

HEALTH AND SAFETY PLAN

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CONTRACT 3 SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS), START-UP AND OPERATIONS, MAINTENACE AND MONITORING (OMM)

Prepared for:

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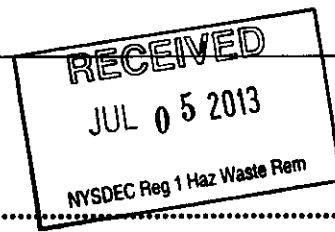
June 19, 2013

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Preface

This Health and Safety Plan (HASP) presents health and safety requirements and guidelines for the Contract 3 Sub-Slab Depressurization System (SSDS) Operation, Maintenance and Monitoring (OMM) to be performed at the 1111 Marcus Avenue, Lake Success NY (the "Site") for the LMC Great Neck SSDS Project (the "Project"). This HASP has been prepared in compliance with applicable sections of Occupational Safety and Health Administration (OSHA) Regulations 29 Code of Federal Regulations (CFR) Part 1910. This HASP has been prepared for the exclusive use of employees of URS Corporation (URS). This HASP shall be available at all times during activities at the Site.

This HASP shall not be used for work activities other than those described in Section 4, nor shall it be modified or used after the expiration date (one year from date of issue) without written approval of the URS Office Health & Safety Representative (HSR). In addition, this HASP shall not be used by firms or persons not under contract to URS without written approval of URS. This HASP is not valid unless it is signed and dated by the Project Manager, HSR and Regional Health and Safety Manager (RHSM).

URS subcontractors may use their own HASP and JSA if such a provision is contained in a written agreement with URS. General health and safety requirements in HASPs prepared by URS subcontractors must be as stringent as those contained in this HASP. URS Safety Management Standard (SMS) 046, Subcontractor Health and Safety Requirements, presents additional information on this subject (all SMSs referenced in this HASP are provided in Appendix A).

Contractors and URS subcontractors (hereinafter, all referred to as "Contractors") involved in activities who adopt this HASP for the protection of their employees are required to read the HASP and comply with its provisions. The adoption of this HASP does not relieve Contractors of their obligations to provide a safe working environment in accordance with all applicable Federal, State and local requirements including, but not limited to, OSHA Regulations 29 CFR Parts 1910 and the OSH Act.. Contractors are solely responsible for providing their employees with appropriate personal protective equipment and monitoring air quality; Contractors are solely responsible for actions taken by their personnel based on the readings.

The health and safety guidelines and requirements presented herein are based on a review of available information and an evaluation of potential hazards. This HASP outlines the health and safety procedures, and equipment required for work activities at this Facility to reduce the potential for personnel exposure to hazards. Changing and/or unanticipated facility conditions may require modification of this HASP to maintain a safe and healthful work environment. Any proposed changes to this HASP require a written addendum which must be approved by the URS Project Manager and HSR. Under no circumstances will modifications to this HASP conflict with Federal, State or local health and safety requirements.

List of Acronyms and Abbreviations

ANSI	American National Standards Institute
bgs	Below Ground Surface
BZ	Breathing Zone
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CIH	Certified Industrial Hygienist
CRZ	Contamination Reduction Zone
dB	Decibels
dBA	Decibels on the A-scale
DOT	Department of Transportation
ESLI	End of Service Life Indicator
ext	Extension
eV	Electron Volt
EZ	Exclusion Zone
F	Fahrenheit
FM	Factory Mutual Engineering Corporation
ft	Feet
HASP	Health and Safety Plan
Hg	Mercury
hr	Hour
HSR	Health and Safety Representative
JSA	Job Safety Analysis
LEL	Lower Explosive Limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mm	Millimeters
µg/L	Micrograms per liter
SDSs	Safety Data Sheets
MTBE	Methyl tertiary butyl ether
NIOSH	National Institute of Occupational Safety and Health
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
OSHA	Occupational Safety and Health Administration
PAHs	Polynuclear aromatic hydrocarbons
PCBs	Polychlorinated Biphenyls
PCE	tetrachloroethene
PEL	Permissible Exposure Limit
PID	Photoionization Detector

List of Acronyms and Abbreviations

PPE	Personal Protective Equipment
ppm	Parts per million
PVC	Polyvinyl Chloride
RHSM	Regional Health and Safety Manager
SMS	Safety Management Standard
SSO	Site Safety Officer
TCE	Trichloroethene
UL	Underwriters Laboratory
URS	URS Corporation
U.S.	United States
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

Section 1

Project Identification

Project Name: LMC Great Neck SSDS Project

Project Number: 11130686

Project Location: Lake Success, New York

Client: Lockheed Martin Corporation
Camden, New Jersey

URS Operating Unit: Clifton, New Jersey

URS Project Manager: Van Ekambaram

URS Facility Safety Officer: Robert Cebula

URS Health and Safety Manager: Ben Bertolotti

Effective Dates: June 24, 2013 to June 24, 2014

Use of the HASP after June 24, 2014 to perform activities described herein or other activities in addition to those described herein, is not permitted. The expiration date may be extended by the HSR by preparation of an addendum to the HASP approved by the URS Project Manager and HSR after a review of the applicability of the HASP and approved addend, if any, to the actual facility

APPROVALS



Van Ekambaram
Project Manager

19 June 2013

Date



Benjamin Bertolotti, CIH
Regional Health and Safety Manager

19 June 2013

Date

Section 2

Staff Organization

This section describes the roles of the various positions on the Project as they pertain to health and safety. The names, responsibilities and authorities of key individuals are presented in Table 1. The organization chart is attached as Figure 1.

URS personnel who might be involved in activities include those listed below. All personnel named on this list are qualified to serve as Alternate Facility Safety Officers (SSOs).

John Lewyta, P.E., BCEE – URS, Assistant O&M Manager

Rich Worthington - GWTT, Lead Operator

Robert Cebula – URS, Assistant Operator

Other personnel may be assigned to the Project as well. Personnel working on the Project must be approved by the HSR and must meet the qualifications of OSHA Regulation 29 CFR Part 1910 and this HASP.

