to read that matches (etc.) will not be carried on post.		Noted. The revised text is as follows: <i>DO NOT carry matches, cigarettes, lighters or other flame-producing devices onto the RVAAP.</i>
30	Pg 5-1, lines 10-12	Key safety equipment should have operational back-ups on-site.		Noted. The following text was added: <i>There will be an operational back-up on site for all key safety equipment.</i>
31	Pg 5-1, line 19	A 4 foot depth is referenced. The extent of any excavation will be determined based upon the achieving the agreed-upon clean-up goals. As such, it may need to be established that no anomalies are present at a depth greater than 4 feet.		Noted. The absence of anomalies will be verified to whatever depth is required for excavation.
32	Pg 6-1, lines 8-10	A 2 foot and 4 foot depth is referenced. The extent of any excavation will be determined based upon the achieving the agreed-upon clean-up goals. As such, it may need to be established that no anomalies are present at a depth greater than 4 feet.		Noted. The absence of anomalies will be verified to whatever depth is required for excavation.
33	Pg 6-2, lines 14, 16, and 20	Remove the references to groundwater monitoring well installation as this is not one of the proposed tasks.		Noted. It is recognized that there is not a groundwater component in the current SOW. The reference to groundwater was originally put in the

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				document by the UXO staff to cover any future possible contingencies so that future reviews and addendums could be minimized. However, based upon this comment the reference to groundwater has been removed.
34	Pg 6-2, line 26	A 4 foot depth is referenced. The extent of any excavation will be determined based upon the achieving the agreed-upon clean-up goals. As such, it may need to be established that no anomalies are present at a depth greater than 4 feet.		Noted. The absence of anomalies will be verified to whatever depth is required for excavation. The 4-foot depth cited in this section refers to the 4-foot cores that will be done as part of the field screen sampling effort. If deeper cores are required to determine the extent of excavation, those deeper depths will be screened for anomalies.
35	Pg 6-3, line 12	Remove the reference to groundwater monitoring well installation as this is not one of the proposed tasks.		It is recognized that there is not a groundwater component in the current SOW. The reference to groundwater was originally put in the document by the UXO staff to cover any future possible contingencies so that future reviews and addendums could be minimized. However, based upon this comment the reference to groundwater has been removed.
36	Pg 6-3, lines 13-14	Is it anticipated that remote test pits will be required due to the presence of non-conventional MEC? If not, remove from the text.		The reference to nonconventional MEC will be removed from the text.
37	Attachment F	Clarify where the SMS will be kept.		Copies of all the SMSs cited in the HSP will be kept in the Bldg. 1036/1038 area and with the Site Safety Officer (Stan Levenger).

HEALTH AND SAFETY PLAN

**SAMPLING OF SOILS BELOW FLOOR SLABS AT
LLs 2,3,4 AND EXCAVATION AND
TRANSPORTATION OF CONTAMINATED SOILS
TO LOAD LINE 4 (BUILDINGS G-1, G-1A AND G-3)**

Ravenna Army Ammunition Plant, OH

February 2008



URS Corporation – Ohio
1375 Euclid Avenue
Suite 600
Cleveland, OH 44115

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.

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HEALTH AND SAFETY PLAN
Ravenna Army Ammunition Plant, OH
8451 State Route 5, Ravenna, OH 44266

PHONE

Project Number: 13812319

Project Manager: Jo Ann Bartsch Office: 216-622-2229

Site Manager: Stan Levenger Cell: 330-687-1816

Site Safety Officer: Stan Levenger Cell: 330-687-1816

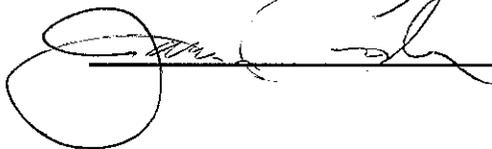
Plan Preparer: Katy Alfaro Office 216-622-2217

Preparation Date: 01/21/2008

Expiration Date: 01/21/2009

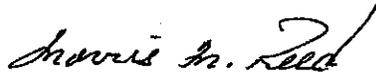
APPROVALS

Health, Safety, and Environment Representative:

 2/6/2008

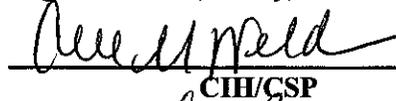
(DATE)

UXO Program Safety Manager:



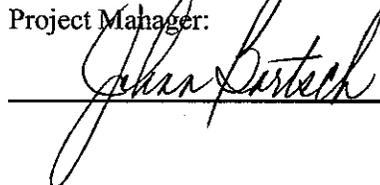
February 5, 2008
(DATE)

Regional Health, Safety, and Environment Manager:

 2/6/08

CIH/CSP (DATE)

Project Manager:

 2/7/08

(DATE)

This Health and Safety Plan is valid only for this specific project as described in Section 3.0. It is not to be used for other projects or subsequent phases of this project without the written approval of the Regional Health, 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**

<u>Section</u>	<u>Page</u>
GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS	I
1.0 PLAN-AT-A-GLANCE	3
Emergency Information	3
Hospital Directions:	3
Occupational Clinic Directions:.....	4
Constituents Of Concern.....	4
Engineering Controls To Be Used (As Applicable).....	6
Instrumentation To Be Used	6
Personal Exposure Sampling	6
Haz-Com Materials Inventory	6
URS Safety Management Standards Checklist.....	11
2.0 FACILITY BACKGROUND/WORK PLAN	13
2.1 SITE HISTORY	13
2.2 PURPOSE AND SCOPE OF WORK.....	13
4.0 RESPONSIBILITIES	15
5.0 JOB HAZARD ANALYSIS.....	18
5.1 CHEMICAL HAZARDS	18
5.1.1 Site Constituents	18
5.1.2 Hazard Communication Materials	22
5.2 PHYSICAL HAZARDS	22
5.2.1 Heat Stress Recognition and Control.....	22
5.2.2 Cold Stress Recognition and Control.....	23
5.2.3 Noise Hazards	23
5.2.4 Slip/Trip/Fall Hazards.....	23
5.2.5 Lifting Hazards	24
5.2.6 Heavy Equipment	24
5.2.7 Underground and Aboveground Utilities.....	25
5.2.8 Work Area Protection	25
5.2.9 Trenching and Excavation	25
5.2.10 Hand Augering.....	26
5.2.11 Contact with MEC	26
5.3 Biological Hazards.....	27
6.0 EXPOSURE MONITORING PLAN.....	28
6.1 CHEMICAL EXPOSURE MONITORING	28
6.2 PERSONAL EXPOSURE MONITORING	28
6.3 DATA LOGGING	28
6.4 DUST CONTROL	29
6.5 EXPLOSIVE ATMOSPHERES	29
6.6 OXYGEN-DEFICIENT ATMOSPHERES.....	29
7.0 PERSONAL PROTECTIVE EQUIPMENT	30
7.1 LIMITATIONS OF PROTECTIVE CLOTHING	30
7.2 DURATION OF WORK TASKS.....	31

8.0	RESPIRATORY PROTECTION.....	32
8.1	RESPIRATOR SELECTION	32
8.2	MEDICAL SCREENING	32
8.3	FIT TESTING.....	32
8.4	RESPIRATOR USE INSTRUCTIONS	33
8.5	RESPIRATOR INSPECTION.....	33
8.6	CLEANING OF RESPIRATORS	34
8.7	MAINTENANCE OF RESPIRATORS	35
8.8	STORAGE OF RESPIRATORS	35
8.9	ADDITIONAL INFORMATION.....	35
9.0	SITE CONTROL	36
9.1	GENERAL.....	36
9.2	WORK ZONES	36
10.0	DECONTAMINATION PROCEDURES.....	38
10.1	SANITATION	38
10.2	DECONTAMINATION – MEDICAL EMERGENCIES	39
10.3	DECONTAMINATION OF TOOLS	39
11.0	SAFE WORK PRACTICES	40
11.1	GENERAL SITE RULES	40
11.2	SAMPLING PRACTICES	41
11.3	SAMPLE SHIPMENT/HAZARDOUS MATERIALS SHIPMENT	41
12.0	EMERGENCY RESPONSE PLAN.....	42
12.1	PLACES OF REFUGE	42
12.2	FIRE.....	42
12.3	COMMUNICATION.....	43
12.4	EMERGENCY RESPONSE PROCEDURES	43
12.5	MEDICAL EMERGENCY RESPONSE PLAN	44
12.6	INCIDENT REPORT	44
12.7	OPERATION SHUTDOWN	45
12.8	SPILL OR HAZARDOUS MATERIALS RELEASE	45
12.9	WEATHER EMERGENCIES	48
13.0	TRAINING, MEDICAL SURVEILLANCE, SITE INSPECTIONS.....	49
13.1	TRAINING AND MEDICAL SURVEILLANCE	49
13.2	SITE INSPECTIONS	50
14.0	RECORDKEEPING.....	51

Attachments

Attachment A	Hospital and Occupational Clinic Route Map
Attachment B	Safety Plan Compliance Agreement and Medical Emergency Contact Sheet
Attachment C	Material Safety Data Sheets
Attachment D	MEC Avoidance and Construction Support Procedures
Attachment E	RVAAP Reporting Forms
Attachment F	URS Safety Management Standards (SMSs)

GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS

°C	degrees centigrade
°F	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
FSHP	Facility Safety and Health Plan (RVAAP)
HEPA	high-efficiency particular arrestor
Hnu	ionizing radiation detection device
HSM	Health and Safety Manager
HSP	Health and Safety Plan
IRP	Installation Restoration Program
kg	kilogram
LEL	lower explosive limit
Lpm	liters per minute
m	meter
MEC	Munitions and Explosives of Concern
mg	milligram
mg/M ³	milligrams per cubic meter
ml	milliliter
mm	millimeter
MSDS	Material Safety Data Sheet
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
PCB	polychlorinated biphenyl (Aroclor)
PEL	permissible exposure limit
PID	photoionization detector
PM	project manager
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
REL	recommended exposure limit
RSO	Radiation Safety Officer
RHSEM	Regional Health, Safety, and Environment Manager
RTL	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SMS	Safety Management Standard
SSO	Site Safety Officer
SSR	Subcontractor's Safety Representative
STEL	short term exposure limit
TLV	threshold limit value
TNT	2,4,6-trinitrotoluene
TWA	time-weighted average
UEL	upper explosive limit
URS	URS Corporation and subsidiaries
USP&FO	United States Property and Fiscal Officer
VOC	volatile organic compound

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:	Ravenna Borowski Funeral Home	330- 296-4541
	North East Ambulance Services	330- 872-5050
Fire:	City of Ravenna Fire Department	330-297-5738
Police:	Post 1/Securitas	330-358-2017
	MKM Engineers	330-358-3005
Hospital:	Robinson Memorial , Ravenna (See Attachment A for Map and directions)	330-297-0811
Occupational Clinic:	Medical Center One-Kent (See Attachment A for Map and directions)	330-678-4380

Incident Notification Call Chain

URS Project Manager:	Jo Ann Bartsch	Office :216-622-2229 Cell: 440-376-2875
URS Site Safety Officer	Stan Levenger	Cell 330-687-1816 Office 614-726-3575
URS UXO Program Safety Manager	Mac Reed	Office 615.224.2148 Cell 615.618.5272
URS Health, Safety, and Environment Representative:	James Anderson	Cell: 440-241-6972 Office: 216- 622-2384
URS Regional Health, Safety, and Environment Manager:	Cece Weldon	Office: 248-994-7466 Cell: 248-752-3405
RVAAP U.S Army Facility Manager	Mark Patterson	330-358-7311

URS Occupational Nurse (Jeanette Schrimsher) 1-866-326-7321 /512-656-0203
National Response Center: (800) 424-8802

HOSPITAL DIRECTIONS:

Robinson Memorial Hospital is located approximately 32 km (20 miles) from the site at 6847 N. Chestnut Street in Ravenna, Oh. It can be reached by taking Highway 5 E. approximately 11 km (7 miles), Highway 5 approximately 3.2 km (2 miles), Highway 59, then right onto highway 44 (Chestnut Street)

Additional information concerning emergency procedures is located in Section 12.0, and the hospital route map is located in Attachment A. A copy of the hospital route map must be readily available in each site vehicle that may be used to transport accident victims to the hospital.

OCCUPATIONAL CLINIC DIRECTIONS:

Start out going WEST on RAVENNA WARREN RD / OH-5 W toward NEWTON FALLS RD. Continue to follow OH-5 W (5.9). Stay STRAIGHT to go onto OH-59 W (6.1 miles). End at 1993 State Route 59, Kent, OH 44240-7609, US

CONSTITUENTS OF CONCERN

- TNT, TNB
- Heavy Metals
- RDX
- VOCs

- SVOCs

- PCBs (Aroclors)

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 Hzds.	Heat/Cold Stress	Noise	Slip/Trip/Fall	Lifting Hzds.	Mechanical Hzds.	Electro-cution	Explosion	Excavation
1. Field Screening for Explosives	Med	Med	n/a	Med	Low	n/a	n/a	Med	n/a
2. Soil Sampling using step probes	Med	Med	n/a	Med	Low	Low	n/a	Med	n/a
3. Surface Debris Sampling	Med	Med	n/a	Med	Low	Low	n/a	Med	n/a
4. Excavation (removal of contaminated soils)	Med	Med	High	Med	Low	Med	Low	Med	High
5. Transportation of contaminated soils to Load Line4	Med	Low	Med	Low	Low	Low	Low	Low	n/a
6. Investigation – Derived Waste Handling	Med	Med	Low	Med	High	n/a	n/a	Med	n/a

High - Exposure likely more than 50% of the time
 Low - Exposure likely less than 10% of the time

Med - Exposure likely 10 to 50% of the time
 n/a – Exposure not anticipated

Additional information concerning project hazards and their control can be found in Section 5.0.

Task	Minimum Protective Clothing/Equipment Requirements
1. Field Screening for Explosives	Steel-toed boots, hard hat (as needed), safety glasses, long-sleeve shirts, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples.
2. Soil Sampling using step probes	Steel-toed boots, hard hat, safety glasses, long-sleeve shirts, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples, safety vest.
3. Surface Debris Sampling	Steel-toed boots, hard hat, safety glasses, long-sleeve shirts, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples, safety vest
4. Excavation	Steel-toed boots, hard hat, safety glasses, hearing protection, long-sleeve shirts, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples, safety vest. Mini Ram® monitoring equipment
5. Transportation of Contaminated soils to Load Line4	Steel-toed boots, hard hat, safety glasses, hearing protection, long-sleeve shirts, work gloves, nitrile gloves when handling potentially contaminated materials, safety vest
6. Investigation – Derived Waste Handling	Steel-toed boots, hard hat, safety glasses, hearing protection, work gloves, nitrile gloves when handling potentially contaminated materials, surgical nitriles for handling samples, safety vest

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).

For more information on Personal Protective Equipment (PPE) and respiratory protection requirements, see the Action Levels table (Page 5) and Section 7.0.

ENGINEERING CONTROLS TO BE USED (AS APPLICABLE)

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

For more information, see Section 5.0.

INSTRUMENTATION TO BE USED

- HNu Photoionization Detector (PID) w/ eV probe
- Organic Vapor Monitor (OVM), PID w/ eV lamp
- Photovac Microtip PID w/ eV lamp
- Multi RAE PID w/ 10.6 eV lamp
- Combustible Gas/O₂ Indicator
- Foxboro Organic Vapor Analyzer (OVA) Flame Ionization Detector (FID)
- Miniram Real-time Dust Monitor
- Other Mini-Ram (dust monitoring Equipment)_____

For more information, see Section 6.0

PERSONAL EXPOSURE SAMPLING

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

For more information on monitoring, see Section 6.0.

HAZ-COM MATERIALS INVENTORY

- Acetone
- Liquinox (decontamination)
- Isobutylene (calibration gas)
- Gasoline (equipment fuel)
- Methane (calibration gas)
- TNT Soil test Kit
- RDX 20 W/ extraction Jar Kit

Table 1- ACTION LEVELS (for Photoionization Detector)

Analyzer Reading	Location	Duration	Action	Personal Protective Equipment
<1 ppm	Point of Operations/ Release Source point / OBZ	NA	Continue monitoring at 15 minute intervals.	Minimum Site Ensemble (Hardhat, Steel-toed Boots, Eye Protection, Safety Vest, Long-sleeved shirt, Gloves)
>1 ppm 1 st Action Level	OBZ	> 1 minute	Use colorimetric tube or benzene specific monitor to check for benzene; if not present at or above 0.5 ppm continue monitoring and the action level is 25 ppm (see below).	Minimum Site Ensemble
Action Levels below assume benzene is present.				
1 ppm benzene	OBZ	> 1 minute	Monitor OBZ; don protective clothing; establish work zones; provide respiratory protection; establish decon area.	Minimum Site Ensemble, PLUS: Tyvek coveralls, Nitrile Outer Gloves, (if product or product saturated soils are encountered), Nitrile Inner Gloves, Chemical Resistant Steel-toed Boots (or chemical resistant covers over steel-toed boots) at discretion of SSO depending on the potential for exposure; half-face respirators with organic vapor cartridges
>5 ppm benzene (2 nd Action Level)	OBZ	> 1 minute	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover excavation and spoils, evacuate upwind and notify RHSEM or PM.	As specified by RHSEM
Action Levels below assume benzene is not detected.				
<25 ppm	Point of Operations/ Release Source point/ OBZ	NA	Continue monitoring at 15 minute intervals.	Minimum Site Ensemble
>25 ppm (3 rd Action Level)	Point of Operations/ Release Source point	>1 minute	Monitor OBZ; don protective clothing; establish work zones	Minimum Site Ensemble, PLUS: Nitrile Outer Gloves, (if product or product saturated soils are encountered), and Nitrile Inner Gloves, Chemical Resistant Steel-toed Boots (or chemical resistant covers over steel-toed boots) at discretion of SSO depending on the potential for exposure.
>25 ppm	OBZ	>1 minute	Provide respiratory protection.	Add half-face respirators with organic vapor cartridges
>100 ppm (4 th Action Level)	OBZ	>1 minute	Stop work; move upwind while vapors dissipate. If elevated levels remain, evacuate upwind and notify RHSEM or PM.	As specified by RHSEM

* Substitute poly-coated Tyvek[®] if there is potential for contact with liquids (groundwater, mud, etc).

OBZ = Operator's Breathing Zone

ppm = parts per million

ACTION LEVELS (LELs- Combustible Gases- MultiRae)

LEL Reading	Location	Action
<10% LEL	Point of Operations/General Work Area	Continue site operations and continue periodic monitoring
10-20% LEL	Point of Operations/General Work Area	Continue site operations and perform continuous monitoring
>20% LEL	Point of Operations/General Work Area	Shutdown operations, evaluate source, ventilate work area

LEL = Lower Explosive Limit

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

ACTION LEVELS (Airborne hazards)

Hazard or Measured Parameter	Area	Interval	Limit	Action
Visible airborne dust	All	Continuously	Visible dust generation	Stop work, use dust suppression techniques

		>5 minutes	1mg/m3	Upgrade PPE Level C
Visible contamination	All	5 minutes/ Continuously	Visible contamination of skin or personal clothing	Upgrade PPE to preclude contact; Level C protection: disposal coveralls, boot covers, etc.