Section 3

Facility Background

The former Unisys Corporation facility was an active manufacturing plant from its startup in 1941 until approximately 1995, when most manufacturing activities ceased. Some limited assembly, integration, prototype development and testing, and/or engineering and administrative activities were still being conducted at the former Unisys Facility through early 1999. The former Unisys facility was originally designed and built by the United States Government and was operated under a contract with the Sperry Gyroscope Company from 1941 to 1951. In 1951, the property was sold to Sperry, which merged with Burroughs in 1986 to form the Unisys Corporation. In 1995, Loral Corporation acquired assets of Unisys, a division of Unisys Corporation. In early 1996, Loral's electronics and systems integration businesses were purchased by Lockheed Martin. The property was sold by Lockheed Martin Corporation (LMC) in early 2000 to IPark Lake Success LLP (IPark), which converted the facility to commercial rental space. Presently the facility houses several tenants that use the lease space for office areas, laboratories, a cafeteria, an outpatient hospital, distribution centers, maintenance spaces, and a fitness center.

Residual chemicals from the manufacturing activities have caused air beneath the building to become contaminated with volatile organic compounds (VOCs). LMC is cooperating with the New York State Department of Environmental Conservation (NYSDEC) to mitigate contaminated air beneath the building. The air is prevented from entering into the building. The sub-slab depressurization system (SSDS) is designed to remove air containing volatile organic carbon (VOC) compounds from under the IPark building, to prevent it from entering the building.

The SSDS consists of vacuum blowers connected through piping to air extraction points installed beneath the floor slab throughout the building. The system is designed to extract up to 6,000 scfm of air from the extraction points, and to maintain a minimum differential pressure of negative 0.004 inches water pressure between the sub-slab space and the building indoor air space. The system treats the air prior to discharge to the atmosphere. Site plot plans of the treatment building and extraction area are attached as Figures 2 and 3.

Section 4

Work Activities

The following activities were reviewed for this HASP:

- Regularly Scheduled Maintenance including:
 - Plant Housekeeping and General Equipment Maintenance
 - Vapor Extraction Piping Inspections
 - General Maintenance of the Moisture Separator Including Pumpout
 - Visual Inspection of HVAC Filters on the Roof
 - Blower Inspections of Air Flow and Vacuum Applied
 - Monitoring System Control from the MCP (office)
 - Monitoring Pressure and Air Stream Concentrations of the Vapor Phase Carbon Vessels
- Monthly Sampling of Vapor Phase Carbon Vessels
- Confined Space Entry
- Indoor Air Quality Sampling
- Differential Pressure Measurements at Sub-Slab Monitoring Points

This HASP is not to be applied to any other facility activities than those described above. Other work activities not described above may be conducted after approval by the HSR of an appropriate addendum to this HASP.

5.1 OVERVIEW

This HASP section assesses the hazards associated with activities performed for operation of the SSDS facility. The specific activities assessed are described in Section 4.

Information concerning types of substances or the concentrations of chemicals that might be encountered was obtained from studies in specific site areas and from histories of activities and work practices at the site. Based on a review of the information, contaminants of concern were identified. Safety Data Sheets (SDSs) or Safety Cards for these contaminants can be found in Appendix B along with SDSs for materials to be brought to the facility as part of facility operation. The SDS library may be appended as operations progress.

Physical hazards were identified from operator interviews and walkthrough of the facility.

5.2 HAZARD SUMMARY

An analysis of Section 4 work activities was made producing a summary list of workplace potential hazards:

- inhalation of air contaminants
- skin and eye injury and irritation
- ingestion of contaminant
- noise
- slip-trip-fall
- lifting
- working with/near fork trucks and aerial lifts
- working from heights with ladder
- confined space
- weather
- overhead
- traffic
- heat stress
- cold exposure
- biological
- energized equipment & systems,
- electrical

Additional hazards may be identified from work at the site. Hazards, if any, must be documented in the HASP. The resulting changes will be incorporated using procedures described in Section 6.9.9 Management of Change.

5.3 CHEMICAL HAZARDS

A risk analysis was performed to determine facility-specific health and safety requirements to protect workers performing tasks outlined in Section 4. The analysis was performed by studying available sampling and site history information. Taken into account were the chemical constituents found during previous investigations, the toxicity and routes of exposure to workers, and the capabilities of detection devices. This HASP has adopted the use of the "lowest allowable exposure limit" which is the most conservative of the exposure limits given by OSHA, the National Institute of Occupational Safety and Health (NIOSH), or the American Conference of Governmental Industrial Hygienists. Inhalation and dermal contact would be the primary routes of exposure. Ingestion is a secondary route of exposure.

5.3.1 Chemical Hazards Due to Site Contaminants

For the principle site contaminants, results of testing and lowest practical exposure limits are tabulated below. Based on laboratory results of previous sub-slab air samples, potential exposure to the halogenated and non-halogenated volatile organic compounds for facility workers are below exposure limits. The results indicate potential chemical exposure risk is acceptably low.

Substance Concentration Calculations based on 2010-2012 Carbon Loading Data

Substance	Sub-Slab Concentration	Exposure Limit
Carbon Tetrachloride	221 ug/m3	12,600 ug/m3 (2 PPM) NIOSH REL (60 minute)
Chloroform	883 ug/m3	9,780 ug/m3 (2 PPM) NIOSH REL (60 minute)
Tetrachloroethene	6180 ug/m3	170,000 ug/m3 (25 PPM) ACGIH TLV (8 hour)*
Trichloroethene	129,000 ug/m3	269,000 ug/m3 (50 PPM) ACGIH TLV (8 hour)*

Note: * - Sub-slab concentrations are listed by the substance names tetrachloroethene and Trichloroethene however exposure limits concentrations are found under synonym names tetrachloroethylene and trichloroethylene. The names used in the HASP are the substance names listed in the table above.

The substances listed above are extracted by the process from sub-slab air and accumulated on activated charcoal in one process tank of two tanks in series using a lead-lag procedure. When breakthrough is detected in the lead tank, the flow to the tanks is reversed. The lead tank becomes the lag tank. The activated charcoal is removed from the previous lead tank for regeneration or destruction. The tank is refilled. The substances adsorb strongly to the activated charcoal so air concentrations in the tank head space are no more than the above indicated.

The Safety Data Sheets (SDSs) for these compounds are provided in Appendix A. See also URS Safety Management Standard (SMS) 002, Worker Right-to-Know (Hazard Communication), for additional information (all SMS referenced in this HASP are provided in Appendix B of this HASP).

5.3.2 Chemical Hazards Due to Materials Brought to Facility

Isobutylene (i.e., isobutene) gas will be used as a calibration standard for the photoionization detector. Hydrochloric acid is a preservative for sample glassware.

Workers might potentially be exposed to diesel fuel or Freon as a result of spills during the operation of the facility. Consult the SDS for clean-up and personal protection requirements.

Sunscreen and/or insect repellent including products containing N,N-diethyl-meta-toluamide (i.e., DEET) or permethrin (e.g., Permanone®) may be used at the facility. The sunscreen and insect repellent that may be used by facility workers should be used according to the manufacturer's instructions.

SDSs for the chemical constituents of concern and chemicals to be brought to the facility are provided in Appendix B. The chemicals that are brought to the facility to conduct work activities may be hazardous and subject to regulation under OSHA's Hazard Communication Standard (i.e., 29 CFR 1910.1200).

5.4 PHYSICAL HAZARDS

5.4.1 Vehicle Safety

The facility and surrounding areas include considerable vehicular and truck traffic. Attention must be paid by personnel to this condition. Personnel must always assume that moving vehicles and trucks do not see them or their equipment. Vehicle parking is permitted in designated areas only. Additionally, the following precautions shall be practiced for company vehicle use unless otherwise noted for personal vehicles:

- all vehicles must be driven or parked in authorized areas only;
- moving vehicles or equipment shall not be passed at the facility;
- only persons who meet the requirements of an authorized driver in URS SMS 057 and who have taken a defensive driving course shall operate vehicles at the facility;
- vehicles and equipment used at the facility shall be legally registered, insured and/or have valid operating permits;
- all personnel shall wear seat belts, as required, when operating vehicles and/or equipment;
- personal vehicles shall not be permitted at the facility except in authorized/designated parking areas;
- unattended vehicles must be shut down unless proper authorization is granted by the SSO;
- all vehicles must be driven within a safe operating speed limit; and
- Cell phone usage, including hands-free devices, is prohibited while operating vehicles or equipment.

SMS 057, Vehicle Safety, provides additional information on this subject.

5.4.2 Noise Exposure

Elevated noise levels in the areas of operating treatment plant equipment are expected. The pieces of equipment include the diesel generator, chiller, and blowers. Ear muffs are required in the diesel generator room? In accordance with OSHA Regulation 29 CFR 1910.95, hearing protection is required to be used when noise levels exceed 85 decibels on the A-scale (dBA) averaged over an 8-hour day. Hearing protection is required to be worn for exposures of greater than 100 decibels (dB) for any length of time. In the absence of noise level exposure data, an appropriate rule of thumb is that when normal conversation is difficult at a distance of 2 to 3 feet between personnel, hearing protection is required.

Contractors shall have hearing protection at the Facility for use by their employees. Personnel will wash their hands with soap and potable water prior to inserting earplugs to avoid initiating ear infections. The SSO will monitor noise levels on an "as needed" basis to provide information relative to compliance with OSHA Regulation 29 CFR 1910.95 using a Quest 2700 Sound Level Meter or equivalent. URS SMS 026, Noise and Hearing Conservation, presents additional information on this subject.

5.4.3 Slip-Trip-Fall Hazards

Slip-trip-fall hazards are common at facilities due to open holes; muddy, slippery or unstable surfaces; and miscellaneous debris and equipment. Workers should exercise caution when working around the Treatment Plant, in tenant spaces, as well as outdoors to avoid slip-trip-fall hazards. If there are holes or uneven terrain in the work area that could cause workers to slip, trip or fall, they must be covered, flagged or marked to warn workers. Slip-trip-fall hazards are greatly increased during work in or near water (wet floors or hallways from rain for example). If conditions become slippery, workers should take small steps with their feet pointed slightly outward to decrease the probability of slipping. The same rule applies to icy surfaces. Workers should watch where they are walking and, if possible, walk only in areas of good stability. Miscellaneous debris and/or equipment observed at the facility should be removed prior to commencing work. While it is difficult to eliminate all slip-trip-fall hazards, implementing safe work practices, wearing proper footwear, and keeping the work area free of obstructions will reduce risk of injury. URS SMS 021, Housekeeping, provides additional information about this hazard.

5.4.4 Housekeeping

Housekeeping procedures contained herein shall pertain to uncontaminated trash, debris and rubbish. Housekeeping shall be maintained in all work areas and shall be performed in such a manner that it occurs continuously throughout the work. Particularly in the MCP (office), Proper receptacles shall be provided for regular trash and recyclable products such as office paper, cardboard, plastics and glass. Housekeeping protocols can be referenced in URS SMS 021, Housekeeping, using URS SMS Form 21-1. The following housekeeping guidelines shall apply at the Facility:

- work areas must be maintained clean and free from trash and debris. Proper receptacles shall be located throughout the work area;
- excess scrap material and rubbish will be removed from the work area daily;

- all surplus materials shall be returned to their storage areas at the completion of work;
- tools and other materials shall be returned to their proper storage areas after use;
- oily rags shall be stored in approved non-combustible metal containers;
- toilets, wash areas and shower areas shall be kept clean;
- accumulations of soiled personal protective equipment is not permitted; and,
- eating, drinking, use of tobacco products, chewing gum, etc., is permitted only in designated areas.

5.4.5 Fall Protection

All personnel performing elevated work which may expose them to falls from heights of 4 ft or greater shall inspect and wear approved fall protection. This includes work performed on ladders and scaffolds, excavations, confined space entry and work performed on aerial lifts. These circumstances are expected to arise at the vapor carbon vessels, the condensate tank, and the plant or IPark roof. Personnel shall be trained in the inspection, use, limitations and storage for the types of fall protection available and/or recommended for the task. Fall protection shall be used in accordance with the protocols stated in URS SMS 040, Fall Protection.

5.4.6 Lifting Hazards

Operations often require the performance of laborious tasks such as lifting. All employees must implement proper lifting procedures such as keeping the load close to the body and using leg muscles instead of back muscles to perform lifting tasks. Additionally, employees will not attempt to lift large, heavy or awkwardly shaped objects without assistance. Safe lifting procedures include:

- 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 (e.g., "1-2-3-lift").
- Wear sturdy work boots 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.

See URS SMS 069, Manual Material Handling, for additional information on this subject.