HEALTH AND SAFETY EQUIPMENT LIST

Required	Not Required	As needed	
x			URS SMSs (relevant to project - see next page)
x			Occupational Safety and Health Administration (OSHA) "Safety on the Job" Posters
x			Hardhats
x			Safety glasses
		x	Ear plugs or muffs
		x	Cotton coveralls
x			Traffic safety vest
		x	Tyvek® coveralls
		x	Polycoated Tyvek® Q-23 coveralls
x			Steel-toed boots
		x	Chemical-resistant steel-toed boots or chemical-resistant boot covers
x			Work gloves
x			Nitrile outer gloves
x			Surgical nitrile inner gloves
x			Plastic sheeting (visqueen)
		x	55-gallon 17-H drums (for contaminated solids)
		x	55-gallon 17-E drums (for liquids)
		x	Drum liners
		x	Barricade tape and barricades
		x	Wash tubs and scrub brushes
x			Decontamination solution (i.e., TSP)
		x	Folding chairs
		x	5- or 10-gallon portable eyewash

	x	Respirator sanitizing equipment
x		First aid kit with eye wash
x		Drinking water
	x	Gatorade or similar drink
x		Type ABC fire extinguishers
	x	Half-face respirators approved by National Institute for Occupational Safety and Health (NIOSH)
	x	Full-face respirators (NIOSH-approved)
	x	Respirator cartridges Organic Vapors -Particulates
x		Multi Rae/lamp 10.6 eV and calibration kit
	x	Combustible gas indicator (CGI) and calibration kit
	x	Garden sprayer
x		Compressed gas horn
	x	Duct tape
x		Paper towels and hand soap
x		Basic Spill Kit
x		Plastic garbage bags
	x	Broom and/or shovel
	x	Liqui-Nox
x		Mini –Ram monitoring equipment

URS SAFETY MANAGEMENT STANDARDS CHECKLIST

Copies of all the below listed SMSs are found in Attachment F. The SMSs in black are required for all sites, the Project Manager is required to indicate the additional SMSs that are specific to this site or task (red).

- SMS 1 - Inspections by Regulatory Agencies**
- SMS 2 - Worker Right to Know**
- SMS 3 - Emergency Action Plans**
- SMS 9 - Corrosive and Reactive Materials**
- SMS 12 - Electrical Safety**
- SMS 13 - Excavation Safety***
- SMS 14 - Fire Prevention**
- SMS 15 - Flammable and Combustible Liquids and Gases**
- SMS 16 - Hand Tools and Portable Equipment**
- SMS 18 - Heat Stress**
- SMS 19 - Heavy Equipment Operations***
- SMS 20 - Hot Work***
- SMS 21 - Housekeeping**
- SMS 24 - Medical Screening and Surveillance**
- SMS 25 - New Employee Health and Safety Orientation**
- SMS 26 - Noise and Hearing Conservation***
- SMS 29 - Personal Protective Equipment**
- SMS 30 - Sanitation***
- SMS 32 - Traffic Control**
- SMS 34 - Utility Clearances and Isolation***
- SMS 39 - Munitions Response/Munitions and Explosives of Concern***
- SMS 42 - Respiratory Protection***
- SMS 43 - Personal Monitoring (Industrial Hygiene)**
- SMS 46 - Subcontractor Health and Safety Requirements**
- SMS 47 - Biological Hazards**
- SMS 49 - Incident Reporting**

- SMS 50 - Specific Chemical Hazards**
- SMS 51 - Blood-borne Pathogens**
- SMS 57 - Vehicle Safety Program**
- SMS 59 - Cold Stress**
- SMS 64 - Hand Safety**
- SMS 65 - Injury Management**
- SMS 66 - Incident Investigation**
- SMS 69 - Manual Material Handling**
- SMS 72 - Behavior Based Safety**
- SMS 78 - Short Service Employee**
- SMS 84 - Lone Worker Safety**

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).

2.0 FACILITY BACKGROUND/WORK PLAN

2.1 SITE HISTORY

The RVAAP is located in northeastern Ohio within Portage and Trumbull Counties, approximately 1.6 km (1 mile) northwest of the city of Newton Falls and 4.8 km (3 miles) east-northeast of the city of Ravenna. The facility is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP have been transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio and subsequently licensed to the Ohio Army National Guard for use as a training site. Currently, RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the confines of the Ravenna Training and Logistics Site (RTLS). The RVAAP's remaining parcels of land are located completely within the RTLS. The RTLS did not exist when RVAAP was operational, and the entire 21,683-acre parcel was a government-owned, contractor-operated industrial facility. The RVAAP Installation Restoration Program (IRP) encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP, and, therefore, references to the RVAAP in this document are considered to be inclusive of the historical extent of the RVAAP, which is inclusive of the combined acreages of the current RTLS and RVAAP, unless otherwise specifically stated.

The installation was active from 1941 to 1992. Activities included loading, assembling, storing, and packing military ammunition; demilitarization of munitions; production of ammonium nitrate fertilizer; disposal of "off-spec" munitions. Various munitions were handled on the installation including artillery rounds of 90mm or more and bombs up to 2,000 pounds.

2.2 PURPOSE AND SCOPE OF WORK

URS will perform field investigation at Load Lines 2, 3, and 4. Load lines 1 through 4 were used to melt and load 2,4,6-trinitrotoluene (TNT), Amatol and Composition B into large-caliber shells and bombs. Composition B is a mixture of hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) and TNT. Amatol is a mixture of TNT and ammonium nitrate. The operations in these load lines produced explosive dust, spills and vapors collected on the walls and floors of each building.

The removal of the majority of buildings down to the floor slabs at load lines 2,3 and 4 has been completed by a contractor (MKM Engineers, Inc./PIKA). MKM/PIKA will be removing floor these floor slabs at 105 buildings. Their work is scheduled to begin in early February.

The extent of residual contamination in the earthfill below the floor slabs, and associated remediation, has not been determined to any degree of confidence.

URS' scope of work includes the assessment and remediation of soils below floor slabs at Load Lines 2, 3 and 4 and excavation and transportation of contaminated soils encountered below floor slabs to temporary covered storage areas, Buildings G-1, G-1A and G-3 at Load Line 4.

Work will begin at Load Line 4 since that load line was thought to have the least potential for significant residual contamination in earthfill below floor slabs. Work will then progress to Load Line 3, and then to Load Line 2. Excavations are anticipated to be no more than 4 feet.

3.0 APPLICABILITY

The purpose of this HSP, which was developed specifically for operations at the Ravenna Army Ammunition Plant site Ravenna, OH, 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. This HSP is to be used by URS personnel 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. This HSP tiers under the Facility-Wide Safety and Health Plan prepared for environmental investigations at RVAAP (Prepared by SAIC, March, 2001).

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

Changing and/or unanticipated site conditions may require modification of this 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.

Excavation activities will be performed by URS Personnel from the Pittsburgh Office. They will follow procedures explained in this HSP. URS is providing a copy of this HSP to each site subcontractor to fulfill its obligation under 29 CFR 1910.120(b) to inform subcontractors of site hazards. In turn, each subcontractor will provide documentation to URS that describes their plan for addressing applicable health and safety requirements for activities that are unique to their scope of services (for example: drill rig operation, excavation safety, electrical safety, etc) (See SMS 46.).

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 (See **RVAAP Facility and Health Plan- Section 3**)

PROJECT MANAGER (URS) –Jo Ann Bartsch

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, and have been fit tested for the appropriate respirators.
- 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.

SITE SAFETY OFFICER (URS) - Stan Levenger

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

- 10.0 Implementing the project HSP and reporting any deviations from the anticipated conditions described in that plan to the PM and, if necessary, the RHSEM.
- 11.0 Determining that monitoring equipment is used properly by URS personnel and calibrated in accordance with manufacturer's instructions or other standards and that results are properly recorded and filed.
- 12.0 Checking with a URS Health, Safety, and Environment Representative to assure URS personnel have current medical clearance and training.
- 13.0 Assuming any other duties as directed by the PM or RHSEM.
- 14.0 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.
- 15.0 Conducting safety meetings for all site personnel in accordance with Section 13 of this HSP.
- 16.0 Conducting daily site inspections prior to the start of each shift. All inspections must be documented (preferably in a bound field logbook).
- 17.0 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.
- 18.0 Seeing that decontamination procedures described in Section 10.0 are followed by URS personnel.
- 19.0 Establishing monitoring of URS personnel and recording the results of exposure evaluations.
- 20.0 Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- 21.0 Maintaining the visitor log.

REGIONAL HEALTH, SAFETY, AND ENVIRONMENT MANAGER (URS) – Cece Weldon

The RHSEM is responsible for:

- Determining the need for periodic audits of the operation to evaluate compliance with this plan; and
- Providing health and safety support as requested by the SSO and PM.

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.

Qualified URS UXO personnel will provide escort and MEC (munitions and explosives of concern) avoidance during field activities. See Attachment D for MEC avoidance and construction support procedures.

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. However, *given that the site is still under investigation*, the potential for exposure to elevated levels of these contaminants may exist. Exposure to elevated levels of these contaminants may pose hazards. Overviews of these hazards are presented here in terms of the following types of occupational exposure limits:

4.0 PEL	Permissible Exposure Limit (OSHA Standard)
5.0 TLV	Threshold Limit Value (American Conference of Governmental Industrial Hygienists [ACGIH] Guidance)
6.0 REL	Recommended Exposure Limit (NIOSH Guidance)
7.0 STEL	Short Term Exposure Limit
8.0 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.

Summaries of the site constituents of concern follow.

Chemicals of Concern

Chemical	TLV/PEL/STEL/IDHL	Health Effects/Potential Hazards	Chemical and Physical Properties	Exposure Routes
Chromium	TLV/TWA: 0.5 mg/m ³ , A4 IDHL: 25 mg/m ³	Eye Irritation, sensitization	Solid: properties vary depending upon specific compound	Inhalation Ingestion Contact
DNT (Dinitrotoluene)	TLV/TWA: 1.25 mg/m ³ , A2 IDHL: (50 mg/m ³)	Suspected human carcinogen, anorexia, cyanosis, reproductive effects	Orange-yellow solid, VPP: 1mm, FP: 404 F	Inhalation Absorption Ingestion Contact
Lead	TLV/TWA: 0.05 mg/m ³ , A3 PEL/TWA: 0.05 mg/m ³ IDHL: 100 mg/m	Weakness, anorexia, abdominal pain, anemia	Soil metal: VP: 0 mm	Inhalation Ingestion Contact
HMX (octogen)	TLV/TWA: N/A	Explosive: assumed irritation of eyes and skin, dizziness, weakness	Assumed similar to RDX FP: explodes, VP: 0.0004 mm at 230F	Assumed: Inhalation Absorption Ingestion Contact
RDX (Cyclonite)	TLV/TWA: 0.5 mg/m ³ , A3 Skin Notation IDHL: none established	Explosive: irritation of eyes and skin, dizziness, weakness	White powder; FP: explodes, VP: 0.0004 mm at 230F	Inhalation Absorption Ingestion Contact
TNT (2,4,6-Trinitrotoluene)	TLV/TWA: 0.5 mg/m ³ , A3 Skin Notation IDHL: 500 mg/m ³	Cluster headache, irritation of skin and mucus membranes, liver damage, kidney damage	Pale solid: FP: explodes; VP: 0.0002 mm	Inhalation Absorption Ingestion Contact
Acetone (Use for EnSys test kit extraction)	TLV/TWA: 250 ppm IDLH: 2500 ppm	Irritation of eyes, nose, throat; headache, dizziness, CNS depression; dermatitis	Colorless liquid with a fragrant, mint-like odor. VP: 180 mmHg	Inhalation Ingestion

	IDLH Notes: 10% of LEL			Contact
Aluminum	TLV/TWA mg/m3: 5 (resp) PEL/TWA mg/m3: 5 IDLH mg/m3: NA	Eye Irritation, skin, respiratory system	RESPIRABLE FRACTION, 10mg/m3 TOTAL DUST	Inhalation Contact
Antimony	TLV/TWA mg/m3: 0.5 PEL/TWA mg/m3: 0.5 IDLH mg/m3: 50	Irritation of eyes, skin, nose, throat, mouth; cough; dizz; head; nausea, vomit, diarrhe; stomach cramps; insomnia; anorexia, unable to smell properly	Noncombustible Solid in bulk form, but a moderate explosion hazard in the form of dust when exposed to flame	Inhalation Ingestion Contact
Arsenic	TLV/TWA mg/m3: NA PEL/TWA mg/m3: 0.01 IDLH mg/m3: 5 CARCINOGEN (Ca); as As;15 MINUTE CEILING	Ulceration of nasal septum, derm, GI disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [carc]	Metal: Silver-gray or tin-white, brittle, odorless solid	Inhalation Absorption Ingestion Contact

Chemical	TLV/PEL/STEL/IDHL	Health Effects/Potential Hazards	Chemical and Physical Properties	Exposure Routes
Barium	TLV/TWA mg/m3: 0.5 PEL/TWA mg/m3: 0.5 IDLH mg/m3: NA	NA	NA	NA
Manganese	TLV/TWA mg/m3: 1 IDLH mg/m3: 500	Parkinson's; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea, rales, flu-like fever; low-back pain; vomit; malaise; fatigue; kidney damage	A lustrous, brittle, silvery solid. IP: NA	Inhalation Ingestion
Cadmium	TLV/TWA mg/m3: NA PEL/TWA mg/m3: 0.005 IDLH mg/m3: 9	Pulmonary edema, dyspnea, cough, chest tight, substernal pain; head; chills, muscle aches; nausea, vomit, diarrhea; anosmia, emphysema, proteinuria, mild anemia; [carc]	Silver-white, blue-tinged lustrous, odorless solid CARCINOGEN (Ca); REDUCE EXPOSURE TO LOWEST FEASIBLE CONCENTRATION (LOQ 0.1 mg/m3)	Inhalation Ingestion
Aroclor-1254	TLV/TWA ppm: NA TLV/TWA mg/m3: 0.001 PEL/TWA mg/m3: 0.5 PEL/TWA mg/m3: 0.5	Irritation of eyes, chloracne; liver damage; reproductive effects; [carc]	Colorless to pale-yellow, viscous liquid or solid (below 50F) with a mild, hydrocarbon odor.	Inhalation Absorption Ingestion Contact
Gasoline (used for fuel)	TLV/TWA: 300 ppm IDLH: Ca	Potential carcinogen per NIOSH, dizziness, eye irritation, dermatitis	Liquid with aromatic odor; FP: -45 F; VP:38-300 mm	Inhalation Absorption Ingestion Contact
Isopropyl alcohol (potentially used for equipment decontamination)	TLV/TWA: 400 ppm STEL: 500 ppm IDLH: 2000 ppm	Irritation may cause local irritation to mucus membranes	Colorless liquid with alcohol odor; VP:33 mm; IP:10.10 eV; FP:53 F	Inhalation Ingestion Contact
Liquinox (used for decontamination)	TLV/TWA: none	Inhalation may cause local irritation to mucus and membranes	Yellow odorless liquid FP: AN	Inhalation Absorption Ingestion Contact
Benzene	PEL/TWA: 1 ppm TLV/TWA: 0.5 ppm STE:5 ppm	Eye Irritant and Central Nervous System Depressant, Cancer	The vapor is heavier than air and may travel along the ground; distant ignition is possible. As a result of flow, agitation, etc. electrostatic charges can be generated.	Inhalation Absorption Contact

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 will be minimized by air monitoring and the use of engineering controls, and respiratory protection will be used if the action levels described in Section 1.0 are exceeded. Ingestion of contaminated materials will be minimized by the use of appropriate personal hygiene procedures during decontamination (i.e., thoroughly washing face and hands with soap and water after leaving the work area and prior to eating or drinking).

5.1.2 Hazard Communication Materials

Materials 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 (i.e., drillers, excavators) on this project.

URS' written Hazard Communication Program is located in SMS 002, a copy of which is to be maintained on site.

5.2 PHYSICAL HAZARDS

Physical hazards at this work site include:

- Injury/accidents from ordnance and explosives;
- Heat stress and 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 **excavation activities**, such as contact with overhead or underground power lines or pipelines;
- Excavation hazards; and
- Muscle strains from hand-auger work.

5.2.1 Heat Stress Recognition and Control

Heat stress monitoring will commence when personnel are wearing PPE, including Tyvek®-type coveralls, and the ambient temperature exceeds 70°F. If standard work garments (cotton coveralls) are worn, monitoring will commence at 85°F. **Heat stress monitoring and control guidance can be found in Attachment F.** Additional information regarding heat stress is provided in SMS 018, a copy of which is to be maintained on site. ***[As cool temperatures are expected to prevail during the course of this project, problems relating to heat stress are not anticipated.]***

5.2.2 Cold Stress Recognition and Control

Protection against cold stress will be initiated when temperatures drop below 45°F. Cold stress guidance is provided below **[and/or in Attachment F]**.

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

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

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

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

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

5.2.3 Noise Hazards

Previous surveys indicate that heavy equipment, such as *drilling or excavation* equipment, may produce continuous and impact noise at or above the action level of 85 dBA. All URS personnel within 25 feet of operating equipment or near an operation that creates noise levels high enough to impair conversation 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. Additional information regarding the URS Hearing Conservation Program is located in SMS 026, a copy of which is to be maintained on site.

5.2.4 Slip/Trip/Fall Hazards

Workers should exercise caution when walking around the site to avoid fall and trip hazards. If there are holes or uneven terrain in the work area that could cause site personnel to fall or trip, they must be covered, flagged, or marked to warn workers. Workers should exercise caution around open excavations, such as test pits, and avoid getting closer than 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 will be spread in muddy areas to reduce slipperiness. Workers should watch where they are walking and walk only in areas of good stability.

5.2.5 Lifting Hazards

The following guidelines will be followed whenever lifting equipment such as portable generators, coolers filled with samples, 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 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, a copy of which is to be maintained on site.

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

- Wear PPE, such as steel-toed shoes, safety glasses or goggles, and hard hats, whenever such equipment is present.
- At all times, be aware of the location and operation of heavy equipment, and take precautions to avoid getting in the way of its operation. Never assume that the equipment operator sees you. Make eye contact and use hand signals to inform the operator of your intent, particularly if you intend to work near or approach the equipment.
- Traffic safety vests **ARE REQUIRED** for URS personnel working near mobile heavy equipment, such as backhoes and other excavators.
- Never walk directly in back of or to the side of heavy equipment without the operator’s acknowledgment.
- When an equipment operator must operate in tight quarters, the equipment subcontractor will provide a person to assist in guiding the operator’s movements.
- Keep all non-essential personnel out of the work area.
- Any heavy equipment that is used in the exclusion zone (EZ) will remain in that zone until its task is completed. The equipment subcontractor will completely decontaminate such equipment in the designated equipment decontamination area as required prior to moving the equipment outside of the EZ/Contamination Reduction Zone (CRZ).

5.2.7 Underground and Aboveground Utilities

The Site Manager or SSO is responsible for locating underground utilities before the commencement of any subsurface (> 0.3 meter [1 ft.]) activities. Resources include site plans, utility companies, and regional utility locating services. The proper utility company personnel will certify in writing to the Site Manager or SSO that underground utilities have been deactivated, and the certification will be retained in the project files.

Procedures for activities conducted proximate to utility locations are located in SMS 034, a copy of which is to be maintained on site.

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

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

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

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

5.2.8 Work Area Protection

Project operations may be undertaken in a roadway or parking lot, causing motor vehicles to pose a hazard. Guidance on properly coning and flagging the work area is provided in Attachment F. 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, a copy of which is to be maintained on site.

5.2.9 Trenching and Excavation

All URS personnel are prohibited from entering a trench or excavation until it has been inspected by a competent person in accordance with 29 CFR 1926.650-651. If personnel are required to enter a trench or excavation that is deeper than 5 feet, the contractor who created the excavation must provide the following prior to personnel entry:

- If hazardous atmospheres are suspected, any trench or excavation more than 4 feet deep must be monitored.
- Adequate shoring, sloping, or benching techniques must be employed.
- Adequate means of employee access and egress must be used.
- The contractor's trained, competent person must inspect the trench or excavation daily, before work commences and on an as-needed basis throughout the day.

A copy of the Fed-OSHA Excavation Standard can be obtained from OSHA's website. Compliance with all provisions of this regulation must be maintained when working in a trench or excavation. Additional information regarding URS procedures for excavation activities is located in SMS 013, a copy of which is to be maintained on site.

During excavation activities control measures may be necessary to prevent airborne releases of dust. Application of a water spray to exposed soils will be the primary dust control measure. Only water from a potable water supply will be used and will be brought to the site using a water truck. Judicious use of the water will occur; no runoff or areas of standing water will be created.

Visual and real time monitoring for dust during excavation activities will be done in accordance with the HASP. A Mini-Ram[®] dust monitor will be strategically placed downwind from the excavation area to monitor dust levels. It may be necessary to reduce work or stop work in order to control dust levels.

5.2.10 Hand Augering

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

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

Hand Safety –See SMS 16 Hand Tools and Portable Equipment.