5.4.7 Weather

Weather conditions are an important consideration in planning and conducting facility operations. Extremely hot or cold weather can cause physical discomfort, loss of efficiency and personal injury. Lightning may accompany storms, creating an electrocution hazard during outdoor operations. To eliminate this hazard, weather conditions must be monitored and work suspended during electrical storms. Remember to consider weather conditions when planning activities including roofwork, sampling events, or maintenance activities outside of the Treatment Plant.

During non-severe weather conditions, outdoor work shall be suspended at the discretion of the SSO with the exception of the following mandatory “stop work” conditions:

- electrical storms approaching and a minimum of 15 minutes after passing;
- excessive periods of heavy rain;
- accumulation of snow or ice as to impede one’s ability to use a pathway;
- winds in excess of tropical storm force (outdoor elevated work is suspended); and,
- wind in excess of hurricane force (all outdoor work is suspended).

The SSO shall verify that all pathways, steps and driveways are free from the accumulation of snow and ice on a continuous basis and ensure that non-slip mats are used inside building thresholds to prevent slipping.

5.4.8 Working with Energized Equipment (Lockout-Tagout)

To isolate machinery or equipment from all potentially hazardous energy before service or maintenance is done where the device unexpectedly becomes energized, starts, or releases energy. Examples of energy sources are electrical circuits, fluid systems including piping, pneumatic systems or hydraulic systems, flammable systems such as the diesel generator, thermal systems using steam, gravity systems, and hazardous material systems running off of waste.

Three types of personnel are recognized in the case of controlling energy sources:

- Authorized employees are trained to correctly lock out and tag energized equipment. URS and GWTT personnel on the OMM team will not be acting as authorized employees.
- Affected employees are aware of the implications of lock and tag controls and will be near locked or tagged equipment during servicing.
- Qualified employees are familiar with the operations and may request, inspect, verify, and control locks and tags or are otherwise involved in supporting the locking and tagging of devices.

It is expected that URS and GWTT personnel will be Affected or Qualified employees. However, as Qualified employees working in the Treatment Plant on a daily basis, URS and GWTT operators will be writing the Lockout and Tagout procedures for Authorized employees, who will be subcontractors.

See URS SMS 023, Lockout Tagout, for additional information about this subject.

5.4.9 Work Area Protection

A few of the monitoring wells are in a relatively active roadway. As such, there could be considerable vehicular and truck traffic (including fuel trucks) during "normal" working hours. In addition, the surface area of the Facility is small and movement within the Facility will be restrictive. Accordingly, motor vehicles, trucks and moving equipment pose a significant safety hazard. Site staff is responsible for implementing standard traffic control set-up and maintenance. Further, waste transfers to the OU 1 area should be evaluated for the impact of the road (i.e., speed bumps, sharp turns) on the waste transfer vehicle. Work areas inherently present hazards to facility workers not involved in the specific work task being conducted and to off-facility populations such as IPark tenants and other personnel at the Facility not involved with the Investigation. Work areas should be "cordoned off" to control access to unauthorized personnel. Guidance on properly coning and flagging the work area is presented in URS SMS 032, Work Zone Traffic Control.

5.4.10 Use of Personal Protective Equipment

Use of steel-toed work boots, safety vests, protective eyewear and hard hats will be required while in all work areas. Hearing protection shall be required in accordance with the noise exposure guidelines outlined below. The personal protective equipment (e.g., protective clothing and air purifying respirators) which may be required for some activities for this Project places a physical strain on the wearer. When personal protective equipment (PPE) such as respirators, gloves and protective clothing are worn, visibility, hearing and manual dexterity are impaired. URS SMS 029, Personal Protective Equipment, presents additional information on this subject.

5.4.11 Heat Stress

Hot weather can cause physical discomfort, loss of efficiency and personal injury. Work which is conducted when temperatures exceed 70 degrees Fahrenheit (°F) may result in increased incidence of heat-related illness. The risk is increased for personnel who are required to don impermeable protective clothing during warm weather, which decreases the body's natural cooling processes. Fluids will be provided at regular intervals during the work periods in order to maintain adequate body fluid levels for the personnel.

URS SMS 018, Heat Stress, presents additional information on this subject. This SMS describes heat stress identification, treatment, prevention and monitoring.

5.4.12 Cold Stress

Cold weather can cause physical discomfort, loss of efficiency and physical injury. Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body which have high surface area-to-volume ratio such as fingers, toes and ears are the most susceptible.

Exposure to cold working conditions can result in cold stress (i.e., hypothermia) and/or injury (frostbite) to hands, feet, and head. Hypothermia can result when the core body temperature drops below 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 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 40°F. At temperatures of 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 -25°F or below.

If fine work is to be performed with bare hands for more than 10 to 20 minutes at temperatures below 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 30°F.

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

URS SMS 059, Cold Stress, presents additional information on this subject. This SMS presents the effects of cold exposure, and treatment, prevention and monitoring procedures.

5.4.13 Work with/near Fork Lifts and Aerial Lifts

Fork lift and aerial lift use is not anticipated during the work activities for this facility. If use of this equipment is planned, an addendum to this HASP will be prepared by the HSR. This addendum will be prepared in accordance with OSHA Regulations and applicable URS SMSs. There is a risk of physical injury resulting from contact with a forklift or manlift. Field personnel should be aware of the presence of these hazards and take steps to avoid them. URS employees authorized to operate the equipment will receive initial and annual training provided by either a URS-qualified individual using a commercially available and compliant training program, or by a qualified training agency.

5.4.14 Excavation Hazards

Excavations are not anticipated during the work activities for this facility. If excavations are to be performed, an addendum to this HASP will be prepared by the HSR. This addendum will be prepared in accordance with OSHA Regulations and applicable URS SMSs.

5.4.15 Underground Structures/Obstructions/Utilities

Underground structures, obstructions, or utilities exposure is not anticipated during the work activities for this facility. If these are to be encountered, an addendum to this HASP will be

prepared by the HSR. This addendum will be prepared in accordance with OSHA Regulations and applicable URS SMSs. Power enters the Treatment Plan underground at approximately 25 kilovolts and steps down to approximately 480 volts. See URS SMS 034, Utility Clearance and Isolation, for additional information about this subject.

5.4.16 Utility Hazards

Overhead hazard exposure to structures, obstructions, or utilities is not anticipated during the work activities for this facility. If these are encountered for any reason, an addendum to this HASP will be prepared by the HSR. This addendum will be prepared in accordance with OSHA Regulations and applicable URS SMSs. Power lines pose a danger of shock or electrocution if the power line is contacted or severed during facility operations

5.5 BIOLOGICAL HAZARDS

Potential biological hazards include illnesses and/or injuries transmitted by plants, insects, animals and pathogenic agents. There are many plants, animals and insects that are potentially harmful to humans including ticks, poison ivy/poison oak, spiders, bees and wasps, mosquitoes and poisonous snakes.

Bloodborne pathogens include diseases that can be transmitted by contact with blood or other bodily fluids as well as contaminated items that may be encountered on the Facility (e.g. used syringes). Universal precautions should be used when administering First Aid. Good hygiene practices and proper decontamination of nondisposable PPE will minimize potential for transmission of bloodborne pathogens.

During work at the Facility, personnel may encounter a wide variety of insects including bees, mosquitoes, ticks and spiders. Personnel are encouraged to use insect repellent when insects are present. Stings of bees and wasps may cause serious allergic reactions in certain individuals. The SSO should be made aware of all personnel with known insect allergies or sensitivities before work begins.

Ticks are parasites that feed on the blood of an animal/human host and can carry several severe diseases, the least bringing several days of fever and pain and the worst causing brain damage. Deer tick bites may result in the transmission of Lyme Disease. A characteristic rash may develop a few days to a few weeks after the bite of an infected tick. The rash generally looks like an expanding red ring with a clear center, but it can vary from a blotchy appearance to red throughout the rash. However, it is important to note that some victims never exhibit a rash. Lyme Disease symptoms include flu-like symptoms such as a headache, stiff neck, fever, muscle aches and/or general malaise. Long-term effects of Lyme Disease may include arthritis of the large joints, meningitis, neurological complications (such as numbness or tingling of the extremities, loss of concentration and memory retention or Bell's Palsy), withdrawal and lethargy, or cardiac symptoms. Facility workers should use the following prevention tactics in accordance with URS SMS 047, Biological Hazards, contained in Appendix B. Other suggested behaviors to reduce the hazards posed by ticks include:

- avoid walking through brush, woods or grassy areas; try to avoid contact with plants if you must walk through these areas;

- dress in light-colored clothing to make adhering ticks more visible. Wear long-sleeved shirts and tuck pants into socks. Wear a hat and tie back long hair;
- use an insecticide containing permethrin or DEET on clothing and boots (**not skin**); and,
- perform self or assisted searches each day to check for ticks.

Pigeon nesting and roosting habits may result in an accumulation of excrement in areas of the facility. Exposure to pigeon excrement can cause illness in humans. Of primary concern is the contracting of psittacosis which is a flu-like illness which can cause death in vulnerable individuals. All workers should avoid coming in contact with these materials and, if exposed to them, should thoroughly wash areas of contact as soon as possible.

Assume that all animals are dangerous. A person who is bitten by an animal may become infected by tetanus or rabies. Warm-blooded animals such as dogs, cats and rats can transmit rabies. Rabies can also be transmitted when the saliva of an infected animal contacts an open wound (even a scratch) or any normal body opening such as the mouth or eye.

URS SMS 047, Biological Hazards, presents additional information on this subject.

5.6 EXPOSURE ROUTES

The primary exposure pathways of concern for these identified contaminants are as follows:

5.6.1 Inhalation of Dust

Several of the work activities to be performed have the potential for generating dust in the breathing zone. Dust suppression techniques will be used as required to reduce airborne exposures.

5.6.2 Inhalation of Volatile Contaminants

Previous experience during these types of activities at other facilities suggests that airborne concentrations of these contaminants during these activities will probably not exceed exposure limits during activities due to emissions gasoline or diesel fuel-powered equipment in open areas.

5.6.3 Ingestion of Contaminants

Personnel may be exposed to accidental ingestion of contaminants by hand to mouth contact after contact with contaminated materials. Ingestion of contaminants will be controlled during work activities by prohibiting eating and smoking in the contamination reduction zone and exclusion zone and by requiring all personnel to decontaminate themselves upon leaving the exclusion zone. Drinking of liquids will take place only after partial decontamination has taken place (except in a heat stress emergency situation).

5.6.4 Skin and Eye Contact with Contaminants

Skin and eye contact due to the operation of gasoline or diesel fuel-powered equipment may cause skin or mucous membrane irritation. Many of these contaminants can be absorbed into the bloodstream through the skin or eyes. Skin contact with potentially contaminated

materials will be reduced by the wearing of personal protective clothing. Anybody area which comes in contact with contaminants will be washed with soap and rinsed immediately. All personnel will report any skin or eye contact symptoms to the SSO. The person will be treated by a physician and steps will be taken to eliminate similar exposures.

5.7 CONTROL OF EXPOSURE TO CHEMICAL HAZARDS

Potential hazards will be reduced by protecting against exposures to contaminants via utilization of appropriate personal protective equipment. Personal protective equipment to protect the body against contact with known or anticipated chemical hazards is divided into five levels of protection categories (i.e., Levels A, B, C, Modified D and D personal protective equipment) according to the degree of protection afforded. The initial levels of personal protective equipment to be used while performing the work activities described in Section 4 are discussed in Section 6, General Health and Safety Requirements. If the personal protective equipment for any level of protection needs to be modified to be appropriate for the specific hazard encountered, an appropriate addendum to this HASP must be prepared by the HSR.

Periodic air monitoring will be employed when personnel perform the carbon vessel sampling, pressure verification, and condensate disposal to assess respiratory hazards in the work zones for work activities as appropriate. The Thermo Model 580B OVM Photoionization Detector with an 11.7 electron volt lamp or equivalent will be used to detect trace concentrations of certain organic gases and a few inorganic gases in the air. Activity-specific air quality monitoring response levels are shown below and in Table 2.

5.8 HAZARD ASSESSMENT BY TASK AND JOB SAFETY ANALYSES

Specific personal protective equipment requirements by task and task location based on these judgments as well as available information on chemical hazards and anticipated work activities are listed in Section 6.