5.2.11 Contact with MEC

The likelihood of encountering MEC during field operations is remote. However, URS will provide qualified UXO escort to perform MEC and anomaly avoidance during field activities. Site will be cleared by UXO personnel for field work. Drilling through the concrete floor slabs is considered too dangerous because of the potential for detonation of potential underlying explosive soil. Sampling activities will be allowable beneath areas of existing floor slab where recent demolition activity has left holes or other damage that allow safe access to the soils below the floor slabs. The surface of the earthfill immediately below the floor slab will be observed to determine if any raw explosives, crystallized explosives, or obvious red colored soil are present. If any of these materials are present, no attempt will be made to sample. Non- UXO Personnel will evacuate the area if ordnance or suspected ordnance is discovered. **See Attachment D for additional details- MEC Avoidance Procedures and Construction Support Procedures.**

5.3 BIOLOGICAL HAZARDS

There is a risk of injury from biological hazards at the Site at or near natural grassy areas where exposure to toxic plants, noxious insects and poisonous snakes and other dangerous vertebrates is possible. Protective boots, clothing, repellents and other appropriate equipment are recommended (See **Attachment F for URS SMS 047**).

Ticks are another concern in these areas. The best way to prevent tick borne diseases (Lyme disease and Rocky Mountain spotted fever) is not to be bitten by a tick. Ticks do not jump, crawl, or fall onto a person. They are picked up when clothing or hair brushes a leaf or other object that a tick is on. Precautionary measures include tucking pant legs into socks or otherwise taping pant legs closed, wearing repellent with DEET, etc. In case of a tick bite, do not remove the tick with your bare hands. See additional information “Biological Hazards” (**Attachment F -URS SMS 047**).

There is also a risk of histoplasmosis causing by inhaling the spores of a fungus called *Histoplasma capsulatum*. This fungus is endemic in the United States and seems to grow best in soils having high nitrogen content, especially those enriched with bat droppings or bird manure. Disturbances of contaminated materials cause small *H. Capsulatum* spores to become airborne or aerosolized. Workers who will disturb collections of bird or bat droppings must be trained in the potential hazard and control measures. See additional information in the FSHP Section 9.16.

Appropriate clothing should be worn if poison ivy, oak, and/or sumac are present. Exposed skin should be washed with a strong soap (e.g., Liqui-Nox) as soon as possible after suspected exposure. If mosquitoes are present, repellent should be used according to label directions to prevent possible transmission of encephalitis or other transmitted diseases. The use of repellents must be addressed to ensure sample integrity when there is a potential for sample medium exposure. See “Biological Hazards” (**Attachment F SMS 047**).

6.0 EXPOSURE MONITORING PLAN

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

6.1 CHEMICAL EXPOSURE MONITORING

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

The monitoring equipment specified in Section 1.0 will be used on a regular basis to evaluate the potential for exposure to airborne contaminants, typically every five to ten minutes. Monitoring will be conducted in the immediate vicinity of the contaminant source point or work area (e.g., at the borehole and cuttings adjacent to the borehole). See Table 1 for Action Levels.

6.2 PERSONAL EXPOSURE MONITORING

Assessment of airborne chemical concentrations will be performed, as appropriate, to ensure that exposures do not exceed acceptable levels. Action levels, with appropriate responses, have been established for this monitoring. In addition to the specified monitoring, the SSO may perform or require additional monitoring, such as organic vapor monitoring, in the field laboratory or equipment decontamination area or personnel exposure monitoring for specific chemicals. The deployment of monitoring equipment will depend on the activities being conducted and the potential exposures. All personal exposure monitoring records will be maintained in accordance with 29 CFR 1910.20. The minimum monitoring requirements and action levels are presented in Table 1.

Most of the fieldwork is not expected to pose airborne exposure hazards for the following reasons:

Work will be performed in open areas with natural ventilation. Field laboratory analyses will be performed in well-ventilated buildings.

Air monitoring for breathing zone using a Multirae is planned during soil sampling, and excavation. Site conditions will be examined by the SSO. If there is any indication of potential airborne hazards, the SSO will contact the Regional Health, Safety and Environment Manager and initiate additional monitoring.

Procedures for personal monitoring are located in SMS 043, a copy of which is to be maintained on site.

6.3 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 the form provided in Attachment E (RVAAP Reporting forms) 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 RHSEM will be contacted for further guidance.

6.4 DUST CONTROL

High winds and site operations can cause airborne dust hazards. If site operations generate sustained visible dust, a water mist (using potable water) will be applied to reduce dust generation. If the mist is not effective in reducing dust generation, personnel will upgrade to Level C (Full-face air respirator with combination organic vapor/high efficiency particulate arrestor (HEPA) cartridges -such as MSA's GMC-H cartridges, tyvex coveralls, nitrile inner gloves).

6.5 EXPLOSIVE ATMOSPHERES

Given the presence of elevated concentrations of site constituents that have a low flash point, the potential exists for explosive atmospheres at the site. Therefore, a MultiRae meter will be used to monitor ambient conditions, and decisions will be based on the levels measured using a MultiRae meter (measurements are in % of the LEL), as determined by the action level Table 1.

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

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

6.6 OXYGEN-DEFICIENT ATMOSPHERES

Oxygen-deficient atmospheres may be encountered in excavations. An excavation with an oxygen-deficient atmosphere is not to be entered, unless absolutely necessary, and then only after following appropriate confined-space entry procedures. These procedures are described in SMS 010, a copy of which is to be maintained at the site. The confined-space entry permit is provided by, and must be approved by, the RHSEM.

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

- 20.8% Continue Operations
- <20.8% Monitor continuously
- <19.5% Do not enter; ventilate and determine whether supplied air equipment is required
- >20.8% Do not enter, competent person will look for the cause of the oxygen-enriched atmosphere and correct it prior to entry

7.0 PERSONAL PROTECTIVE EQUIPMENT

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

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

As the various monitoring action levels are reached, additional PPE is required. Section 1.0 describes the incremental PPE requirements relative to specific action levels and the specific kinds of PPE to be used. Procedures for the use and selection of PPE are provided in SMS 029, a copy of which is to be maintained on site. Also, general guidelines for selection and use of PPE are presented in the RVAAP -FSHP-Section 5.

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. *[Additional rest breaks will be scheduled according to heat stress monitoring protocols as described in SMS 18.]*

8.0 RESPIRATORY PROTECTION

8.1 RESPIRATOR SELECTION

Engineering controls and safe work practices (e.g., elimination of the source of contamination, ventilation equipment, working upwind, limiting exposure time, etc.) 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. Airborne readings will be compared to the action levels in the table in Section 1.0. See action level/respirator requirements in Section 6.1.

8.2 MEDICAL SCREENING

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

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

8.3 FIT TESTING

A person wearing a respirator must be clean-shaven in the area of the face-piece seal. Long hair, sideburns, and skullcaps that extend under the seal are not allowed. Glasses with temple pieces extending under the seal are not allowed for full-face respirators. Persons with facial conditions that prevent a proper seal are not allowed to wear a respirator until the condition is corrected. Facial conditions that may cause a seal problem include missing dentures, scars, severe acne, etc. Contact lenses may be worn with respiratory protection.

No individual will enter an area where the use of respiratory protective equipment is required unless the person has been fit tested within the last year. Fit testing will be performed in accordance with accepted fit test procedures defined in SMS 042, a copy of which is to be maintained at the site.

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

Respirator wearers will perform a user seal check each time 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. Chemical gas or vapor respirator cartridges will be *changed out at least daily*.

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. 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 nose cups, 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, a copy of which is to be available on site.

9.0 SITE CONTROL

Additional site control measures are described in the FSHP- Section 10. The RVAAP is not open to the public, and only authorized personnel are allowed in the load line areas. The SSH will be responsible for establishing the site control zones, as necessary, around controlled areas that present physical or chemical hazards.

9.1 GENERAL

Barricade tape and/or barricades will be used to delineate a work zone for safety purposes around the work area. The barriers will be set in a 25-foot radius (as practical) around the work area to provide sufficient maneuvering space for personnel and equipment. A short piece of barricade tape can be affixed to a secure upright (e.g., a drill rig mast or a vehicle antenna) to serve as a wind direction telltale. A 5-foot opening in the barricades at the support zone (upwind of the work area) will serve as the personnel and equipment entry and exit point. The personnel decontamination station will be established at this point if formal decontamination procedures are required (see Section 9.0). All entry and exit from the work area will be made at this opening to control potential sources of contamination and leave contaminated soil and debris in the work area.

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

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

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

9.2 WORK ZONES

Site control zones will be established in multiple locations over the site. The exact locations will vary depending on site conditions. As a general rule, an exclusion zone will be established around any task or area that poses a potential to spread contamination or injure personnel.

- EZ – A 25-foot 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.
- 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

Personal Hygiene and decontamination requirements are described in the FSHP-Section 11. For additional details see instructions below:

- 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.

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

All spent decontamination fluids (rinse waters, etc.) 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. Drinking cups will be supplied; personnel will not drink directly from the source of water or share drinking cups. 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.

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.

URS procedures for site sanitation are located in SMS 030, a copy of which is to be maintained on site.

10.2 DECONTAMINATION – MEDICAL EMERGENCIES

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

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

10.3 DECONTAMINATION OF TOOLS

When all work activities have been completed, contaminated tools used by URS personnel will be 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

- **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. 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.**
- **All personnel will enter designated work areas only through the CRZ. 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). All non-essential vehicles should remain within the support zone.**
- **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 on RVAAP.**
- **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 the PM.
- All personal protective equipment will be used as specified and required.
- The buddy system will be used at all times when sampling for hazardous material, when the first action level criteria have been exceeded, or 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 (page 1) can be called for assistance.

12.1 PLACES OF REFUGE

In the event of a site emergency requiring evacuation, all personnel will evacuate to a pre-designated area a safe distance from any health or safety hazard (typically, the URS field office, unless conditions dictate otherwise). The SSO (*in cooperation with a facility representative*) will designate a primary assembly area prior to the start of work each day. The 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

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

- Before any flame-producing devices (i.e., cutting torches or welding irons) are used in the EZ, the SSO must be contacted. In some cases, the client may require to be contacted as well, to determine whether a hot work permit is required. 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.
- Two 2A10B:C 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.

Type ABC fire extinguishers 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

A communication network must be set up to alert site personnel of emergencies and to summon outside emergency assistance. Where voice communication is not feasible, an audible alarm (compressed gas horn or vehicle horn) will be set up to alert employees of emergencies. These devices will be used to signal to other project personnel in the event of accidents or emergencies. Short blast (less than ½ second) of the horn will be used to request assistance, while extended blasts (more than 2 seconds) will signal an evacuation.

Each field team shall have a hand-held, 2-way radio for communication purposes. Post 1 is the first point of contact for any emergency service. Securitas will coordinate the response.

Emergency phone numbers will be posted at the phone or radio used for outside communication. The SSO is responsible for establishing the communication network prior to the start of work and for explaining it to all site personnel during the site safety briefing.

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

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

12.4 EMERGENCY RESPONSE PROCEDURES

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

- Emergency care provider(s)
- Provide first aid/CPR as needed
- Communicator

The role of the communicator is to maintain contact with appropriate emergency services 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, 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 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 and infection control kit (inspected weekly);
- Eyewash – A 15 minute eyewash (required if corrosives are present), or an appropriate amount of portable sterile eyewash bottles, will be available on site for flushing foreign particles or contaminants out of eyes. The SSO will demonstrate the proper operation of the unit(s) prior to the start of work;
- Compressed gas horns;
- Emergency telephone numbers list;
- Basic spill kits;
- Portable radios for emergency communications in remote areas; and
- Fire extinguisher 25 to 75 feet from outside flammables storage (or use) area.

Drugs, inhalants, or medications will not be included in the first aid kit.

Supplies should be reordered as they are used. A monthly inventory must be done on the first aid kit and infection control kit contents, and supplies that have been used must be reordered.

12.6 INCIDENT REPORT

ALL site injuries and illnesses must be reported to the SSO (Stan Levenger) and PM (Jo Ann Bartsch) immediately following first-aid treatment. The SSO will notify the RHSEM (Cece Weldon) . 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 or illness, regardless of severity, is to be reported (see SMS 049).

SSO must first notify RVAAP's security personnel, who will, in turn, contact the proper authorities. The SSO or RHSEM should then notify the U.S. Army Project Manager immediately. The required Accident Report (ENG from 3394) must be completed and submitted to the US Army Project Manager within 2 days. (See RVAAP FSHP-Section 12 and Attachment E for additional details)

Incident Notification Call Chain

URS Site Safety Officer	Stan Levenger	Cell 330-687-1816 Office 614-726-3575
URS Project Manager:	Jo Ann Bartsch	Office :216-622-2229 Cell: 440-376-2875
URS Health, Safety, and Environment Representative:	James Anderson	Cell: 440-241-6972 Office: 216- 622-2384
URS Regional Health, Safety, and Environment Manager:	Cece Weldon	Office: 248-994-7466 Cell: 248-752-3405
URS UXO Program Safety Manager	Mac Reed	Office: 615-224-2148 Cell: 615-618-5272
RVAAP U.S Army Facility Manager	Mark Patterson	330-358-7311

12.7 OPERATION SHUTDOWN

In certain extremely hazardous situations, the SSO or SSR 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 RHSEM, will have ultimate authority for operations shutdown and restart.

The Army reserves the right to stop work for any violations of the HSP. The Ohio EPA also has stop-work authority under the June 2004 Directors Final Findings and Orders.

12.8 SPILL OR HAZARDOUS MATERIALS RELEASE

Potential spills include releases of fuels, lubricants, hydraulic fluids, and decontamination solvents. In the event of a spill or leak, the employee making the discovery will immediately notify the SSO. The SSO will determine whether the leak poses an environmental risk or will exceed the capacity of on-site personnel and equipment. In the unlikely event that there is a probability that the spill will extend beyond the immediate area, site personnel will evacuate to the pre-designated assembly area. The SSO will inform the local fire department (330-297-5738) and hazardous materials response team. If this is not the case, the on-site spill kit will be utilized to clean up the spill.

The Site Safety Officer will make the following emergency contacts:

Regional Health, Safety, and Environment Manager – Cece Weldon
Office: 248-994-7466
Cell: 248-752-3405

Health, Safety, and Environment Representative –	James Anderson Cell: 440-241-6972 Office: 216- 622-2384
Project Manager –	Jo Ann Bartsch Office :216-622-2229 Cell: 440-376-2875
Ohio EPA Spill Number	1-800-282-9378
EPA Response Center (if reportable quantity is exceeded) –	(800) 424-8802.
RVAAP U.S Army Facility Manager	Mark Patterson 330-358-7311
RVAAP Security-Post 1	Securitas 330-358-2017

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:		
Security, Post 1	_____	_____
Fire Department	_____	_____
Police Department	_____	_____
Nearest Hospital or Medical Care Facility	_____	_____
Project Manager	_____	_____
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	_____	_____

12.9 WEATHER EMERGENCIES

Weather forecasts 4 days ahead should be obtained during fieldwork planning. During field activities, the Project Manager will assess current weather conditions utilizing Radar websites (http://www.weather.gov/radar_tab.php). The following climatic factors should be considered in fieldwork planning:

- temperature range,
- rain,
- flood,
- wind,
- cyclone,
- electrical storm,
- dry, hot conditions and fire risk,
- snow ,
- UV exposure, and
- River tides and currents.

In the case of lightning, evacuate to the pre-designated area or field office and do not use the telephone until the storm has passed. If high winds occur, move away from the exterior windows. Report the situation to the Project Manager /Site Safety Officer.

The National Weather Service issues severe weather warning including thunderstorm, tornado and winter storm warnings when a high probability of severe weather exists. If a severe weather warning is issued, field work activities will be cancelled.

In the event of a reported flood, severe storm, or tornado and after the risk for personal safety has diminished, the Project Manager should visit and inspect the site. Any unsafe or abnormal conditions should be reported to the U.S Army Project Manage immediately.

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.
- UXO personnel will have appropriate training in accordance with the Department of Defense Explosives Safety Board.

All URS site personnel are participating in medical surveillance programs that meet the requirements of 29 CFR 1910.120(f). Current copies of training certificates and statements of medical program participation for all URS personnel are maintained by the local URS office. The RVAAP operating contractor will be given copies of all required 40-hour HAZWOPER training, 8-hour refresher training, and First Aid/CPR training for any URS employees and subcontractor personnel on site.

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.

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 RHSEM.

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

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

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

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.

Additionally, weekly reports will be submitted to the U.S Army Project Manager. See FSHP-Section 13 for details. (See Attachment E- Reporting Forms)

ATTACHMENT A

**HOSPITAL AND OCCUPATIONAL
CLINIC ROUTE MAP**

Hospital Route and Map

Start: 8451 State Route 5
Ravenna, OH 44266-9244, US

End: Robinson Memorial Hospital: 330-297-0811
6847 N Chestnut St, Ravenna, OH 44266, US

Directions	Distance
Total Est. Time: 13 minutes Total Est. Distance: 9.23 miles	
 1: Start out going WEST on RAVENNA WARREN RD / OH-5 W toward NEWTON FALLS RD. Continue to follow OH-5 W.	5.9 miles
 2: Stay STRAIGHT to go onto OH-59 W.	0.7 miles
 3: Turn RIGHT onto CLEVE E LIVERPOOL RD / OH-14 / OH-44.	2.3 miles
 4: Turn LEFT onto N CHESTNUT ST.	0.1 miles
 5: End at Robinson Memorial Hospital: 6847 N Chestnut St, Ravenna, OH 44266, US	
Total Est. Time: 13 minutes Total Est. Distance: 9.23 miles	



Occupational Clinic Route and Map

Start: 8451 State Route 5
Ravenna, OH 44266-9244, US

End: 1993 State Route 59
Kent, OH 44240-7609, US

Directions	Distance
Total Est. Time: 20 minutes Total Est. Distance: 12.06 miles	
 1: Start out going WEST on RAVENNA WARREN RD / OH-5 W toward NEWTON FALLS RD. Continue to follow OH-5 W.	5.9 miles
 2: Stay STRAIGHT to go onto OH-59 W.	6.1 miles
 3: End at 1993 State Route 59 Kent, OH 44240-7609, US	



ATTACHMENT B

**SAFETY PLAN COMPLIANCE
AGREEMENT AND MEDICAL
EMERGENCY CONTACT SHEET**

**ATTACHMENT B
SAFETY PLAN COMPLIANCE AGREEMENT AND
MEDICAL EMERGENCY CONTACT SHEET**

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

SIGNED: _____
Signature Date

Firm: URS Corp.

OPTIONAL: This brief Medical Emergency Contact Sheet will be kept in the Support Zone during site operations. This data sheet will accompany injured personnel when medical assistance or transport to hospital facilities is necessary.

Emergency Contact: _____ Phone #: _____

Relationship: _____

Do you wear contact lenses? _____

ATTACHMENT C

MATERIAL SAFETY DATA SHEETS



Material Safety Data Sheet

TNT Soil 20 Test Kit

MATERIAL IDENTIFICATION

Manufacturer/Distributor:	Strategic Diagnostics Inc. 111 Pencader Drive Newark, DE 19702	
Phone Number:	1-(302) 456-6789	
Trade Names and Synonyms:	TNT Soil 20 Test Kit (7002000)	
NFPA Ratings	Health:	2
	Flammability:	4
	Reactivity:	1

OSHA HAZARD DETERMINATION

Hazardous Ingredients	CAS Number	Weight Percent
Acetone Acetone, Dimethyl Ketone	67-64-1	≤ 100
Tetrabutylammonium Hydroxide	2052-49-5	≤ 25

PHYSICAL DATA

Plastic kit containing small amounts of various liquids and powders.

HAZARDOUS REACTIVITY

Instability Stable - Reactivity not expected with the product.

FIRE AND EXPLOSION DATA

Fire and Explosion Hazards	There is a fire and explosion hazard with this chemical. Acetone has a flash point of 1°F and 869°F for auto ignition.
Extinguishing Media	Use Carbon dioxide, dry chemical powder or appropriate foam.
Special Fire Fighting Instructions	This chemical kit is highly flammable. Vapor may travel considerable distance to source of ignition and flashback.

HEALTH HAZARD INFORMATION

Primary Route(s) of Exposure/Entry: Skin, Eyes and inhalation. Wash thoroughly after handling and take precautionary measures. If victim is experiencing difficulty in breathing, remove to fresh air and provide oxygen.

Signs and Symptoms of Exposure/Medical Conditions Aggravated by Exposure:

Skin exposure to acetone may cause irritation, redness, dryness or inflammation. Acetone may cause irritation to eyes that is characterized by a burning sensation, redness, tearing, inflammation and possible

corneal injury. Inhaling or ingesting acetone may cause irritation to the digestive tract, central nervous system depression, headache, dizziness, unconsciousness, coma, respiratory tract irritation, and kidney and liver damage. May cause motor incoordination and speech abnormalities.

Tetrabutylammonium Hydroxide is extremely destructive to the tissue of the mucous membranes and upper respiratory tract, eyes and skin. Inhalation may cause spasm, inflammation, and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Symptoms of overexposure may include burning sensations, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting.

Carcinogenicity: None of the components in this material is listed by IARC, NTP, OSHA, or ACGIH as a carcinogen.

Applicable Exposure Limits

Acetone

TLV (ACGIH) 750 ppm; 1780 mg/m³

STEL: 1000 ppm; 2380 mg/m³

PEL (OSHA) TWA: 1000 ppm

TWA: 2400 mg/m³

Tetrabutylammonium Hydroxide

TLV (ACGIH) 200 ppm; 260 mg/m³

PEL (OSHA) TWA: 200 ppm; 260 mg/m³ 8 H

STEL : 250 ppm; 310 mg / m³

FIRST AID

- Inhalation** Get medical attention immediately. Remove affected person to fresh air.
- Skin Contact** The compound is not likely to be hazardous by skin contact, but may cause irritation. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation persists, contact a physician.
- Eye Contact** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes occasionally lifting upper and lower lids. Call a physician.
- Ingestion** The compound is toxic by ingestion. If victim is conscious and alert, give 2–4 cupfuls of milk or water. Call a physician immediately.

PROTECTION INFORMATION

General Control Measures and Precautions: Ventilation – Chemical fume hood required.

Personal Protective Equipment: Respiratory Protection: NIOSH / MSHA –approved respirator face shield (8 inch minimum)

Protective Gloves: Are highly recommended.

Eye Protection: Safety glasses are required.

Other Protective Equipment: A lab coat or other long sleeved garment is required to limit skin exposure. Access to safety shower and eyewash is required.

SPILL, LEAK AND DISPOSAL INFORMATION

Spill, Leak, or Release

Review FIRE AND EXPLOSION HAZARDS and SAFETY PRECAUTIONS before proceeding with clean up.

Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean

up.

No special clean up practices are required. Absorb spill with inert material and collect in suitable waste container.

Waste Disposal Dispose of as solid waste in accordance with any applicable federal, state, and local requirements.

SHIPPING INFORMATION

DOT	Proper Shipping Name	Not DOT regulated.
IATA/IMO	Proper Shipping Name	Not restricted.

TITLE III HAZARD CLASSIFICATION

Acute	No
Chronic	No
Fire	No
Reactivity	No
Pressure	No

REGULATORY INFORMATION

OSHA HAZARD DETERMINATION: This material is not known to be hazardous as defined by OSHA's Hazard Communication Standard, 29 CFR 1910.1200

EPA DETERMINATIONS:

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, & LIABILITY ACT (CERCLA/SUPERFUND), 40 CFR 302 - This material is not known to contain hazardous substances in sufficient quantity to make it subject to CERCLA regulations.

TOXIC SUBSTANCES CONTROL ACT (TSCA), 40 CFR 710

The material is a mixture as defined by TSCA. The chemical ingredients in this material are in the Section 8(b) Chemical Substance Inventory and/or are otherwise in compliance with TSCA. In the case of ingredients obtained from other manufacturers, Strategic Diagnostics, Inc. relies on the assurance of responsible third parties in providing this statement.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261, SUBPARTS C AND D

The material, when discarded or disposed of, is not specifically listed as a hazardous waste in Federal regulations; however, it could be considered hazardous if it meets criteria for being toxic, corrosive, ignitable or reactive according to U.S. EPA definitions (40 CFR 261). This material could also become a hazardous waste if it is mixed with or comes in contact with a listed hazardous waste. If it is a hazardous waste, regulations 40 CFR 262-266 and 268 may apply.

HAZARDOUS MATERIALS TRANSPORTATION REGULATIONS, 49 CFR 171-178 - This material is not known to contain hazardous substances in sufficient quantity to make it subject to the Regulations.

FOREIGN REGULATIONS: CANADIAN HAZARDOUS PRODUCTS ACT (WHMIS)

The material is not a WHMIS Controlled Product.

STATE REGULATIONS:

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 ("PROPOSITION 65")

The material is not known to contain any ingredient (s) subject to the Act.

PENNSYLVANIA WORKER AND COMMUNITY RIGHT TO KNOW ACT

This material is not known to contain any ingredient(s) subject to the Act. Non-hazardous ingredient(s) information is withheld as trade secret in accordance with Section 11 of the Pennsylvania Worker and Community Right to Know Act.

The above data are based on tests, experience, and other information which Strategic Diagnostics Inc. believes reliable and are supplied for informational purposes only. However, some ingredients may have been purchased or obtained from third-party manufacturers. In these instances, Strategic Diagnostics, Inc., in good faith, relies on information provided by those third parties. Since conditions of use are outside our control, STRATEGIC DIAGNOSTICS INC. DISCLAIMS ANY LIABILITY FOR DAMAGE OR INJURY WHICH RESULTS FROM USE OF THE ABOVE DATA. NOTHING CONTAINED HEREIN SHALL CONSTITUTE A GUARANTEE, WARRANTY (INCLUDING WARRANTY OF MERCHANTABILITY) OR REPRESENTATION (INCLUDING FREEDOM FROM PATENT LIABILITY) BY STRATEGIC DIAGNOSTICS, INC. WITH RESPECT TO THE DATA, THE MATERIAL DESCRIBED, OR ITS USE FOR ANY SPECIFIC PURPOSE, EVEN IF THAT PURPOSE IS KNOWN TO STRATEGIC DIAGNOSTICS INC.

Responsibility for MSDS: Strategic Diagnostics Inc.
111 Pencader Drive
Newark, DE 19702
(302) 456-6789

* End of MSDS *

**Material Safety Data Sheet****RDX 20 w/ Extraction Jar Kit****MATERIAL IDENTIFICATION**

Manufacturer/Distributor: Strategic Diagnostics Inc.
111 Pencader Drive
Newark, DE 19702

Phone Number: 1-(302) 456-6789

Trade Names and Synonyms: RDX 20 w / Extraction Jar Kit (7085000)

NFPA Ratings

Health:	2
Flammability:	4
Reactivity:	1

OSHA HAZARD DETERMINATION

Hazardous Ingredients	CAS Number	Weight Percent
Acetone	67-64-1	≤ 100
Acetic Acid	64-19-1	≤ 77

PHYSICAL DATA

Plastic kit containing small amounts of various liquids and powders.

HAZARDOUS REACTIVITY

Instability Stable - Reactivity not expected with the product.

FIRE AND EXPLOSION DATA

Fire and Explosion Hazards There is a fire and explosion hazard with this kit. Acetone has a flash point of 1°F and an autoignition temperature of 869°F.

Extinguishing Media Use carbon dioxide, dry chemical powder or appropriate foam. Water may be effective for cooling, but not for extinguishing.

Special Fire Fighting Instructions Fire fighters must wear appropriate protective clothing and a self – contained breathing apparatus.

HEALTH HAZARD INFORMATION

Primary Route(s) of Exposure/Entry: Skin, Eyes and Mouth. Wash thoroughly after handling. If ingested or inhaled seek prompt medical attention.

Signs and Symptoms of Exposure/Medical Conditions Aggravated by Exposure:

Acetone and acetic acid may be harmful by ingestion, inhalation and / or skin absorption. Material may cause irritation to skin, eyes, mucous membranes and upper respiratory tract. Continual skin exposure to acetone may cause dermatitis.

Carcinogenicity: None of the components in this material is listed by IARC, NTP, OSHA, or ACGIH as a carcinogen.

Applicable Exposure Limits

Acetone

TLV (ACGIH) 2380 mg / m³ (1000 ppm)
1780 mg / m³ (750 ppm)

PEL (OSHA) 8H TWA 2400 mg / m³ (1000 ppm)

Acetic acid

TLV (ACGIH) 37 mg / m³ (15 ppm)
25 mg / m³ (10 ppm)

PEL (OSHA) 25 mg / m³ (10 ppm)

FIRST AID

- Inhalation** If inhaled, remove victim to fresh air. If not breathing give artificial respiration. Consult a physician if necessary.
- Skin Contact** The compound is not likely to be hazardous by skin contact, but may cause irritation. If irritation occurs, flush skin with large amounts of soapy water.
- Eye Contact** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
- Ingestion** The compound is toxic by ingestion. If swallowed, wash mouth out with water provided that person is conscious. Call a physician.

PROTECTION INFORMATION

General Control Measures and Precautions: Ventilation - Mechanical ventilation required.

Personal Protective Equipment: Respiratory Protection: None required.

Protective Gloves: Are highly recommended.

Eye Protection: Safety glasses are required.

Other Protective Equipment: Access to a safety shower and eyewash is required. Lab coat or other long - sleeved garment is required.

SPILL, LEAK AND DISPOSAL INFORMATION

Spill, Leak, or Release Review FIRE AND EXPLOSION HAZARDS and SAFETY PRECAUTIONS before proceeding with clean up.

Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean up.

Clean up spill with an activated carbon absorbent, take up and place in closed container. Ventilate and wash spill site after material pick up is complete.

Waste Disposal Dispose of as solid waste in accordance with any applicable federal, state, and local requirements.

SHIPPING INFORMATION

DOT Proper Shipping Name Not DOT regulated.

IATA/IMO	Proper Shipping Name	Not restricted.
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TITLE III HAZARD CLASSIFICATION

Acute	No
Chronic	No
Fire	No
Reactivity	No
Pressure	No

REGULATORY INFORMATION

OSHA HAZARD DETERMINATION: This material is not known to be hazardous as defined by OSHA's Hazard Communication Standard, 29 CFR 1910.1200

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(INCLUDING WARRANTY OF MERCHANTABILITY) OR REPRESENTATION (INCLUDING FREEDOM FROM PATENT LIABILITY) BY STRATEGIC DIAGNOSTICS, INC. WITH RESPECT TO THE DATA, THE MATERIAL DESCRIBED, OR ITS USE FOR ANY SPECIFIC PURPOSE, EVEN IF THAT PURPOSE IS KNOWN TO STRATEGIC DIAGNOSTICS INC.

Responsibility for MSDS: Strategic Diagnostics Inc.
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(302) 456-6789

* End of MSDS *

MATERIAL SAFETY DATA SHEET



BP UNLEADED GASOLINES

MSDS No. 12632000 ANSI/ENGLISH

1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: BP UNLEADED GASOLINES

MANUFACTURER/SUPPLIER:

BP Oil Company
200 East Randolph Drive
Chicago, Illinois 60601 U.S.A.

EMERGENCY HEALTH INFORMATION:

1 (800) 447-8735

EMERGENCY SPILL INFORMATION:

1 (800) 424-9300 CHEMTREC (USA)

**OTHER PRODUCT SAFETY
INFORMATION:**

(630) 836-5441

2.0 COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS#	Range % by Wt.
Gasoline	8006-61-9	99.9-100
Benzene	71-43-2	0-3
Butane	106-97-8	4-6
Cyclohexane	110-82-7	0-1
Ethylbenzene	100-41-4	0-2
Heptane	142-82-5	6-8
Hexane	110-54-3	8-10
Pentane	109-66-0	9-11
Toluene	108-88-3	10-12
Trimethylbenzene	95-63-6	0-3
Xylene	1330-20-7	8-10

(See Section 8.0, "Exposure Controls/Personal Protection", for exposure guidelines)

3.0 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Danger! Extremely flammable. Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness, and nausea, and may lead to unconsciousness or death. Harmful if swallowed and/or aspirated into the lungs. Prolonged or repeated contact may cause irritation and/or dermatitis. Use as motor fuel only. Long-term exposure to vapors has caused cancer in laboratory animals.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: High concentrations of vapor/mist may cause eye discomfort.

SKIN CONTACT: Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis.

INHALATION: Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness, and nausea, and may lead to unconsciousness or death. See "Toxicological Information" section (Section 11.0).

INGESTION: Harmful or fatal if liquid is aspirated into lungs. Ingestion causes gastrointestinal irritation and diarrhea. See "Toxicological Information" section (Section 11.0).

HMIS CODE: (Health:1) (Flammability:3) (Reactivity:0) CHRONIC HEALTH HAZARD.

NFPA CODE: (Health:1) (Flammability:3) (Instability:0)

4.0 FIRST AID MEASURES

EYE: Flush eyes with plenty of water. Get medical attention if irritation persists.

SKIN: Wash exposed skin with soap and water. Remove contaminated clothing, including shoes, and thoroughly clean and dry before reuse. Get medical attention if irritation develops.

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get medical attention.

INGESTION: If swallowed, do NOT induce vomiting. Get immediate medical attention.

5.0 FIRE FIGHTING MEASURES

FLASHPOINT: -45°F

UEL: 7.6%

LEL: 1.3%

AUTOIGNITION TEMPERATURE: 495.0°F

FLAMMABILITY CLASSIFICATION: Extremely Flammable Liquid.

EXTINGUISHING MEDIA: Agents approved for Class B hazards (e.g., dry chemical, carbon dioxide, foam, steam) or water fog. Water may be ineffective but should be used to cool-fire exposed containers, structures and to protect personnel.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Extremely flammable vapor/air mixtures form. Extinguishment of fire before source of vapor is shut off can create an explosive mixture in air. Product gives off vapors that are heavier than air which can travel considerable distances to a source of ignition and flashback. Runoff to sewer may cause a fire or explosion hazard.

FIRE-FIGHTING EQUIPMENT: Firefighters should wear full bunker gear, including a positive pressure self-contained breathing apparatus.

PRECAUTIONS: Keep away from sources of ignition (e.g., heat and open flames). Keep container closed. Use with adequate ventilation.

HAZARDOUS COMBUSTION PRODUCTS: Combustion of this product in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., carbon monoxide, carbon dioxide) and inadequate oxygen levels.

6.0 ACCIDENTAL RELEASE MEASURES

Remove or shut off all sources of ignition. Wear respirator and spray with water to disperse vapors. Increase ventilation if possible. Prevent spreading by diking, ditching, or absorbing on inert materials. Keep out of sewers and waterways.

7.0 HANDLING AND STORAGE

HANDLING: Use with adequate ventilation. Keep away from ignition sources (e.g., heat, sparks, or open flames). Ground and bond containers when transferring materials. Wash thoroughly after handling.

STORAGE: Store in flammable liquids storage area. Keep container closed. Store away from heat, ignition sources, and open flame in accordance with applicable regulations.

SPECIAL PRECAUTIONS: Keep out of sewers and waterways. Avoid strong oxidizers. Report spills to appropriate authorities. USE AS MOTOR FUEL ONLY.

8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE: None required; however, use of eye protection is good industrial practice.

SKIN: Avoid prolonged or repeated skin contact. Wear protective clothing and gloves if prolonged or repeated contact is likely.

INHALATION: Use with adequate ventilation. Avoid breathing vapor and/or mist. If ventilation is inadequate, use NIOSH certified respirator that will protect against organic vapor and dust/mist.

ENGINEERING CONTROLS: Control airborne concentrations below the exposure guidelines.

EXPOSURE GUIDELINES:

Component	CAS#	Exposure Limits
Gasoline	8006-61-9	OSHA PEL: 300 ppm (1989); Not established. (1971) OSHA STEL: 500 ppm (1989); Not established. (1971) ACGIH TLV-TWA: 300 ppm ACGIH TLV-STEL: 500 ppm
Benzene	71-43-2	OSHA PEL: 1 ppm OSHA STEL: 5 ppm ACGIH TLV-TWA: 0.5 ppm (skin) ACGIH TLV-STEL: 2.5 ppm (skin) Mexico TWA: 10 ppm Mexico STEL: 25 ppm
Butane	106-97-8	OSHA PEL: 800 ppm (1989); Not established. (1971) ACGIH TLV-TWA: 800 ppm Mexico TWA: 800 ppm
Cyclohexane	110-82-7	OSHA PEL: 300 ppm (1989)(1971) ACGIH TLV-TWA: 300 ppm Mexico TWA: 300 ppm Mexico STEL: 375 ppm
Ethylbenzene	100-41-4	OSHA PEL: 100 ppm (1989)(1971) OSHA STEL: 125 ppm(1989); Not established. (1971) ACGIH TLV-TWA: 100 ppm ACGIH TLV-STEL: 125 ppm Mexico TWA: 100 ppm Mexico STEL: 125 ppm

Heptane	142-82-5	OSHA PEL: 400 ppm (1989); 500 ppm (1971) OSHA STEL: 500 ppm (1989); Not established. (1971) ACGIH TLV-TWA: 400 ppm ACGIH TLV-STEL: 500 ppm Mexico TWA: 400 ppm (skin) Mexico STEL: 500 ppm (skin)
Hexane	110-54-3	OSHA PEL: 50 ppm (1989); 500 ppm (1971) ACGIH TLV-TWA: 50 ppm (skin) Mexico TWA: 100 ppm
Pentane	109-66-0	OSHA PEL: 600 ppm (1989); 1000 ppm (1971) OSHA STEL: 750 ppm (1989); Not established. (1971) ACGIH TLV-TWA: 600 ppm Mexico TWA: 600 ppm Mexico STEL: 760 ppm
Toluene	108-88-3	OSHA PEL: 100 ppm (1989); 200 ppm (1971) OSHA STEL: 150 ppm (1989); Not established. (1971) OSHA Ceiling: 300 ppm (1971) ACGIH TLV-TWA: 50 ppm (skin) Mexico TWA: 100 ppm Mexico STEL: 150 ppm
Trimethylbenzene	95-63-6	OSHA PEL: 25 ppm (1989); Not established. (1971) ACGIH TLV-TWA: 25 ppm Mexico TWA: 25 ppm Mexico STEL: 35 ppm
Xylene	1330-20-7	OSHA PEL: 100 ppm (1989)(1971) OSHA STEL: 150 ppm (1989); Not established. (1971) ACGIH TLV-TWA: 100 ppm ACGIH TLV-STEL: 150 ppm Mexico TWA: 100 ppm (skin) Mexico STEL: 150 ppm (skin)

9.0 CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE AND ODOR: Clear. Liquid. Hydrocarbon odor.

pH: Not determined.

VAPOR PRESSURE: 7-15 lb RVP (ASTM D323)

VAPOR DENSITY: 3.0-4.0

BOILING POINT: 80.0-430.0°F (range)

MELTING POINT: Not determined.

SOLUBILITY IN WATER: Negligible, below 0.1%.

SPECIFIC GRAVITY (WATER=1): 0.75

10.0 STABILITY AND REACTIVITY

STABILITY: Burning can be started easily.

CONDITIONS TO AVOID: Keep away from ignition sources (e.g. heat, sparks, and open flames).

MATERIALS TO AVOID: Avoid chlorine, fluorine, and other strong oxidizers.

HAZARDOUS DECOMPOSITION: None identified.

HAZARDOUS POLYMERIZATION: Will not occur.

11.0 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY DATA:

EYE IRRITATION: This product had a primary eye irritation score (PEIS) of 0/110.0 (rabbit)

SKIN IRRITATION: This product had a primary skin irritation score (PDIS) of 1.1/8.0 (rabbit)

DERMAL LD50: greater than 5 ml/kg (rabbit).

ORAL LD50: 18.8 ml/kg (rat).

INHALATION LC50: 20.7 mg/l (rat)

OTHER TOXICITY DATA: Excess exposure to vapors may produce headaches, dizziness, nausea, drowsiness, irritation of eyes, nose and throat and central nervous system depression. Aspiration of this material into the lungs can cause chemical pneumonia and can be fatal. Aspiration into the lungs can occur while vomiting after ingestion of this product. Inhalation of unleaded gasoline vapors did not produce birth defects in laboratory animals. Ingestion of this material can cause gastrointestinal irritation and diarrhea.