Prior to any work being performed each day, based on the information provided in this HASP and relevant facility-specific information for that day (e.g., weather conditions, other work being performed at the Facility), the SSO shall prepare a complete site Hazard Assessment. Job Safety Analysis (JSA) will be created by OMM Operators including GWTT, for all tasks that are anticipated to be conducted during the day. No work activity shall be performed unless a JSA for that work activity has been prepared and discussed with all facility personnel. JSAs shall be reviewed and modified as necessary to ensure that all job hazards are identified and mitigated. The Hazard Assessment form for this project is provided in Section 10. The Job Safety Analysis forms for this project will be completed upon review of task specific job safety analysis. This will be reviewed and amended as conditions on the job change. Examples of tasks that require completion of a JSA or series of JSAs are listed below.

- Transfer of condensate to disposal
- Removal of snow greater than two feet deep from area around the roof mounted condenser
- VFD switch use

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- Filter changes on roof mounted equipment located near the edge of the roof.
- Fan #200 and #300 Intake and Exhaust Valve operation to prevent muscle strain due to awkward body position for valve operation.

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6.1 MEDICAL SURVEILLANCE

All employees involved in activities shall be active participants in the URS medical surveillance program or the equivalent. All medical examinations and procedures shall be performed by or under the supervision of a physician who is board eligible or board certified in occupational medicine.

Before commencing any of the activities defined in Section 4, all personnel must take an entry medical examination and periodic medical examinations as required by OSHA Regulation 29 CFR 1910.120(f) as part of a medical surveillance program. Contractors involved in activities must provide documentation of medical examinations for their employees.

Medical surveillance is a major component of all health and safety programs. It was established to monitor and promote the health of employees engaged in projects which have the potential for exposure to hazardous substances. Exposure to chemicals has the potential to cause adverse health effects although the use of recognized safety procedures and protective equipment substantially mitigates associated risks. In the event a potentially harmful exposure occurs, early detection of symptoms is extremely important to successful treatment. Thus, the medical surveillance procedures prescribed as part of this health and safety program must be followed by all relevant personnel without exception.

Medical surveillance provides a clinical base of information that is used to evaluate an employee's fitness to work on a hazardous waste facility, to identify anomalies in a person's medical history that may be related to potential impaired health, and to evaluate a person's capability to use respiratory protective equipment. This base of medical information includes personnel health history, exposure history, physical examination results, laboratory analyses and results of screening and special tests.

Medical examinations must include (at a minimum):

- Past medical history - on entry to the program, information concerning past occupational and personal as well as family history of disease.
- Present medical profile - all pertinent medical information regarding present state of health and during each year of work in hazardous material projects.
- Exposure history - information concerning the cumulative duration of time spent on potentially hazardous facilities the primary toxic substances, and the levels of protection employed by each facility.
- Kidney and liver function tests - possible exposure to aromatic hydrocarbons warrant examination of the liver enzymes and blood exams to evaluate kidney and liver function.
- Hematology - complete blood-forming function exams including complete blood count, white blood count, red blood count and hemoglobin exams.
- Urinalysis.
- Physical examination.

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- Hearing test.
- Vision test.
- Pulmonary function test.

Optional tests, if recommended by the examining physician for this specific facility, could include:

- Electrocardiogram.
- Radiography (X-ray Examinations).
- Special tests - medical information concerning the effects of exposure to specific contaminants.

The objectives of the medical surveillance component of the health and safety program are:

- Protect the health of employees assigned to work at sites containing potentially hazardous substances.
- Pre-assignment screening of employee's health to determine present status and to identify existing problems that may be aggravated by chemical exposure or physical stress.
- Monitor employee's health for early signs of work-related illness and employee suitability for further assignments at sites containing potentially hazardous substances.
- Evaluation and care of individuals with work-related illnesses or injuries.
- Satisfy the requirements of OSHA Regulation 29 CFR Part 1910.134 regarding respiratory protection and OSHA Regulation 29 CFR Part 1910.120 for hazardous waste workers.

Examining physicians will use information provided by the employee in the questionnaire, the examination results, and the results of laboratory tests to determine if any work restrictions (e.g., medical fitness to wear respiratory protection during work activities) or occupational health problems appear to be present. Contractors must provide documentation indicating that their personnel working within any contamination reduction zone or exclusion zone are active participants in good standing in a medical surveillance program and are medically fit to wear a respirator.

URS SMS 024, Medical Screening & Surveillance, presents additional information on this subject.

6.2 SAFETY TRAINING

Employees shall not participate in activities until they have been trained to a level required by their job function and responsibility. Trainers shall have received a level of training higher than and including the subject matter of the level of instruction they are providing. All training and experience shall be certified.

URS SMS 055, Health and Safety Training, presents additional information on this subject.

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6.2.1 Safety Orientation Meeting

A safety orientation meeting will be conducted for all employees, including contractors, prior to the commencement of activities. The following topics will be discussed at this meeting:

- names of health and safety personnel and alternates responsible for facility health and safety;
- health and safety organization;
- hazards at the Facility;
- exposure risk;
- Job Safety Analyses;
- required work procedures including, but not limited to, work area facility control measures, lockout and tagout, subcontractor/visitor policy and confined space entry, as applicable;
- personal protective equipment to be used;
- air monitoring; and,
- emergency procedures.

All personnel must be provided with and read a copy of this HASP. At the end of the meeting, attendees will be informally quizzed to assess their understanding of the health and safety requirements. They must sign a safety compliance agreement form stating they have read, understand and agree to comply with the provisions of the HASP. Anyone refusing to sign the form will be prohibited from working at the Facility.

If a new employee, who has not gone through the facility-specific safety orientation meeting is assigned to the Facility, the SSO must present a similar briefing to the new employees before he/she participates in any activities. All new employees must sign the safety compliance agreement form before beginning work.

6.2.2 Daily Safety Briefings

During operations, daily safety briefings must be held at the start of each work shift by the SSO to review and plan specific health and safety aspects of scheduled work. GWTT provided STARRT forms must be completed and retained for the period indicated by GWTT. Topics discussed during these briefings will include drilling procedures, work area facility control measures, Job Safety Analyses, facility hazards, precautions, lockout/tagout procedures (as necessary), PPE, air monitoring, and applicable procedures for the work activities to be conducted during that work shift. All facility personnel who are following this HASP are required to attend these briefings. Names and affiliations of individuals attending these briefings and items discussed must be documented by the SSO. Refer to Section 10 for health and safety related forms.