In a long-term inhalation study of whole unleaded gasoline vapors, exposure-related kidney damage and kidney tumors were observed in male rats. Similar kidney effects were not seen in female rats or in mice. At the highest exposure level (2056 ppm), female mice had an increased incidence of liver tumors. Results from subsequent scientific studies have shown that a broad variety of chemicals cause these kidney effects only in the male rat. Further studies have discovered the means by which

the physiology of the male rat uniquely predispose it to these effects. Consequently, the Risk Assessment Forum of the Environmental Protection Agency has recognized that these responses are not predictive of a human health hazard. The liver tumors that were increased in the high-dose female mice are likewise of questionable significance because of their high spontaneous occurrence even without chemical exposure and because the rate of their occurrence is accelerated by a broad spectrum of chemicals not commonly considered to be carcinogens (e.g., phenobarbital). Thus, the significance of the mouse liver tumor response in terms of human health is questionable.

Gasoline is a complex mixture of hydrocarbons and contains benzene (typically no more than 2 volume%), toluene, and xylene. Chronic exposure to high levels of benzene has been shown to cause cancer (leukemia) in humans and other adverse blood effects (anemia). Benzene is considered a human carcinogen by IARC, NTP and OSHA. Over exposure to xylene and toluene can cause irritation to the upper respiratory tract, headache and narcosis. Some liver damage and lung inflammation were seen in chronic studies on xylene in guinea pigs but not in rats.

Solvent "sniffing" (abuse) or intentional overexposure to vapors can produce serious central nervous system effects, including unconsciousness, and possibly death.

12.0 ECOLOGICAL INFORMATION

Ecological testing has not been conducted on this material by BP Amoco.

13.0 DISPOSAL INFORMATION

Residues and spilled material are hazardous waste due to ignitability. Disposal must be in accordance with applicable federal, state, or local regulations. Enclosed-controlled incineration is recommended unless directed otherwise by applicable ordinances.

The container for this product can present explosion or fire hazards, even when emptied! To avoid risk of injury, do not cut, puncture, or weld on or near this container. Since the emptied containers retain product residue, follow label warnings even after container is emptied.

14.0 TRANSPORTATION INFORMATION

U.S. DEPT OF TRANSPORTATION

Shipping Name	Gasoline
Hazard Class	3
Identification Number	UN1203
Packing Group	II

INTERNATIONAL INFORMATION:

Sea (IMO/IMDG)

Shipping Name Gasoline
Class 3.1
Packing Group II
UN Number UN1203

Air (ICAO/IATA)

Shipping Name Gasoline , UN1203
Class 3
Packing Group II

European Road/Rail (ADR/RID)

Shipping Name Not determined.

Canadian Transportation of Dangerous Goods

Shipping Name Gasoline
Hazard Class 3
UN Number UN1203
Packing Group II

15.0 REGULATORY INFORMATION

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR Part 302.4): This product is exempt from the CERCLA reporting requirements under 40 CFR Part 302.4. However, if spilled into waters of the United States, it may be reportable under 33 CFR Part 153 if it produces a sheen.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR Part 355): This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

SARA TITLE III SECTIONS 311/312 HAZARDOUS CATEGORIZATION (40 CFR Part 370): This product is defined as hazardous by OSHA under 29 CFR Part 1910.1200(d). Hazardous categories for this product are: Acute = yes; Chronic = yes; Fire = yes; Pressure = no; Reactive = no.

SARA TITLE III SECTION 313 (40 CFR Part 372): This product contains the following substance(s), which is on the Toxic Chemicals List in 40 CFR Part 372:

Component/CAS Number	Weight Percent
Benzene 71-43-2	3
Trimethylbenzene 95-63-6	3
Cyclohexane 110-82-7	1
Ethylbenzene 100-41-4	2
Xylene 1330-20-7	10
Hexane 110-54-3	10
Toluene 108-88-3	12

U.S. INVENTORY (TSCA): Listed on inventory.

OSHA HAZARD COMMUNICATION STANDARD: Flammable liquid. Irritant. Contains components listed by ACGIH. Contains components listed by OSHA. Contains a carcinogenic component.

WHMIS Controlled Product Classification: B2, D2A, D2B.

EC INVENTORY (EINECS/ELINCS): Not determined.

JAPAN INVENTORY (MITI): Not determined.

AUSTRALIA INVENTORY (AICS): Not determined.

KOREA INVENTORY (ECL): Not determined.

CANADA INVENTORY (DSL): Not determined.

PHILIPPINE INVENTORY (PICCS): Not determined.

16.0 OTHER INFORMATION

This material contains an ingredient/ingredients present on the following State Right-To-Know lists:

-Florida- -Massachusetts- -New Jersey- -Pennsylvania- -California- -Minnesota-

This product contains an ingredient/ingredients known to the state of California to cause cancer and/or reproductive toxicity.

Prepared by:

Environment, Health and Safety Department

Issued: July 16, 1999

This Material Safety Data Sheet conforms to the requirements of ANSI Z400.1.

NOTICE: The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. However, no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from any hazards inherent in the nature of the product.



U.S. Department of Labor
Occupational Safety & Health Administration

www.osha.gov



Search **GO** Advanced Search

OSHA/EPA Occupational Chemical Database

Chemical Identification

Chemical Name: ISOPROPANOL

CAS #: 67-63-0

UN No: 1219

Formula: C3H8O

Synonyms: Dimethyl carbinol; IPA; Isopropanol; 2-Propanol; sec-Propyl alcohol; Rubbing alcohol; isopropanol

Physical Properties			
Physical Description: Colorless liquid with the odor of rubbing alcohol.			
BP: 181°F	MW: 60.1	LEL: 2.0%	NFPA Fire Rating: 3
FRZ/MLT: FRZ: -127°F	VP: 33 mmHg	UEL: (200°F): 12.7%	NFPA Health Rating: 1
FP: 53°F	VD: NA		NFPA Reactivity Rating: 0
Sp. GR: 0.79	IP: 10.10 eV		NFPA Sp. Inst.: NA

Exposure Limits		
OSHA	NIOSH	Related Information
PEL-TWA ppm: 400	REL-TWA ppm: 400	AIHA Emergency Response Pl Guidelines - ERPG-1/ERPG-2/NA
PEL-TWA mg/m3: 980	REL-TWA mg/m3: 980	
PEL-STEL ppm: NA	REL-STEL ppm: 500	
PEL-STEL mg/m3: NA	REL-STEL mg/m3: 1225	
PEL-C ppm: NA	REL-C ppm: NA	
PEL-C mg/m3: NA	REL-C mg/m3: NA	Carcinogen Classifications: IA
Skin Notation: No	Skin Notation: No	
Notes: NA	Notes: NA	
	IDLH ppm: 2000	
	IDLH mg/m3: NA	
	IDLH Notes: 10% of LEL	

NIOSH Pocket Guide to Chemical Hazards (Current through June 2006)	
Isopropyl alcohol	CAS: 67-63-0
Formula: (CH3)2CHOH	RTECS: NT80500
Synonyms & Trade Names: Dimethyl carbinol, IPA, Isopropanol, 2-Propanol, sec-Propyl alcohol, Rubbing alcohol	DOT ID & Guide:
Exposure Limits	
NIOSH REL: TWA 400 ppm (980 mg/m3) ST 500 ppm	OSHA PEL : TWA 400 ppm (980 mg/m3)

(1225 mg/m3)			
IDLH: 2000 ppm [10%LEL]		Conversion: 1 ppm = 2.46 mg/m3	
Physical Description			
Colorless liquid with the odor of rubbing alcohol.			
MW: 60.1	BP: 181F	FRZ: -127F	Sol: Miscible
VP: 33 mmHg	IP: 10.10 eV	RGasD: NA	Sp.Gr: 0.79
Fl.P: 53F	UEL(200F): 12.7%	LEL: 2.0%	MEC: NA
Class IB Flammable Liquid (See flammable and combustible liquid classes)			
Incompatibilities & Reactivities			
Strong oxidizers, acetaldehyde, chlorine, ethylene oxide, acids, isocyanates			
Measurement Methods			
NIOSH 1400; OSHA 109			
Personal Protection & Sanitation		First Aid	
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.		Eye: Irr immed Skin: Water flush Breath: Resp support Swallow: Medical attention immed (See procedures)	
NIOSH Respirator Recommendations			
NIOSH/OSHA 2000 ppm: SA:CF/CCRFOV/GMFOV/PAPROV/SCBAF/SAF : SCBAF:PD,PP/SAF:PD,PP:ASCB GMFOV/SCBAE (See symbols and codes)			
Exposure Routes			
Inh Ing Con			
Symptoms			
Irrit eyes, nose, throat; drow, dizz, head; dry cracking skin; in animals: narco (See abbreviations)			
Target Organs			
Eyes, skin, resp sys (See abbreviations)			

DOT Emergency Response Guidebook (ERG 2004)

Guide Number: 129

129 Flammable Liquids (Polar/Water-Miscible/Noxious)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- * HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- * Vapors may form explosive mixtures with air.
- * Vapors may travel to source of ignition and flash back.
- * Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- * Vapor explosion hazard indoors, outdoors or in sewers.
- * Those substances designated with a P may polymerize explosively when heated or involved in a fire.
- * Runoff to sewer may create fire or explosion hazard.
- * Containers may explode when heated.
- * Many liquids are lighter than water.

HEALTH

- * May cause toxic effects if inhaled or absorbed through skin.
- * Inhalation or contact with material may irritate or burn skin and eyes.
- * Fire will produce irritating, corrosive and/or toxic gases.
- * Vapors may cause dizziness or suffocation.
- * Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- * CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- * Isolate spill or leak area immediately for at least 50 to 100 meters (160 to 330 feet) in all directions.
- * Keep unauthorized personnel away.
- * Stay upwind.
- * Keep out of low areas.
- * Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- * Wear positive pressure self-contained breathing apparatus (SCBA).
- * Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- * Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- * If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE**FIRE**

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.

Small Fires

- * Dry chemical, CO₂, water spray or alcohol-resistant foam.
- * Do not use dry chemical extinguishers to control fires involving nitromethane or nitroethane.

Large Fires

- * Water spray, fog or alcohol-resistant foam.
- * Do not use straight streams.
- * Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- * Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- * Cool containers with flooding quantities of water until well after fire is out.
- * Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- * ALWAYS stay away from tanks engulfed in fire.
- * For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- * ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- * All equipment used when handling the product must be grounded.
- * Do not touch or walk through spilled material.
- * Stop leak if you can do it without risk.
- * Prevent entry into waterways, sewers, basements or confined areas.
- * A vapor suppressing foam may be used to reduce vapors.
- * Absorb or cover with dry earth, sand or other non-combustible material

and transfer to containers.

- * Use clean non-sparking tools to collect absorbed material.

Large Spills

- * Dike far ahead of liquid spill for later disposal.
- * Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- * Move victim to fresh air.
- * Call 911 or emergency medical service.
- * Apply artificial respiration if victim is not breathing.
- * Administer oxygen if breathing is difficult.
- * Remove and isolate contaminated clothing and shoes.
- * In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- * Wash skin with soap and water.
- * Keep victim warm and quiet.
- * Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- * Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

Additional Emergency Response Information (CAMEO Data)

Non-fire Spill Response: Keep sparks, flames, and other sources of ignition away. Keep material out of and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without undue personnel hazard. Water spray to disperse vapors and dilute standing pools of liquid. (AAR, 1999)

Firefighting: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. S of water may be ineffective. Cool all affected containers with flooding quantities of water. Apply water from distance as possible. Use "alcohol" foam, dry chemical or carbon dioxide. (AAR, 1999)

Reactivity: STABILITY: This chemical is sensitive to heat. Solutions of this chemical in water, DMSO, 95% acetone should be stable for 24 hours under normal lab conditions. REACTIVITY: This chemical reacts with to form dangerously unstable peroxides. Contact with 2-butanone increases the reaction rate for peroxide violent, explosive reaction occurs when it is heated with (aluminum isopropoxide + crotonaldehyde). It for mixtures with trinitromethane and hydrogen peroxide. This chemical reacts with barium perchlorate to form explosive compound. It ignites on contact with dioxygenyl tetrafluoroborate, chromium trioxide and potassium butoxide. Vigorous reactions occur with (hydrogen + palladium), nitroform, oleum, COCl₂, aluminum triisocyanide and oxidizers. It also reacts explosively with phosgene in the presence of iron salts. It is incompatible with anhydrides, halogens and aluminum. (NTP, 1992)

First Aid: EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center for any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop. IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment. INHALATION: IMMEDIATELY remove the victim from the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever available, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than that advised under Protective Clothing. INGESTION: DO NOT INDUCE VOMITING. Volatile chemicals have a risk of being aspirated into the victim's lungs during vomiting which increases the medical problems. If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call a hospital or poison control center. IMMEDIATELY transport the victim to a hospital. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital. (NTP, 1992)

 [Back to Top](#)

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Occupational Safety & Health Administration
200 Constitution Avenue, NW
Washington, DC 20210

LIQUINOX MSDS

Section 1 : PRODUCT AND COMPANY IDENTIFICATION

Chemical family: Detergent.

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).

Supplier: Same as manufacturer.

Product name: Liquinox

Section 2 : INGREDIENT INFORMATION

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

Section 3 : HAZARD IDENTIFICATION

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

Effects of acute exposure

Eye contact: May cause irritation.

Skin contact: Prolonged and repeated contact may cause irritation.

Inhalation: May cause headache and nausea.

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

Effects of chronic exposure: See effects of acute exposure.

Section 4 : FIRST AID MEASURES

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.
If irritation persists, seek medical attention.

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

Section 5 : FIRE FIGHTING MEASURES

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.
Use water spray to cool fire exposed containers.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Explosion Data

Sensitivity to static discharge: Not available.

Sensitivity to mechanical impact: Not available.

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

Rate of burning: Not available.

Explosive power: Containers may rupture if exposed to heat or fire.

Section 6 : ACCIDENTAL RELEASE MEASURES

Leak/Spill: Contain the spill.
Prevent entry into drains, sewers, and other waterways.
Wear appropriate protective equipment.
Small amounts may be flushed to sewer with water.
Soak up with an absorbent material.
Place in appropriate container for disposal.
Notify the appropriate authorities as required.

Section 7 : HANDLING AND STORAGE

Handling procedures and equipment: Protect against physical damage.
Avoid breathing vapors/mists.
Wear personal protective equipment appropriate to task.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Avoid extreme temperatures.
Launder contaminated clothing prior to reuse.

Storage requirements: Store away from incompatible materials.
Keep containers closed when not in use.

Section 8 : EXPOSURE CONTROLS / PERSONAL PROTECTION

Precautionary Measures

Gloves/Type:



Wear appropriate gloves.

Respiratory/Type: None required under normal use.

Eye/Type:



Safety glasses recommended.

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.

Exposure limit of material: Not available.

Section 9 : PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid.

Appearance & odor: Odourless.
Pale yellow.

Odor threshold (ppm): Not available.

Vapour pressure @ 20°C (68°F):
(mmHg): 17

Vapour density (air=1): >1

Volatiles (%)

By volume: Not available.

Evaporation rate (butyl acetate = 1): < 1.

Boiling point (°C): 100 (212F)

Freezing point (°C): Not available.

pH: 8.5

Specific gravity @ 20 °C: (water = 1).
1.083

Solubility in water (%): Complete.

Coefficient of water\oil dist.: Not available.

VOC: None

Chemical family: Detergent.

Section 10 : STABILITY AND REACTIVITY

Chemical stability: Product is stable under normal handling and storage conditions.

Conditions of instability: Extreme temperatures.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizing agents.

Hazardous decomposition products: See hazardous combustion products.

Section 11 : TOXICOLOGICAL INFORMATION

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

LC50 of product, species & route: Not available.

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.

Section 12 : ECOLOGICAL INFORMATION

Environmental toxicity: No data at this time.

Environmental fate: No data at this time.

Section 13 : DISPOSAL CONSIDERATIONS

Waste disposal: In accordance with local and federal regulations.

Section 14 : TRANSPORT INFORMATION

D.O.T. CLASSIFICATION: Not regulated.

Special shipping information: Not regulated.

Section 15 : REGULATORY INFORMATION

Canadian Regulatory Information

WHMIS classification: Not controlled.

DSL status: Not available.

USA Regulatory Information

SARA hazard catagories sections 311/312: Immediate (Acute) Health Hazard: No.
Delayed (Chronic) Health Hazard: No.
Fire Hazard: No.
Sudden Release of Pressure: No.
Reactive: No.

SARA Section 313: None

TSCA inventory: All components of this product are listed on the TSCA inventory.

NFPA

Health Hazard: 1

Flammability: 0

Reactivity: 0

HMIS

Health Hazard: 1

Flammability: 0

Physical hazard: 0

PPE: A

Section 16 : OTHER INFORMATION

Supplier MSDS date: 2006/07/14

Data prepared by: Global Safety Management
3340 Peachtree Road, #1800
Atlanta, GA 30326

Phone: 877-683-7460

Fax: (877) 683-7462

Web: www.globalsafetynet.com

Email: info@globalsafetynet.com.

General note: This material safety data sheet was prepared from information obtained from various sources, including product suppliers and the Canadian Center for Occupational Health and Safety.



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Occupational Safety & Health Administration

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Chemical Identification

Chemical Name: BENZENE

CAS #: 71-43-2

UN No: 1114

Formula: C6H6

Synonyms: Benzol; Phenyl hydride

Physical Properties

Physical Description: Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42°F.]

BP: 176°F	MW: 78.1	LEL: 1.2%	NFPA Fire Rating: 3
FRZ/MLT: FRZ: 42°F	VP: 75 mmHg	UEL: 7.8%	NFPA Health Rating: 2
FP: 12°F	VD: NA		NFPA Reactivity Rating: 0
Sp. GR: 0.88	IP: 9.24 eV		NFPA Sp. Inst.: NA

Exposure Limits

OSHA	NIOSH	Related Information
PEL-TWA ppm: 1	REL-TWA ppm: 0.1	AIHA Emergency Response Pl Guidelines - ERPG-1/ERPG-2/50 ppm/150 ppm/1000 ppm
PEL-TWA mg/m3: NA	REL-TWA mg/m3: NA	
PEL-STEL ppm: 5	REL-STEL ppm: 1	
PEL-STEL mg/m3: NA	REL-STEL mg/m3: NA	
PEL-C ppm: NA	REL-C ppm: NA	
PEL-C mg/m3: NA	REL-C mg/m3: NA	Carcinogen Classifications: IA Ca, NTP-K, OSHA-Ca, TLV-A1
Skin Notation: No	Skin Notation: No	
Notes: SEE 29 CFR 1910.1028, FOR INDUSTRIES EXEMPT FROM THIS STANDARD THE PELs ARE LOCATED IN 29 CFR 1910.1000 TABLE Z-2 (8-HR TWA=10 ppm, C=25ppm, PEAK=50ppm FOR A 10 MINUTE INTERVAL DURING AN 8-HOUR SHIFT)	Notes: CARCINOGEN (Ca)	
	IDLH ppm: 500	
	IDLH mg/m3: NA	
	IDLH Notes: Ca	

NIOSH Pocket Guide to Chemical Hazards (Current through June 2006)

Benzene	CAS: 71-43-2
Formula: C6H6	RTECS: CY14000

Synonyms & Trade Names: Benzol, Phenyl hydride			DOT ID & Guide:
Exposure Limits			
NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A		OSHA PEL: [1910.1028] TWA 1 ppm ST 5 ppm F	
IDLH: Ca [500 ppm]		Conversion: 1 ppm = 3.19 mg/m ³	
Physical Description			
Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42F.]			
MW: 78.1	BP: 176F	FRZ: 42F	Sol: 0.07%
VP: 75 mmHg	IP: 9.24 eV	RGasD: NA	Sp.Gr: 0.88
Fl.P: 12F	UEL: 7.8%	LEL: 1.2%	MEC: NA
Class IB Flammable Liquid (See flammable and combustible liquid classes)			
Incompatibilities & Reactivities			
Strong oxidizers, many fluorides & perchlorates, nitric acid			
Measurement Methods			
NIOSH 1500, 1501, 3700, 3800; OSHA 12, 1005			
Personal Protection & Sanitation		First Aid	
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash, Quick drench		Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed (See procedures)	
NIOSH Respirator Recommendations			
NIOSH : SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE (See symbols and codes)			
Exposure Routes			
Inh Abs Ing Con			
Symptoms			
Irrit eyes, skin, nose, resp sys; gidd; head, nau, staggered gait; ftg, anor, lass; dermat; bone marrow depre (See abbreviations)			
Target Organs			
Eyes, skin, resp sys, blood, CNS, bone marrow (See abbreviations)			

DOT Emergency Response Guidebook (ERG 2004)

Guide Number: 130

130 Flammable Liquids (Non-Polar/Water-Immiscible/Noxious)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- * HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- * Vapors may form explosive mixtures with air.
- * Vapors may travel to source of ignition and flash back.
- * Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- * Vapor explosion hazard indoors, outdoors or in sewers.
- * Those substances designated with a P may polymerize explosively when heated or involved in a fire.

- * Runoff to sewer may create fire or explosion hazard.
- * Containers may explode when heated.
- * Many liquids are lighter than water.

HEALTH

- * May cause toxic effects if inhaled or absorbed through skin.
- * Inhalation or contact with material may irritate or burn skin and eyes.
- * Fire will produce irritating, corrosive and/or toxic gases.
- * Vapors may cause dizziness or suffocation.
- * Runoff from fire control or dilution water may cause pollution.

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- * CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
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- * Keep unauthorized personnel away.
- * Stay upwind.
- * Keep out of low areas.
- * Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- * Wear positive pressure self-contained breathing apparatus (SCBA).
- * Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- * Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- * If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE**FIRE**

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.

Small Fires

- * Dry chemical, CO₂, water spray or regular foam.

Large Fires

- * Water spray, fog or regular foam.
- * Do not use straight streams.
- * Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- * Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- * Cool containers with flooding quantities of water until well after fire is out.
- * Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- * ALWAYS stay away from tanks engulfed in fire.
- * For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- * ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- * All equipment used when handling the product must be grounded.
- * Do not touch or walk through spilled material.
- * Stop leak if you can do it without risk.
- * Prevent entry into waterways, sewers, basements or confined areas.
- * A vapor suppressing foam may be used to reduce vapors.

- * Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- * Use clean non-sparking tools to collect absorbed material.

Large Spills

- * Dike far ahead of liquid spill for later disposal.
- * Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- * Move victim to fresh air.
- * Call 911 or emergency medical service.
- * Apply artificial respiration if victim is not breathing.
- * Administer oxygen if breathing is difficult.
- * Remove and isolate contaminated clothing and shoes.
- * In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- * Wash skin with soap and water.
- * Keep victim warm and quiet.
- * Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- * Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

Additional Emergency Response Information (CAMEO Data)

Non-fire Spill Response: Keep sparks, flames, and other sources of ignition away. Keep material out of and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without undue personnel hazard. Use water spray to knock-down vapors. (AAR, 1999)

Firefighting: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Small amount of water may spread fire. Cool all affected containers with flooding quantities of water. Apply water from a distance as possible. Use foam, dry chemical, or carbon dioxide. (AAR, 1999)

Reactivity: CHEMICAL PROFILE: Alkyl chlorides or other alkyl halides will react vigorously with benzene or at minus 70C. in the presence of ethyl aluminum dichloride or ethyl aluminum sesquichloride. Explosions have been reported (NFPA 491M 1991). Benzene ignites in contact with the powdered chromic anhydride (Mellor 11:1 (REACTIVITY, 1999)

First Aid: EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center for advice. Do not use any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop. IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. IMMEDIATELY call a hospital or poison control center for advice if symptoms (such as redness or irritation) develop. IMMEDIATELY transport the victim to a hospital for treatment. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised on the label. CLOTHING: DO NOT INDUCE VOMITING. Volatile chemicals have a high risk of being aspirated into the victim's lungs during vomiting which increases the medical problems. If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call a hospital or poison control center. IMMEDIATELY transport the victim to a hospital. If the victim is convulsing or unconscious, do not give anything by mouth until the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital. OTHER: Since this chemical is a known or suspected carcinogen you should contact a physician for advice regarding the possible long term health effects and proper medical monitoring. Recommendations from the physician will depend upon the specific chemical, physical and toxicity properties, the exposure level, length of exposure, and the route of exposure. (1992)

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Occupational Safety & Health Administration
200 Constitution Avenue, NW
Washington, DC 20210

ATTACHMENT D

**MEC Avoidance and Construction
Support Procedures**

TABLE OF CONTENTS

Section 1	Introduction.....	1-1
	1.1 Introduction.....	1-1
Section 2	UXO team Qualifications and Responsibilities	2-1
	2.1 UXO team	2-1
	2.1.1 UXO team Qualifications	2-1
	2.1.2 Responsibilities	2-1
	2.1.3 Authority.....	2-1
Section 3	On-Site Training.....	3-1
	3.1 On-Site Training	3-1
Section 4	MEC Safety.....	4-1
	4.1 MEC Safety.....	4-1
Section 5	Project Equipment.....	5-1
	5.1 Project Equipment.....	5-1
	5.1.1 Geophysical Sweep Equipment	5-1
	5.1.2 Geophysical Survey Equipment.....	5-1
Section 6	MEC Avoidance Activities.....	6-1
	6.1 Site Access and MEC Clearance Surveying	6-1
	6.2 Clearing and Grubbing.....	6-1
	6.3 Land Surveying	6-1
	6.4 Geophysical Surveying	6-1
	6.5 Sampling and Drilling.....	6-2
	6.5.1 Surface Soil Sampling.....	6-2
	6.5.2 Subsurface Soil Sampling and Monitoring Well Installation	6-2
	6.5.3 Soil Sampling with Direct Push Technology.....	6-3
Section 7	References	7-1

TABLE OF CONTENTS

Acronyms and Abbreviations

ACM	asbestos-containing material
AEDA	Ammunition, Explosives, and other Dangerous Articles
bgs	below ground surface
DDESB	Department of Defense Explosives Safety Board
DoD	Department of Defense
DPT	direct push technology
ECS	explosives-contaminated soil
EODB	Explosive Ordnance Disposal Bulletin
ESS	Explosive Safety Submission
EZ	exclusion zone
FSP	Field Sampling Plan
GPS	geographic position system
HD	Hazard Division
HTRW	hazardous, toxic, radioactive waste
IDW	investigation-derived waste
MC	munitions constituents
MEC	munitions and explosives of concern
MGFD	munition with the greatest fragmentation distance
MSD	minimum separation distance
NEW	net explosive weight
PPE	personal protective equipment
QC	quality control
RVAAP	Ravenna Army Ammunition Plant
SHSO	Site Health and Safety Officer
SSHP	Site Safety and Health Plan
SOP	standard operating procedure
SOW	scope of work
SUXOS	Senior Unexploded Ordnance Supervisor

TABLE OF CONTENTS

UXOQC	Unexploded Ordnance Quality Control officer
UXOSO	Unexploded Ordnance Safety Officer
URS	URS Group, Inc.
USACE	United States Army Corps of Engineers
UXO	unexploded ordnance
WP	work plan

1.1 INTRODUCTION

This Facility-Wide Munitions and Explosives of Concern (MEC) Avoidance and Construction Support Plan discusses surface and subsurface MEC anomaly avoidance procedures and construction support techniques to be used while conducting hazardous, toxic, radioactive waste (HTRW)-related activities during investigative, design, and remedial actions to be completed at Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio. The MEC avoidance and construction support procedures contained in this plan were developed in accordance with the United States Army Corps of Engineers (USACE) EP 75-1-2 “Munitions and Explosives of Concern (MEC) Support During HTRW and Construction Activities” (USACE 2004a). These procedures will be performed and adhered to by all URS Group, Inc. (URS) and subcontractor personnel during HTRW field activities conducted at RVAAP. URS and its subcontractors will work closely with the USACE staff assigned to RVAAP to ensure a safe working environment and to ensure the equipment, supplies, and other resources needed to provide MEC avoidance and MEC construction support are present on-site.

Anomaly avoidance procedures will be utilized during HTRW-related field investigation activities at RVAAP that have the potential for encountering MEC. These activities include, but are not limited to, surface and subsurface soil sampling, boring and drilling. The purpose of avoidance during field activities is to avoid any potential surface MEC and subsurface anomalies during sampling, drilling, investigative, or excavation activities. For anomaly avoidance on site with potential MEC, URS will provide an unexploded ordinance (UXO) escort consisting of a qualified UXO Technician III.

For MEC support during construction activities, URS will provide the appropriate personnel based on the project-specific conditions. When a determination is made by the project management team (USACE and URS) that the probability of encountering MEC is low (e.g., current or previous land use leads to an initial determination that MEC may be present), a two-person UXO team consisting of a minimum of two qualified UXO personnel (one UXO Technician III and one UXO Technician II) will provide on-site UXO standby support in case the construction contractor encounters a suspected MEC item.

No intrusive work will be allowed if a determination is made that the probability of encountering MEC is moderate to high (current or previous land use leads to a determination that MEC was employed or disposed of in the parcel of concern [e.g., open burn and open detonation areas, impact areas, maneuver areas, etc.]). Intrusive anomaly investigation and/or MEC removal is not authorized under the current scope of work (SOW) at RVAAP. If a MEC removal action is authorized at a later date, the policies and procedures for a MEC removal action will be contained in a separate MEC Removal Work Plan (WP).

2.1 UXO TEAM

2.1.1 UXO team Qualifications

MEC avoidance and construction support activities will be completed by URS personnel (and/or subcontract personnel) with UXO Technician training and appropriate documentation, in accordance with Department of Defense Explosives Safety Board (DDESB) Technical Paper 18 (DDESB 2004). The UXO escort must be on-site during all investigative/design HTRW activities in specific areas of RVAAP that have a potential for encountering MEC. For MEC support during construction activities, a two-person UXO team consisting of a minimum of two qualified UXO personnel (one UXO Technician III and one UXO Technician II) will provide on-site UXO standby support in case the construction contractor encounters a suspected MEC item. The team may include additional UXO-qualified personnel, depending on project-specific and task-specific conditions and requirements.

2.1.2 Responsibilities

The UXO team members have the following responsibilities for MEC avoidance and construction support procedures during HTRW field investigations in areas with potential or suspected MEC:

- Provide the ordnance expertise to identify and avoid all possible MEC-related hazards and act as the UXO Safety Officer (UXOSO) for the project during HTRW field activities.
- Conduct a surface access survey and a subsurface survey for anomalies (if applicable).
- Establish and delineate surface MEC or subsurface anomaly-free ingress/egress lanes and work areas.
- Conduct MEC safety briefings for all site personnel and visitors.
- Reporting of all surface and subsurface potential MEC encountered to the appropriate authority for proper response and disposition.
- Work closely with the USACE personnel on all MEC-related matters.

2.1.3 Authority

The designated site UXOSO has final on-site authority on all munitions and MEC matters. The UXOSO will report to and communicate directly with the URS Project Manager.

3.1 ON-SITE TRAINING

As part of the MEC avoidance and construction support process, URS will perform project-specific training for all on-site personnel assigned to MEC avoidance and construction support activities. The purpose of this training is to ensure that all on-site personnel fully understand the operational procedures and methods to be used at RVAAP, including individual duties and responsibilities and all safety and environmental concerns during sampling, investigation and excavation activities. Any personnel arriving at the site after this initial training session will have to complete the training before starting work. The UXOSO will conduct the training, which will include the following topics:

- Field equipment operation, including safety precautions and safety equipment, field inspection of equipment, and maintenance procedures that will be used
- Procedures, guidelines, and requirements in relevant sections of the WP and the SSHP, as they relate to the task being performed
- Site- and task-specific hazards, including physical, biological, and chemical hazards
- Public relations, including encounters with press and public
- Environmental concerns and sensitivities, including endangered/threatened species and historic, archaeological, and cultural resources on-site
- Specific ordnance materials (e.g., MEC, munitions constituents [MC], explosive soil) potentially found on-site
- Emergency procedures and contact information for RVAAP

4.1 MEC SAFETY

If MEC is encountered during any phase of work on RVAAP, the URS Project Manager, URS Health and Safety Representative, URS UXO Safety/Quality Control (QC) Manager, URS UXO Program Safety Manager, and the USACE Site Safety Representative will immediately be notified (USACE 2004b). In general, the following MEC safety protocols will be followed:

- The cardinal principle to be observed involving ordnance, explosives, ammunition, severe fire hazards, or toxic materials is to limit the exposure to a minimum number of personnel, for the minimum amount of time, to a minimum amount of hazardous material consistent with a safe and efficient operation.
- The age or condition of a MEC item does not decrease the effectiveness. MEC that has been exposed to the elements for an extended period of time becomes more sensitive to shock, movement, and friction because the stabilizing agent in the explosives may be degraded.
- Consider MEC that has been exposed to fire as extremely hazardous. Chemical and physical changes to the contents may have occurred that render it more sensitive than it was in its original state.
- DO NOT touch or move any ordnance items regardless of the markings or apparent condition.
- DO NOT visit a MEC site if an electrical storm is occurring or approaching. If a storm approaches during a site visit or during site operations, leave the site immediately and seek shelter.
- DO NOT use radio or cellular phones in the vicinity of suspect MEC items.
- DO NOT drive vehicles into a suspected MEC area; use clearly marked lanes.
- DO NOT carry matches, cigarettes, lighters or other flame-producing devices onto the RVAAP.
- Always assume MEC items contain a live charge until determined otherwise.
- DO NOT touch, move, or jar any MEC item, regardless of its apparent condition.
- DO NOT be misled by markings on the MEC item stating “practice bomb,” “dummy,” or “inert.” Even practice bombs have explosive charges that are used to mark and/or spot the point of impact; or the item could be marked incorrectly.

5.1 PROJECT EQUIPMENT

Project equipment for MEC avoidance and construction support will come from URS sources, subcontractors, and local vendors offering equipment for lease or purchase. All equipment, regardless of source, will be inspected to ensure completeness and operational readiness. Any equipment found damaged or defective will be repaired or returned for replacement. All instruments and equipment that require routine maintenance and/or calibration will be inspected initially upon arrival and then periodically as required in the Facility-Wide WP or manufacturer's equipment manual. Equipment required for daily usage shall be calibrated twice daily (start and finish). This system of checks ensures that the equipment on-site is functioning properly. If an equipment check indicates that any piece of equipment is not operating correctly and field repair cannot immediately be accomplished, the equipment will be removed from service until it can be repaired. Alternately, the equipment may be replaced with a like model or an approved substitute. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service. Key safety equipment will have an operational backup on site.

5.1.1 Geophysical Sweep Equipment

The use of geophysical sweep equipment will depend on the local area of the sweep and the intended work to be conducted in that area. If the area is to be investigated only on foot, it may suffice to conduct only a detector-aided visual search of the area. If vehicular traffic is expected, the site will require a geophysical sweep for shallow subsurface anomalies (to a depth of 4 feet). For the purpose of MEC and anomaly avoidance, the following geophysical equipment will be utilized.

- For a geophysical sweep of an area, either the Schonstedt GA-52Cx or the GA-72Cd will be utilized. These units can be expected to detect subsurface ferrous anomalies to a depth of 4 feet.
- Additionally, a White's Spectrum XLT all-metals detector may be utilized. This unit can be expected to detect subsurface ferrous and non-ferrous anomalies to a depth of 18 to 24 inches.
- For downhole surveillance, either the Schonstedt MG 220/230 or the MK26 Forrester will be utilized. The use of the MK26 will depend on the diameter of the borehole. If direct push technology (DPT) is used, then the Schonstedt MG 220/230 will be used. The MK 26 will not fit inside the typical direct push borehole (e.g., 1 to 1.5 inches outer diameter).

5.1.2 Geophysical Survey Equipment

(The use of Geophysical Survey Equipment is not applicable to this project)

This section discusses MEC avoidance and clearance activities to be used at RVAAP.

6.1 SITE ACCESS AND MEC CLEARANCE SURVEYING

In areas with potential MEC, the UXO escort will conduct a magnetometer-assisted surface clearance access survey and/or a subsurface survey for anomalies before any activities (e.g., site visits or field investigations) commence, including foot and vehicular traffic. Geophysical instrumentation capable of detecting the smallest known or anticipated MEC will be used to locate anomalies just below the surface that may be encountered through erosion from rain or continual vehicular traffic. The subsurface surveys (to a depth of 4 feet below ground surface [bgs]) need only be conducted when the use of motor vehicles is anticipated. If only foot traffic is required, then a surface clearance and access survey (to a depth of 2 feet bgs) will suffice.

HTRW personnel must be escorted by UXO-qualified personnel at all times in areas potentially impacted with MEC until the team has completed the access surveys and the cleared areas are marked. Escorted HTRW personnel will follow behind the UXO escort. If anomalies are detected, the UXO escort will halt escorted personnel in place, select a course around the item, and instruct escorted personnel to follow. No personnel will be allowed outside of the surveyed and cleared areas.

The UXO team will conduct an access survey of the footpath and/or vehicular lanes approaching and leaving HTRW areas with known or suspected MEC. The access route shall be at least twice as wide as the widest vehicle that will use the route. The route shall be clearly marked with flagging or stakes for future entry.

UXO personnel must also complete an access survey of an area around the proposed investigation site that is large enough to support all planned operations. The size of the surveyed area will be project-specific and will take into account, for example, maneuverability of required equipment (e.g., drill rigs, excavation equipment, etc.), parking of support vehicles, and establishment of decontamination stations. At a minimum, the surveyed area should have a dimension in all directions equal to twice the length of the longest vehicle or piece of equipment to be brought on-site and clearly delineated with flagging or stakes.

6.2 CLEARING AND GRUBBING

This section is not applicable to this project.

6.3 LAND SURVEYING

This section is not applicable to this project.

6.4 GEOPHYSICAL SURVEYING

This section is not applicable to this project.

6.5 SAMPLING AND DRILLING

6.5.1 Surface Soil Sampling

The following paragraphs describe anomaly avoidance procedures for surface soil sampling (between 0 and 12 inches bgs) in areas with potential MEC. Soil sampling at depths greater than 12 inches bgs will follow the procedures in **Section 6.5.2** of this plan.

The team will visually survey the surface of each proposed surface soil sampling site for any indication of MEC or MEC-related contamination. In addition, the team will conduct a survey of the proposed sample locations using hand-held magnetometers.

If anomalies or evidence of explosive contamination are detected at a proposed sampling location or too many anomalies are detected in a general area of interest, the HTRW personnel will select an alternate location for collection of surface soil samples. Any anomalies detected will be prominently marked with survey flagging or non-metallic pin flags for avoidance during HTRW sampling activities.

6.5.2 Subsurface Soil Sampling and Monitoring Well Installation

The following paragraphs describe anomaly avoidance procedures for subsurface soil sampling in an area with potential MEC. Subsurface soil sampling is defined as the collection of samples below a nominal depth of approximately 12 inches with a split-spoon, Shelby tube, direct push sampler, or bucket auger (i.e., hand auger) soil sampler using drilling techniques. Drilling techniques will also be used to drill larger diameter soil borings (e.g., 4- to 8-inch outer diameter) for HTRW investigations.

The team will conduct a surface clearance and access survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in **Section 6.1**.

The team will complete a hand-held, magnetometer-assisted, subsurface survey of the proposed drill-hole location(s) to a depth of 4 feet. If an anomaly is detected, sampling personnel will select a new borehole location. Any anomalies detected will be prominently marked with survey flagging or non-metallic pin flags for avoidance. If the subsurface sampling depth is greater than the geophysical instrumentation (e.g. hand-held magnetometer) detection capabilities, the team must incrementally complete the downhole geophysical survey to undisturbed soil depth as outlined below.

Underground Utilities

This section is not applicable to this project.

Pilot Hole and Incremental Geophysical Survey for Conventional MEC Clearance

This Section is not applicable to this project.

Test Pits for Non-Conventional MEC Clearance

This section is not applicable to this project.

6.5.3 Soil Sampling with Direct Push Technology

The following paragraphs describe anomaly avoidance procedures for soil sampling and use of DPT in areas with potential MEC. Soil sampling with DPT typically involves manual or mechanical penetration at the desired location, followed by withdrawal and collection of a soil sample.