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6.2.3 Facility Inspections

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

6.2.4 Hazard Communication Program

Materials that are considered hazardous under the Globally Harmonized OSHA Communication Standard (i.e., OSHA Regulation 29 CFR 1910.1200) may be brought to the Facility (e.g., acids for sample preservation) after approval for use by the HSR. Field personnel, including Contractors, must comply with the requirements of the OSHA Hazard Communication Standard. SDSs or Safety Cards must be available at the Facility for all applicable materials. Data on these materials must be presented as part of the safety orientation meeting. The SSO is responsible for maintaining an SDS/Safety Card file for these chemical constituents and for all materials which are brought to the Facility. Personnel shall receive training for safe use of these materials during safety orientation meetings and daily facility safety briefings, as required. URS SMS 002, Work Right-to-Know (Hazard Communication), presents additional information on this subject.

6.2.5 Facility Security

- Access to the work area must be controlled. Considerable vehicular and truck traffic is expected to occur at the Facility. The drivers of many vehicles may be unfamiliar with traffic patterns at the Facility.
- Only authorized personnel shall be permitted to enter work areas. No one shall enter the work area without appropriate authorization.
- All persons entering the work area shall be equipped with appropriate PPE.
- All personnel entering the work zone must be familiar with and abide by the HASP. All of these individuals must have signed the Health and Safety Plan Compliance Agreement form.

6.3 INJURY/ILLNESS/INCIDENT REPORTING

In the event of an injury or incident, the SSO will immediately notify the URS Project Manager and HSR. Types of injuries, illnesses or incidents considered reportable are as follows:

- illness resulting from chemical exposure or unknown causes;
- near misses;
- physical injury including scratches and/or abrasions;
- fire, explosions and flashes resulting from activities performed by URS or contractors;

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- infractions of safety rules and requirements; and,
- unexpected chemical exposures.

Work will be suspended to correct the cause of the injury/illness/incident and to modify this HASP, as necessary.

A URS Injury/Illness/Incident Report form must be submitted to the URS Project Manager and HSR within 24 hours of occurrence. The URS Project Manager will be responsible for informing the Client of any accidents/illnesses/incidents reported by facility personnel. URS SMSs 049, Injury/Illness/Incident Reporting & Notifications, and 065, Injury Management and present additional information on this subject.

6.4 BUDDY SYSTEM

Unless the requirements of URS SMS 084, Lone Worker, are strictly complied with, the "buddy system" will be used during all activities. During monthly sampling of sub-slab monitoring points, it is expected that the "buddy system" will be employed. Equipment maintenance will be scheduled on days when two people are on site.

6.5 PROJECT SAFETY LOGS

Project Safety Log forms (Section 10) will be maintained by the SSO throughout the Project and provided to the URS Project Manager after the Project is completed. Logged information shall include:

- (1) names of all URS, Client, visitor and Contractor personnel entering and leaving the Facility each day,
- (2) dates each major activity started and was completed,
- (3) air monitoring data,
- (4) description of unforeseen hazards and steps taken to mitigate these hazards,
- (5) summary of telephone conversations regarding health and safety,
- (6) safety infractions, if any,
- (7) accidents, near misses and injuries, if any, and
- (8) all other significant health and safety items.

6.6 CONTROLLED AREA

A controlled area is defined as an area within which all entry and activities are regulated by URS because of activities underway in that area. Rationale for the establishment of a controlled area would include the need to control exposure of URS and non-URS personnel to any anticipated hazards, and to protect URS personnel from the consequences of non-URS operations at the Facility. For example, during sampling at sub-slab monitoring points outdoors, not in the Treatment Plant or tenant spaces. Barricade tape and/or barricades will be used to delineate the controlled area for safety purposes around the work area. The barriers will be set in a 15-ft or greater (as necessary and/or practical) radius 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 an indicator of wind direction. A 5-ft wide opening in the barricades at the support

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zone (upwind of the work area) will serve as the personnel and equipment entry and exit point.

At the end of the shift, all monitoring wells must be covered or otherwise secured. All purge and decontamination fluids are to be handled in accordance with relevant regulations and instructions from the URS Project Manager.

The Facility Manager or SSO 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.

6.7 VISITOR CLEARANCES

All visitors entering the work zone at the Facility will be required to read and verify compliance with the provisions of this HASP and will receive an orientation to the facility. Additionally, in the case of contractors or vendors performing non-office tasks, a hazard evaluation must be completed for the work planned that day. All visitors must provide their own personal protective equipment unless specifically authorized by the URS Project Manager to don URS-supplied personal protective equipment. Documentation of facility visitor registration and training will be maintained on the Project Safety Log forms found in Section 10.

In the event that a visitor does not adhere to the provisions of the HASP, he/she will be requested to leave the Facility. All nonconformance incidents will be recorded on the Project Safety Log form.

6.8 WORK ZONES

Personnel will consider and if needed establish three work zones around each work activity: the exclusion zone, the contamination reduction zone and the support zone.

6.8.1 Exclusion Zone

The Exclusion Zone (EZ) is the area where contamination is or may be present such as the well points, the generator or equipment. All individuals entering this area must be approved by the SSO. Access control points will be established at the periphery of the EZ to regulate the flow of personnel and equipment into and out of the EZ. Initially, the EZ will extend a distance of 15 ft. from the edge of intrusive activity unless conditions at the Facility warrant either a larger or smaller distance as determined by the SSO. All persons entering the EZ will wear applicable PPE. It is anticipated that an EZ will be established at each individual area of intrusive work rather than encompass the entire Facility.

6.8.2 Contamination Reduction Zone

The Contaminant Reduction Zone (CRZ) is established outside the EZ to minimize the migration of contaminants from the EZ to clean or support areas, and to reduce the exposure potential of individuals leaving the EZ. All personnel must decontaminate as appropriate when leaving the EZ. A CRZ will be established adjacent to each individual area of intrusive work. The CRZ will be delineated by using warning tape, snow fence and/or traffic cones in

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addition to posting directions (to exit and enter the EZ) and signs, as appropriate, at the discretion of the SSO. No one will be permitted into the CRZ or EZ unless he/she is in full compliance with the requirements of this HASP.