The team will conduct a surface clearance and access clearance survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in **Section 6.1**.

Soil sampling and DPT installations will follow the same anomaly-avoidance procedures as described previously for subsurface soil sampling (i.e., incremental downhole geophysical survey for metallic anomalies). However, the actual sampling and geophysical screening will occur through the DPT borehole. Following collection of the soil samples, the sampling location will be backfilled in accordance with project-specific procedures.

- Department of the Army (DA). 1978. Decontamination of Facilities and Equipment. Technical Bulletin 700-4. October.
- Department of Defense (DoD). 1995. Defense Demilitarization Manual. DoD 4160.21-M-1. February.
- Department of Defense Explosives Safety Board (DDESB). 2004. Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel. DDESB Technical Paper 18. December.
- DDESB. 1998. Guidance of Clearance Plans. Memorandum. February.
- DoD. 1997. Defense Materiel Disposition Manual. DoD 4160.21-M August
- DoD. 2004. DoD Ammunition and Explosives Safety Standards. Directive 6055.9-STD. October.
- DoD. 2004a. Management and Disposition of Material Potentially Presenting an Explosive Hazard (MPPEH). DoD 4140.62. December.
- Explosive Ordnance Disposal Bulletin (EODB). 2002. General Information on EOD Disposal Procedures. TM 60A-1-1-31. January
- United States Army Corps of Engineers (USACE). 1998. Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions. Report HNC-ED-CS-S-98-7. August.
- USACE. 2000. Ordnance and Explosives Response. USACE Engineering Pamphlet EP 1110-1-18. April.
- USACE. 2004a. Munitions and Explosives of Concern (MEC) Support during HTRW and Construction Activities. USACE Engineering Pamphlet EP 75-1-2. August.
- USACE. 2004b. Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations. USACE Engineering Pamphlet EP 385-1-95a. August.

ATTACHMENT E

RVAAP Reporting Forms

DAILY SAFETY INSPECTION

PROJECT: _____

		Portable electrical equipment double insulated or plugged to a GFCI
		Electrical wiring covered by insulation or enclosure
		Three wire, UL approved, extension cords used
		Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, work areas clear of objects that might fall on employees)
		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
		Excavations deeper than 5 feet shored or sloped (if personnel will enter) and in compliance with SSHP
		Moving (rotating) machinery guarded to prevent employee contact
		Fall protection provided for work at elevations greater than 4 feet
		All containers of hazardous material labeled to indicate contents and hazards
		MSDSs for hazardous materials on site
		If work is conducted in areas open to hunting (and during season) high visibility vests and other alerting systems such as lights, noise devices (radios) in use
		15-minute eyewash (accessible and full) within 100 feet of areas where corrosive sample preservatives are poured
		Potable and non-potable water labeled
		Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
		Visitor access controlled
		Site hazards and controls consistent with SSHP
		Site hazard controls appropriate and sufficient

Actions taken to correct or control any "N" responses

Name

Signature

Date

DAILY SAFETY INSPECTION

PROJECT: _____

Page 1 of 2

N	Y	NA	Item
			Daily safety briefing conducted
			Emergency numbers and route to hospital posted
			SSHP onsite, available to employees, and complete
			Required exposure monitoring conducted and documented
			Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented
			First aid kit available and inspected weekly
			Personnel wearing PPE required by SSHP for field work (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)
			Personnel using buddy system (maintain visual or verbal contact and able to render aid)
			If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek are being monitored, work/rest cycle in SSHP being followed
			If temperature <40°F: cold stress training conducted, controls in SSHP implemented
			Personnel using appropriate biological hazard controls (See SSHP)
			Drill rig operating manual on site
			Drill rigs inspected weekly and documented
			Personnel near drill rig or other overhead hazards wearing hardhats
			Each of two drill rig kill switches tested daily
			Employees excluded from under lifted loads
			Unnecessary personnel excluded from hazardous areas, specifically near drill rigs
			Radius of exclusion zone around drill rig at least equal to mast height
			Personnel wearing hearing protection when within 25 feet of drill rigs, generators, or other noisy equipment
			Containers of flammable liquids closed and labeled properly
			Fully charged fire extinguisher available 25 to 50 feet from flammables storage area and inspected monthly
			Personnel exiting potentially contaminated areas washing hands and face before eating
			Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranex or rainsuit

DAILY HEALTH AND SAFETY SUMMARY
PROJECT NAME: PROJECT NO:

NAME: DATE: M Tu W Th F Sa Su TIME:

TASKS PERFORMED:

OFF-NORMAL EVENTS:

<i>(For Safety Staff only)</i>	REPORT NO	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT <i>(For Use of this Form See Attached Instructions and USACE Suppl to AR 385-40)</i>			REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)
1 ACCIDENT CLASSIFICATION						
PERSONNEL CLASSIFICATION		INJURY/ILLNESS/FATAL		PROPERTY DAMAGE		MOTOR VEHICLE INVOLVED
<input type="checkbox"/> CIVILIAN <input type="checkbox"/> MILITARY		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		<input type="checkbox"/>
<input type="checkbox"/> CONTRACTOR		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		<input type="checkbox"/>
<input type="checkbox"/> PUBLIC		<input type="checkbox"/> FATAL <input type="checkbox"/> OTHER		PROPERTY DAMAGE		MOTOR VEHICLE INVOLVED
2 PERSONAL DATA						
a. NAME (Last,First,MI)		b. AGE	c. SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE	d. SOCIAL SECURITY NUMBER		e. GRADE
f. JOB SERIES/TITLE		g. DUTY STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ON DUTY <input type="checkbox"/> TDY <input type="checkbox"/> OFF DUTY		i. EMPLOYMENT STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ARMY ACTIVE <input type="checkbox"/> ARMY RESERVE <input type="checkbox"/> VOLUNTEER <input type="checkbox"/> PERMANENT <input type="checkbox"/> FOREIGN NATIONAL <input type="checkbox"/> SEASONAL <input type="checkbox"/> TEMPORARY <input type="checkbox"/> STUDENT <input type="checkbox"/> OTHER (Specify) _____		
3 GENERAL INFORMATION						
a. DATE OF ACCIDENT (month/day/year)	b. TIME OF ACCIDENT (Military time)	c. EXACT LOCATIONS OF ACCIDENT			d. CONTRACTOR'S NAME	
e. CONTRACT NUMBER <input type="checkbox"/> CIVIL WORKS <input type="checkbox"/> MILITARY <input type="checkbox"/> OTHER (Specify)		f. TYPE OF CONTRACT <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> SERVICE <input type="checkbox"/> A/E <input type="checkbox"/> DREDGE <input type="checkbox"/> OTHER (Specify)		g. HAZARDOUS/TOXIC WASTE ACTIVITY <input type="checkbox"/> SUPERFUND <input type="checkbox"/> DERP <input type="checkbox"/> IRP <input type="checkbox"/> OTHER (Specify)		(1) PRIME (2) SUBCONTRACTOR
4 CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see instructions)						
a. CONSTRUCTION ACTIVITY (CODE)				b. TYPE OF CONSTRUCTION EQUIPMENT (CODE)		
#				#		
5 INJURY/ILLNESS INFORMATION (Include name on line and corresponding code number in box for items e, f, & g - see instructions)						
a. SEVERITY OF ILLNESS/INJURY (CODE)			b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY	
#						
e. BODY PART AFFECTED (CODE)			g. TYPE AND SOURCE OF INJURY/ILLNESS (CODE)			
PRIMARY #			TYPE #			
SECONDARY #			SOURCE #			
f. NATURE OF ILLNESS/INJURY (CODE)						
#						
6 PUBLIC FATALITY (Fill in line and corresponding code number in box - see instructions)						
a. ACTIVITY AT TIME OF ACCIDENT (CODE)			b. PERSONAL FLOTATION DEVICE USED?			
#			<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			
7 MOTOR VEHICLE ACCIDENT						
a. TYPE OF VEHICLE		b. TYPE OF COLLISION			c. SEAT BELTS	
<input type="checkbox"/> PICKUP/VAN <input type="checkbox"/> AUTOMOBILE <input type="checkbox"/> TRUCK <input type="checkbox"/> OTHER (Specify)		<input type="checkbox"/> SIDE SWIPE <input type="checkbox"/> HEAD ON <input type="checkbox"/> REAR END <input type="checkbox"/> BROADSIDE <input type="checkbox"/> ROLL OVER <input type="checkbox"/> BACKING <input type="checkbox"/> OTHER (Specify)			USED NOT USED NOT AVAILABLE (1) FRONT SEAT (2) REAR SEAT	
8 PROPERTY/MATERIAL INVOLVED						
a. NAME OF ITEM		b. OWNERSHIP			c. \$ AMOUNT OF DAMAGE	
(1)						
(2)						
(3)						
9 VESSEL/FLOATING PLANT ACCIDENT (Fill in line and corresponding code number in box from list. See instructions)						
a. TYPE OF VESSEL/FLOATING PLANT (CODE)				b. TYPE OF COLLISION/MISHAP (CODE)		
#				#		
10 ACCIDENT DESCRIPTION (Use additional paper, if necessary)						

11 CAUSAL FACTOR(S) (Read Instruction Before Completing)					
<p>a. (Explain YES answers in item 13)</p> <p>DESIGN Was design of facility workplace or equipment a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>INSPECTION MAINTENANCE Were inspection and maintenance procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>PERSON'S PHYSICAL CONDITION In your opinion, was the physical condition of the person a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>OPERATING PROCEDURES Were operating procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>JOB PRACTICES Were any job safety/health practices not followed when the accident occurred? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>HUMAN FACTORS Did any human factors such as size or strength of person, etc. contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>ENVIRONMENTAL FACTORS Did heat, cold, dust, sun, glare, etc. contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>					
<p>a. (CONTINUED)</p> <p>CHEMICAL AND PHYSICAL AGENT FACTORS Did exposure to chemical agents, such as dust, fumes, mists, vapors, or physical agents such as noise, radiation, etc. contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>OFFICE FACTORS Did office setting such as lifting office furniture, carrying, stooping, etc. contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>SUPPORT FACTORS Were inappropriate tools/resources provided to properly perform the activity/task? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>PERSONAL PROTECTIVE EQUIPMENT Did the improper selection, use, or maintenance of personal protective equipment contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>DRUGS/ALCOHOL In your opinion was drugs or alcohol a factor to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>			<p>b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?</p> <p><input type="checkbox"/> YES (If yes, attach a copy) <input type="checkbox"/> NO</p>		

12 TRAINING		
<p>a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>b. TYPE OF TRAINING</p> <p><input type="checkbox"/> CLASSROOM <input type="checkbox"/> ON JOB</p>	<p>c. DATE OF MOST RECENT FORMAL TRAINING</p> <p>(Month) / (Day) / (Year)</p>

13 FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES (See instruction for definition of direct and indirect causes) (Use additional paper, if necessary)	
a. DIRECT CAUSE	
b. INDIRECT CAUSE(S)	

14 ACTION(S) TAKEN ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S)	
DESCRIBE FULLY	

15 DATES FOR ACTIONS IDENTIFIED IN BLOCK 14					
a. BEGINNING (Month/Day/Year) / /			b. ANTICIPATED COMPLETION (Month/Day/Year) / /		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT		d. DATE (Mo/Da/Yr)	e. ORGANIZATION IDENTIFIER (Div. Br. Sect.)		f. OFFICE SYMBOL
CORPS _____		____ / ____ / ____	_____		_____
SUBCONTRACTOR _____		____ / ____ / ____	_____		_____

16 MANAGEMENT REVIEW (1st)		
a. <input type="checkbox"/> CONCUR	b. <input type="checkbox"/> NON CONCUR	c. COMMENTS
SIGNATURE	TITLE	DATE

17 MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)		
a. <input type="checkbox"/> CONCUR	b. <input type="checkbox"/> NON CONCUR	c. COMMENTS
SIGNATURE	TITLE	DATE

18 SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW		
a. <input type="checkbox"/> CONCUR	b. <input type="checkbox"/> NON CONCUR	c. ADDITIONAL ACTIONS/COMMENTS
SIGNATURE	TITLE	DATE

19 COMMAND APPROVAL	
COMMENTS	
COMMANDER SIGNATURE	DATE

GENERAL. Complete a separate report for each person who was *injured, caused, or contributed* to the accident (excluding uninjured personnel and witnesses). Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs (OWCP) shall be at the discretion of the FOA Commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16 and 17.

INSTRUCTIONS FOR SECTION 1 — ACCIDENT

CLASSIFICATION. (Mark All Boxes That Are Applicable.)

- a. **GOVERNMENT.** Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.
 - (1) **INJURY/ILLNESS/FATALITY**—Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 (injury), CA-2 (illness), or CA-6 (fatality) to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.
 - (2) **PROPERTY DAMAGE**—Mark the appropriate box if accident resulted in any damage of \$1000 or more to government property (including motor vehicles).
 - (3) **VEHICLE INVOLVED**—Mark if accident involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
 - (4) **DIVING ACTIVITY**—Mark if the accident involved an in-house USACE diving activity.
- b. **CONTRACTOR.**
 - (1) **INJURY/ILLNESS/FATALITY**—Mark if accident resulted in any contractor lost-time injury/illness or fatality.
 - (2) **PROPERTY DAMAGE**—Mark the appropriate box if accident resulted in any damage of \$1000 or more to contractor property (including motor vehicles).
 - (3) **VEHICLE INVOLVED**—Mark if accident involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
 - (4) **DIVING ACTIVITY**—Mark if the accident involved a USACE Contractor diving activity.
- c. **PUBLIC.**
 - (1) **INJURY/ILLNESS/FATALITY**—Mark if accident resulted in public fatality or permanent total disability. (The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander).
 - (2) **VOID SPACE**—Make no entry.
 - (3) **VEHICLE INVOLVED**—Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS/FATALITY" is marked.
 - (4) **VOID SPACE**—Make no entry.

INSTRUCTIONS FOR SECTION 2 — PERSONAL DATA

- a. **NAME**—(MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS). Enter last name, first name, middle initial of person involved.
- b. **AGE**—Enter age.
- c. **SEX**—Mark appropriate box.
- d. **SOCIAL SECURITY NUMBER**—(FOR GOVERNMENT PERSONNEL ONLY) Enter the social security number (or other personal identification number if no social security number issued).
- e. **GRADE**—(FOR GOVERNMENT PERSONNEL ONLY) Enter pay grade. Example: O-6; E-7; WG-8; WS-12; GS-11; etc.
- f. **JOB SERIES/TITLE**—For *government civilian employees* enter the pay plan, full series number, and job title, e.g., GS-0810/Civil

Engineer. For *military personnel* enter the primary military occupational specialty (PMOS), e.g., 15A40 or 11G50. For *contractor employees* enter the job title assigned to the injured person, e.g., carpenter, laborer, surveyor, etc.

- g. **DUTY STATUS**—Mark the appropriate box.
 - (1) **ON DUTY**—Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.
 - (2) **TDY**—Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.
 - (3) **OFF DUTY**—Person was not on official business at time of accident.
- h. **EMPLOYMENT STATUS**—(FOR GOVERNMENT PERSONNEL ONLY) Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTIONS FOR SECTION 3 — GENERAL INFORMATION

- a. **DATE OF ACCIDENT**—Enter the month, day, and year of accident.
- b. **TIME OF ACCIDENT**—Enter the local time of accident in military time. Example: 1430 hrs (not 2:30 p.m.).
- c. **EXACT LOCATION OF ACCIDENT**—Enter facts needed to locate the accident scene (installation/project name, building number, street, direction, and distance from closest landmark, etc.).
- d. **CONTRACTOR NAME**
 - (1) **PRIME**—Enter the exact name (title of firm) of the prime contractor.
 - (2) **SUBCONTRACTOR**—Enter the name of any subcontractor involved in the accident.
- e. **CONTRACT NUMBER**—Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.
- f. **TYPE OF CONTRACT**—Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.
- g. **HAZARDOUS/TOXIC WASTE ACTIVITY (HTW)**—Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program (IRP) HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site (FUDS) activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4 — CONSTRUCTION ACTIVITIES

- a. **CONSTRUCTION ACTIVITY**—Select the *most appropriate* construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

- | | |
|-------------------------|----------------------------|
| 1. MOBILIZATION | 14. ELECTRICAL |
| 2. SITE PREPARATION | 15. SCAFFOLDING/ACCESS |
| 3. EXCAVATION/TRENCHING | 16. MECHANICAL |
| 4. GRADING (EARTHWORK) | 17. PAINTING |
| 5. PIPING/UTILITIES | 18. EQUIPMENT/MAINTENANCE |
| 6. FOUNDATION | 19. TUNNELING |
| 7. FORMING | 20. WAREHOUSING/STORAGE |
| 8. CONCRETE PLACEMENT | 21. PAVING |
| 9. STEEL ERECTION | 22. FENCING |
| 10. ROOFING | 23. SIGNING |
| 11. FRAMING | 24. LANDSCAPING/IRRIGATION |
| 12. MASONRY | 25. INSULATION |
| 13. CARPENTRY | 26. DEMOLITION |

b. TYPE OF CONSTRUCTION EQUIPMENT—Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER," and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

- | | |
|---------------------------------------|-----------------------------------|
| 1. GRADER
HIGHWAY) | 13. DUMP TRUCK (OFF |
| 2. DRAGLINE | 14. TRUCK (OTHER) |
| 3. CRANE (ON VESSEL/BARGE) | 15. FORKLIFT |
| 4. CRANE (TRACKED) | 16. BACKHOE |
| 5. CRANE (RUBBER TIRE) | 17. FRONT-END LOADER |
| 6. CRANE (VEHICLE MOUNTED) | 18. PILE DRIVER |
| 7. CRANE (TOWER) | 19. TRACTOR (UTILITY) |
| 8. SHOVEL | 20. MANLIFT |
| 9. SCRAPER | 21. DOZER |
| 10. PUMP TRUCK (CONCRETE) | 22. DRILL RIG |
| 11. TRUCK (CONCRETE/TRANSIT
MIXER) | 23. COMPACTOR/VIBRATORY
ROLLER |
| 12. DUMP TRUCK (HIGHWAY) | 24. OTHER |

INSTRUCTIONS FOR SECTION 5—INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY/ILLNESS—Reference para 2-10 of USACE Suppl 1 to AR 385-40 and enter code and description from list below.

- | | |
|-----|---|
| NOI | NO INJURY |
| FAT | FATALITY |
| PTL | PERMANENT TOTAL DISABILITY |
| PPR | PERMANENT PARTIAL DISABILITY |
| LWD | LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK |
| NLW | RECORDABLE CASE WITHOUT LOST WORKDAYS |
| RFA | RECORDABLE FIRST AID CASE |
| NRI | NON-RECORDABLE INJURY |

- b. ESTIMATED DAYS LOST—Enter the estimated number of workdays the person will lose from work.
- c. ESTIMATED DAYS HOSPITALIZED—Enter the estimated number of workdays the person will be hospitalized.
- d. ESTIMATED DAYS RESTRICTED DUTY—Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.
- e. BODY PART AFFECTED—Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA CODE BODY PART NAME

- | | | |
|--------------------------------|----|---------------------|
| ARM/WRIST | AB | ARM AND WRIST |
| | AS | ARM OR WRIST |
| TRUNK, EXTERNAL
MUSCULATURE | B1 | SINGLE BREASTS |
| | B2 | BOTH BREASTS |
| | B3 | SINGLE TESTICLE |
| | B4 | BOTH TESTICLES |
| | BA | ABDOMEN |
| | BC | CHEST |
| | BL | LOWER BACK |
| | BP | PENIS |
| | BS | SIDE |
| | BU | UPPER BACK |
| | BW | WAIST |
| | BZ | TRUNK OTHER |
| HEAD, INTERNAL | C1 | SINGLE EAR INTERNAL |
| | C2 | BOTH EARS INTERNAL |
| | C3 | SINGLE EYE INTERNAL |
| | C4 | BOTH EYES INTERNAL |
| | CB | BRAIN |
| | CC | CRANIAL BONES |
| | CD | TEETH |
| | CJ | JAW |

ELBOW

FINGER

TOE

HEAD, EXTERNAL

KNEE

LEG, HIP, ANKLE,
BUTTOCK

HAND

FOOT

TRUNK, BONES

SHOULDER

THUMB

TRUNK, INTERNAL ORGANS

- | | |
|----|------------------------------------|
| CL | THROAT, LARYNX |
| CM | MOUTH |
| CN | NOSE |
| CR | THROAT, OTHER |
| CT | TONGUE |
| CZ | HEAD OTHER INTERNAL |
| EB | BOTH ELBOWS |
| ES | SINGLE ELBOW |
| F1 | FIRST FINGER |
| F2 | BOTH FIRST FINGERS |
| F3 | SECOND FINGER |
| F4 | BOTH SECOND FINGERS |
| F5 | THIRD FINGER |
| F6 | BOTH THIRD FINGERS |
| F7 | FOURTH FINGER |
| F8 | BOTH FOURTH FINGERS |
| G1 | GREAT TOE |
| G2 | BOTH GREAT TOES |
| G3 | TOE OTHER |
| G4 | TOES OTHER |
| H1 | EYE EXTERNAL |
| H2 | BOTH EYES EXTERNAL |
| H3 | EAR EXTERNAL |
| H4 | BOTH EARS EXTERNAL |
| HC | CHIN |
| HF | FACE |
| HK | NECK/THROAT |
| HM | MOUTH/LIPS |
| HN | NOSE |
| HS | SCALP |
| KB | BOTH KNEES |
| KS | KNEE |
| LB | BOTH LEGS/HIPS/
ANKLES/BUTTOCKS |
| LS | SINGLE LEG/HIP/
ANKLE/BUTTOCK |
| MB | BOTH HANDS |
| MS | SINGLE HAND |
| PB | BOTH FEET |
| PS | SINGLE FOOT |
| R1 | SINGLE COLLAR BONE |
| R2 | BOTH COLLAR BONES |
| R3 | SHOULDER BLADE |
| R4 | BOTH SHOULDER BLADES |
| RB | RIB |
| RS | STERNUM (BREAST BONE) |
| RV | VERTEBRAE (SPINE, DISC) |
| RZ | TRUNK BONES OTHER |
| SB | BOTH SHOULDERS |
| SS | SINGLE SHOULDER |
| TB | BOTH THUMBS |
| TS | SINGLE THUMB |
| V1 | LUNG, SINGLE |
| V2 | LUNGS, BOTH |
| V3 | KIDNEY, SINGLE |
| V4 | KIDNEYS, BOTH |
| VH | HEART |
| VL | LIVER |
| VR | REPRODUCTIVE ORGANS |
| VS | STOMACH |
| VV | INTESTINES |
| VZ | TRUNK, INTERNAL; OTHER |

f. NATURE OF INJURY/ILLNESS—Select the most appropriate nature of injury/illness from the list below. This nature of injury/illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury/illness name on the line and place the corresponding CODE letters in the box provided.

CODE SOURCE OF INJURY NAME

0200 ENVIRONMENTAL CONDITION
0210 TEMPERATURE EXTREME (INDOOR)
0220 WEATHER (ICE, RAIN, HEAT, ETC.)
0230 FIRE, FLAME, SMOKE (NOT TOBACCO)
0240 NOISE
0250 RADIATION
0260 LIGHT
0270 VENTILATION
0271 TOBACCO SMOKE
0280 STRESS (EMOTIONAL)
0290 CONFINED SPACE
0300 MACHINE OR TOOL
0310 HAND TOOL (POWERED: SAW, GRINDER, ETC.)
0320 HAND TOOL (NONPOWERED)
0330 MECHANICAL POWER TRANSMISSION APPARATUS
0340 GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK)
0350 VIDEO DISPLAY TERMINAL
0360 PUMP, COMPRESSOR, AIR PRESSURE TOOL
0370 HEATING EQUIPMENT
0380 WELDING EQUIPMENT
0400 VEHICLE
0411 AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE
0412 AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE
0421 DRIVER OF GOVERNMENT VEHICLE
0422 PASSENGER OF GOVERNMENT VEHICLE
0430 COMMON CARRIER (AIRLINE, BUS, ETC.)
0440 AIRCRAFT (NOT COMMERCIAL)
0450 BOAT, SHIP, BARGE
0500 MATERIAL HANDLING EQUIPMENT
0510 EARTHMOVER (TRACTOR, BACKHOE, ETC.)
0520 CONVEYOR (FOR MATERIAL AND EQUIPMENT)
0530 ELEVATOR, ESCALATOR, PERSONNEL HOIST
0540 HOIST, SLING CHAIN, JACK
0550 CRANE
0551 FORKLIFT
0560 HANDTRUCK, DOLLY
0600 DUST, VAPOR, ETC.
0610 DUST (SILICA, COAL, ETC.)
0620 FIBERS
0621 ASBESTOS
0630 GASES
0631 CARBON MONOXIDE
0640 MIST, STEAM, VAPOR, FUME
0641 WELDING FUMES
0650 PARTICLES (UNIDENTIFIED)
0700 CHEMICAL, PLASTIC, ETC.
0711 DRY CHEMICAL-CORROSIVE
0712 DRY CHEMICAL-TOXIC
0713 DRY CHEMICAL-EXPLOSIVE
0714 DRY CHEMICAL-FLAMMABLE
0721 LIQUID CHEMICAL-CORROSIVE
0722 LIQUID CHEMICAL-TOXIC
0723 LIQUID CHEMICAL-EXPLOSIVE
0724 LIQUID CHEMICAL-FLAMMABLE
0730 PLASTIC
0740 WATER
0750 MEDICINE
0800 INANIMATE OBJECT
0810 BOX, BARREL, ETC.
0820 PAPER
0830 METAL ITEM, MINERAL
0831 NEEDLE
0840 GLASS
0850 SCRAP, TRASH
0860 WOOD
0870 FOOD
0880 CLOTHING, APPAREL, SHOES
0900 ANIMATE OBJECT
0911 DOG
0912 OTHER ANIMAL
0920 PLANT
0930 INSECT
0940 HUMAN (VIOLENCE)

0950 HUMAN (COMMUNICABLE DISEASE)
0960 BACTERIA, VIRUS (NOT HUMAN CONTACT)

CODE SOURCE OF INJURY NAME

1000 PERSONAL PROTECTIVE EQUIPMENT
1010 PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
1020 RESPIRATOR, MASK
1021 DIVING EQUIPMENT
1030 SAFETY BELT, HARNESS
1040 PARACHUTE

INSTRUCTIONS FOR SECTION 6—PUBLIC FATALITY

- a. **ACTIVITY AT TIME OF ACCIDENT**—Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box if the activity performed is not identified on the list. Select from the most appropriate primary activity area (water related, non-water related or other activity), the code number for "Other," and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

- | | |
|-----------------------------------|---|
| 1. Sailing | 9. Swimming/designated area |
| 2. Boating - powered | 10. Swimming/other area |
| 3. Boating -unpowered | 11. Underwater activities (skin diving scuba, etc.) |
| 4. Water skiing | 12. Wading |
| 5. Fishing from boat | 13. Attempted rescue |
| 6. Fishing from bank dock or pier | 14. Hunting from boat |
| 7. Fishing while wading | 15. Other |
| 8. Swimming/supervised area | |

NON-WATER RELATED RECREATION

- | | |
|--|--|
| 16. Hiking and walking | 23. Sports/summer (baseball, football, etc.) |
| 17. Climbing (general) | 24. Sports/winter (skiing, sledding, snowmobiling, etc.) |
| 18. Camping/picnicking authorized area | 25. Cycling (bicycle, motorcycle, scooter) |
| 19. Camping/picnicking unauthorized area | 26. Gliding |
| 20. Guided tours | 27. Parachuting |
| 21. Hunting | 28. Other non-water related |
| 22. Playground equipment | |

OTHER ACTIVITIES

- | | |
|--|----------------------------------|
| 29. Unlawful acts (fights, riots, vandalism, etc.) | 33. Sleeping |
| 30. Food preparation/serving | 34. Pedestrian struck by vehicle |
| 31. Food consumption | 35. Pedestrian other acts |
| 32. Housekeeping | 36. Suicide |
| | 37. "Other" activities |

- b. **PERSONAL FLOTATION DEVICE USED**—If fatality was water-related was the victim wearing a personal flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7—MOTOR VEHICLE ACCIDENT

- a. **TYPE OF VEHICLE**—Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.
- b. **TYPE OF COLLISION**—Mark appropriate box.
- c. **SEAT BELT**—Mark appropriate box.

INSTRUCTIONS FOR SECTION 8—PROPERTY/MATERIAL INVOLVED

- a. **NAME OF ITEM**—Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number (NSN) whenever applicable.
- b. **OWNERSHIP**—Enter ownership for each item listed. (Enter one of the following: *USACE; OTHER GOVERNMENT; CONTRACTOR; PRIVATE*)
- c. **\$ AMOUNT OF DAMAGE**—Enter the total estimated dollar amount of damage (parts and labor), if any.

* The injury or condition selected below must be caused by a specific incident or event which occurred during a single work day or shift.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
*TRAUMATIC INJURY OR DISABILITY	TA	AMPUTATION
	TB	BACK STRAIN
	TC	CONTUSION, BRUISE, ABRASION
	TD	DISLOCATION
	TF	FRACTURE
	TH	HERNIA
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/ CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TQ	TRAUMATIC FOOD
POISONING	TW	TRAUMATIC TUBERCULOSIS
	TX	TRAUMATIC VIROLOGICAL/ INFECTIVE/PARASITIC
DISEASE	T1	TRAUMATIC CEREBRAL
	T2	CONDITION/STROKE
VASCULAR	T3	TRAUMATIC HEARING LOSS
	T3	TRAUMATIC HEART
CONDITION	T4	TRAUMATIC MENTAL
		STRESS, NERVOUS
DISORDER		
CONDITION	T8	TRAUMATIC INJURY - OTHER (EXCEPT DISEASE, ILLNESS)

** A nontraumatic physiological harm or loss of capacity produced by systematic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc., or other continued and repeated exposures to conditions of the work environment over a long period of time. For practical purposes, an occupational illness/disease or disability is any reported condition which does not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME	
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY	RA	ASBESTOSIS	
	RB	BRONCHITIS	
	RE	EMPHYSEMA	
	RP	PNEUMOCONIOSIS	
	RS	SILICOSIS	
	R9	RESPIRATORY DISEASE,	
	OTHER VIROLOGICAL, INFECTIVE & PARASITIC DISEASES	VB	BRUCELLOSIS
		VC	COCCIDIOMYCOSIS
		VF	FOOD POISONING
VH		HEPATITIS	
VM		MALARIA	
VS		STAPHYLOCOCCUS	
VT		TUBERCULOSIS	
V9		VIROLOGICAL/INFECTIVE/ PARASITIC - OTHER	
DISABILITY, OCCUPATIONAL		DA	ARTHRITIS, BURSITIS
	DB	BACK STRAIN, BACK SPRAIN	
	DC	CEREBRAL VASCULAR CONDITION: STROKE	
	DD	ENDEMIC DISEASE (OTHER THAN CODE TYPES R&S)	
	DE	EFFECT OF ENVIRONMENTAL CONDITION	
	DH	HEARING LOSS	
	DK	HEART CONDITION	
	DM	MENTAL DISORDER, EMOTIONAL STRESS, NERVOUS CONDITION	
	DR	RADIATION	
	DS	STRAIN, MULTIPLE	

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
SKIN DISEASE OR CONDITION	DJ	ULCER
	DV	OTHER VASCULAR CONDITIONS
	D9	DISABILITY, OTHER
	SB	BIOLOGICAL
	SC	CHEMICAL
	S9	DERMATITIS, UNCLASSIFIED

g. TYPE AND SOURCE OF INJURY/ILLNESS (CAUSE) - Type and source Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident (see example 1, below). Examples

(1) An employee tripped on carpet and struck his head on a desk.
TYPE: 210 (fell on same level) SOURCE: 0110 (walking/working surface)

NOTE: This example would NOT be coded 120 (struck against) and 0140 (furniture).

(2) A Park Ranger contracted dermatitis from contact with poison ivy/ oak.
TYPE: 510 (contact) SOURCE: 0920 (plant)

(3) A lock and dam mechanic punctured his finger with a metal sliver while grinding a turbine blade
TYPE: 410 (punctured by) SOURCE: 0830 (metal)

(4) An employee was driving a government vehicle when it was struck by another vehicle.
TYPE: 800 (traveling in) SOURCE: 0421 (government-owned vehicle, as driver)

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME	CODE	SOURCE OF INJURY NAME
	STRUCK	0100	BUILDING OR WORKING AREA
0110	STRUCK BY	0110	WALKING/WORKING SURFACE (FLOOR, STREET, SIDEWALKS, ETC.)
0111	STRUCK BY FALLING OBJECT	0120	STAIRS, STEPS
0120	STRUCK AGAINST	0130	LADDER
	FELL, SLIPPED, TRIPPED	0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0210	FELL ON SAME LEVEL	0150	BOILER, PRESSURE VESSEL
0220	FELL ON DIFFERENT LEVEL	0160	EQUIPMENT LAYOUT (ERGONOMIC)
0230	SLIPPED, TRIPPED (NO FALL)	0170	WINDOWS, DOORS
	CAUGHT	0180	ELECTRICITY
0310	CAUGHT ON		
0320	CAUGHT IN		
0330	CAUGHT BETWEEN		
	PUNCTURED, LACERATED		
0410	PUNCTURED BY		
0420	CUT TY		
0430	STUNG BY		
0440	BITTEN BY		
	CONTACTED		
0510	CONTACTED WITH (INJURED PERSON MOVING)		
0520	CONTACTED BY (OBJECT WAS MOVING)		
	EXERTED		
0610	LIFTED, STRAINED BY (SINGLE ACTION)		
0620	STRESSED BY (REPEATED ACTION)		
	EXPOSED		
0710	INHALED		
0720	INGESTED		
0730	ABSORBED		
0740	EXPOSED TO		
0800	TRAVELING IN		

**INSTRUCTIONS FOR SECTION 9—VESSEL/
FLOATING PLANT ACCIDENT**

- a. TYPE OF VESSEL/FLOATING PLANT — Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel/floating plant.

VESSEL/FLOATING PLANTS

- | | |
|------------------------|-----------------------------|
| 1. ROW BOAT | 7. DREDGE/DIPPER |
| 2. SAIL BOAT | 8. DREDGE/CLAMSHELL, BUCKET |
| 3. MOTOR BOAT | 9. DREDGE/PIPELINE |
| 4. BARGE | 10. DREDGE/DUST PAN |
| 5. DREDGE/HOPPER | 11. TUG BOAT |
| 6. DREDGE/SIDE CASTING | 12. OTHER |

- b. COLLISION/MISHAP— Select from the list below the object(s) that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

- | | |
|-----------------------------|-----------------------|
| 1. COLLISION W/OTHER VESSEL | 7. HAULAGE UNIT |
| 2. UPPER GUIDE WALL | 8. BREAKING TOW |
| 3. UPPER LOCK GATES | 9. TOW BREAKING TOW |
| 4. LOCK WALL | 10. SWEEP DOWN ON DAM |
| 5. LOWER LOCK GATES | 11. BUOY/DOLPHIN/CELL |
| 6. LOWER GUIDE WALL | 12. WHARF OR DOCK |
| | 13. OTHER |

INSTRUCTIONS FOR SECTION 10—ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT—Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specific. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11—CAUSAL FACTORS

- a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain on item 13 below. Consider, as a minimum, the following:

- (1) DESIGN— Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?
- (2) INSPECTION/MAINTENANCE — Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site, or work activity inspections have helped avoid the accident?
- (3) PERSON'S PHYSICAL CONDITION — Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was overexertion a factor?
- (4) OPERATING PROCEDURES— Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?
- (5) JOB PRACTICES — Were any of the provisions of the Safety and Health Requirements Manual (EM 381-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?

- (6) HUMAN FACTORS — Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person, i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc. at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?

- (7) ENVIRONMENTAL FACTORS — Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc. play a part in the accident?

- (8) CHEMICAL AND PHYSICAL AGENT FACTORS — Did exposure to chemical agents (either single shift exposure or long-term exposure) such as dusts, fibers (asbestos, etc.), silica, gases (carbon monoxide, chlorine, etc.), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by-products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?

- (9) OFFICE FACTORS — Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

- (10) SUPPORT FACTORS — Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc.?

- (11) PERSONAL PROTECTIVE EQUIPMENT— Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc.) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?

- (12) DRUGS/ALCOHOL— Is there any reason to believe the person's mental or physical capabilities, judgment, etc. were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers."

- b. WRITTEN JOB/ACTIVITY HAZARD ANALYSIS — Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident. Mark the appropriate box. *If one was performed, attach a copy of the analysis to the report.*

INSTRUCTIONS FOR SECTION 12 — TRAINING

- a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? — For the purpose of this section, "trained" means the person has been provided the necessary information [either formal and/or on-the-job (OJT) training] to competently perform the activity/task in a safe and healthful manner.

- b. TYPE OF TRAINING — Mark the appropriate box that best indicates the type of training (classroom or on-the-job) that the injured person received before the accident happened.

- c. DATE OF MOST RECENT TRAINING — Enter the month, day, and year of the last *formal* training completed that covered the activity-task being performed at the time of the accident.

INSTRUCTIONS FOR SECTION 13—CAUSES

- a. **DIRECT CAUSES** — The direct cause is that single factor which most directly lead to the accident. See examples below.
- b. **INDIRECT CAUSES** — Indirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

- a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
Direct cause: failure to provide fall protection at elevation.
Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee (possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.
- b. Private citizen has stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle (note USACE vehicle was in proper/safe working condition).
Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.
Indirect cause: failure of employee to pay attention to driving (defensive driving).

INSTRUCTIONS FOR SECTION 14—ACTION TO ELIMINATE CAUSE(S)

DESCRIPTION — Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15—DATES FOR ACTION

- a. **BEGIN DATE** — Enter the date when the corrective action(s) identified in Section 14 will begin.
- b. **COMPLETE DATE** — Enter the date when the corrective action(s) identified in Section 14 will be completed.
- c. **TITLE AND SIGNATURE** — Enter the title and signature of supervisor completing the accident report. For a **GOVERNMENT** employee accident/illness the immediate supervisor will complete and sign the report. For **PUBLIC** accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For **CONTRACTOR** accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE supervisor shall also sign the report. Upon entering the information required in 15.d, 15.e, and 15.f below, the responsible USACE supervisor shall forward the report for management review as indicated in Section 16.
- d. **DATE SIGNED** — Enter the month, day, and year that the report was signed by the responsible supervisor.
- e. **ORGANIZATION NAME** — For **GOVERNMENT** employee accidents enter the USACE organization name (Division, Branch, Section, etc.) of the injured employee. For **PUBLIC** accidents enter the USACE organization name for the person identified in block 15.c. For **CONTRACTOR** accidents enter the USACE organization name for the USACE office responsible for providing contact administration oversight.
- f. **OFFICE SYMBOL** — Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15.e.

INSTRUCTIONS FOR SECTION 16—MANAGEMENT REVIEW (1st)

1st REVIEW — Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15.c shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief (2nd review) for review and comment.

INSTRUCTIONS FOR SECTION 17—MANAGEMENT REVIEW (2nd)

2nd REVIEW — The FOA Staff Chief (i.e., FOA Chief of Construction, Operations, Engineering, Planning, etc.) shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18—SAFETY AND OCCUPATIONAL HEALTH REVIEW

3rd REVIEW — The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc. are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date, and forward to FOA Commander for review, comment, and signature.

INSTRUCTIONS FOR SECTION 19—COMMAND APPROVAL

4th REVIEW — The FOA Commander shall (to include the person designated Acting Commander in his absence) review the completed report, comment if required, sign, date, and forward the report to FOA Safety and Occupational Health Office. Signature authority should not be delegated.

ATTACHMENT F

**URS Safety Management Standards
(SMS)**

**COPIES OF ALL SMSs WILL BE KEPT IN THE
FIELD OFFICE AT THE SITE (BUILDING
1036/1038) AND WITH THE SITE SAFETY
OFFICER (Stan Levenger)**