6.8.3 Support Zone

The support zone is the outermost part of the work area and is located in a clean area, the Treatment Plant office or the general IPark campus, preferably upwind and immediately outside of the CRZ, or in the on-facility vehicles. Supplies, emergency equipment, vehicles and support personnel are located in the support zone. Normal work clothes are appropriate within this zone. The location of the support zone depends on factors such as accessibility, wind direction (if possible, it should be located upwind of the work area) and the presence of on-facility resources (e.g., roads, shelters and utilities). The MCP office and adjacent storage cage will be considered support zone areas unless the adjacent equipment is deemed to be in the exclusion zone.

6.9 ACTIVITIES

6.9.1 Personnel Requirements/Prohibitions

- No running or "horseplay."
- The required level of personal protective equipment must be worn by all on-facility personnel.
- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work zone; drinking of water, Gatorade® or equivalent fluids may occur in the work zone at the discretion of the SSO. Smoking, carrying lighters and/or matches is prohibited in the work zones.
- No contact lenses may be worn by personnel engaged in work requiring respirators.
- No jewelry (including rings) may be worn by personnel engaged in work except watches.
- Medicine and alcohol can increase the effects of exposure to toxic chemicals; personnel taking any prescribed drugs or over-the-counter medication that may affect their performance in the (i.e., cause drowsiness, photosensitizing agent) should inform the SSO or Human Resources Representatives of this fact. They shall not be assigned to operations where the potential for absorption, inhalation or ingestion of toxic substances exists. Alcoholic beverage intake will not be allowed during breaks.
- Safety devices on equipment must be left intact and used as designed.
- Equipment and tools will be kept clean and in good repair and used only for their intended purpose.
- A large-faced mallet will be used for driving wooden stakes; small-faced hammers, such as a claw hammer, may not be used for driving wooden stakes.

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- Eye protection must be worn when any hammering or pounding may produce flying particles or slivers.
- Leather gloves must be worn when handling objects that may produce slivers (e.g., wooden stakes).
- Whenever possible, personnel should work from a position upwind of sources of exposure to contaminants.
- All persons entering and/or working work zone will read sign and become familiar with this HASP. A copy of the HASP will be available at the Facility through the SSO.
- Field personnel will use the “buddy system” (i.e., working in pairs) when in the work zone unless the requirements of URS SMS 084, Lone Worker, are being followed. Buddies shall prearrange hand signals for communication. Visual contact shall be maintained between crew members at all times. Crew members must observe each other for signs of toxic exposure. Indication of adverse effects include, but are not limited to:
 - changes in complexion and skin discoloration;
 - changes in coordination;
 - changes in demeanor;
 - excessive salivation and pupillary response; or,
 - changes in speech pattern.
 - Also, employees shall inform each other of non-visual effects of toxic exposure such as:
 - headaches;
 - dizziness;
 - nausea;
 - blurred vision;
 - cramps; or,
 - irritation of eyes, skin or respiratory tract.
- All personnel will bring to the attention of the SSO or Facility Manager any unsafe condition or practice associated with work activities that they are unable to correct themselves.
- Hands will be thoroughly cleaned prior to smoking, drinking, eating or other sanitation activities.
- Legible and understandable precautionary labels shall be affixed prominently to containers of contaminated scrap, waste, debris and clothing.
- Containers shall be moved with proper equipment only. Containers shall be secured to prevent dropping or loss of control during transport.
- Emergency equipment shall be located in storage areas in readily accessible locations which will remain minimally contaminated in an emergency.

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6.9.2 Equipment Operation

The following information warrants extra attention regarding work around equipment (e.g., generators) and heavy materials:

- Hard hats, steel-toed work boots and safety glasses must be worn.
- Pay attention at all times.
- Maintain visual contact at all times.
- Only qualified persons are to operate equipment..
- Never use a piece of equipment unless you are familiar with the operation; this applies to light as well as heavy equipment.
- Hearing protection will be provided, if requested by an employee, and is required any time noise levels exceed 85 dBA (8-hour average) or 100 dB peak (impact/impulse).
- Be sure that underground and overhead power lines, sewer lines, gas lines and telephone lines have been identified and that they will not present a hazard in the work area.
- Wear high visibility vests at all times. Additional information about working in traffic areas is presented in URS SMS 032, Work Zone Traffic Control.

All work involving hand tools and portable equipment must be performed in accordance with URS SMS 016, Hand Tools and Portable Equipment. See URS SMS 061, Machine Guarding, for additional information about this subject.

6.9.3 Manual Material Handling

The following are guidelines to follow when working with heavy materials:

- be aware of footing at all times;
- use chains, hoists, straps and any other equipment to safely aid in the moving or lifting of heavy objects/materials;
- use your legs, not your back;
- do not manhandle filled drums;
- get help whenever in doubt about a material's weight; and,
- use the "buddy system."

Additional information concerning working with heavy materials is presented in URS SMS 069, Manual Material Handling.

6.9.4 Safety Precautions when Sampling

All personnel engaged in sampling operations shall wear safety glasses or goggles, chemical-resistant steel-toed work boots and hard hats (if overhead hazards are present), and hearing protection (if required) unless working in occupied IPark tenant building areas. As tools and equipment can create hazard, the following procedures are to be followed during these work activities:

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- hard hats are required if working near overhead hazards;
- goggles, safety glasses or face shields, as appropriate, will be worn when operating power tools;
- gloves are required to protect hands;
- no loose-fitting clothing, jackets with hoods, jewelry or free long hair is permitted near operating equipment;
- hands must be kept away from the moving parts of machinery when operating;
- all crews will consist of at least two people, one of which will include a SSO or designated team member, to monitor activities unless the requirements of URS SMS 084, Lone Worker, are being followed.
- no sampling will occur during impending electrical storms or when rain or icy conditions create a work hazard.

See URS SMS 061, Machine Guarding, for additional information about this subject.

6.9.5 Housekeeping

Housekeeping is a very important aspect of an investigation program and will be strongly stressed in all aspects of work. Good housekeeping plays a key role in occupational health protection and is a way of preventing dispersion of dangerous contaminants. All work areas will be kept as clean as possible at all time and spills will be cleaned up immediately. Housekeeping will be the responsibility of all employees.

To minimize the spread of contamination beyond the work facility, URS will implement a housekeeping program for activities. The program will include:

- checking the work area at the end of each work day to ensure that tools, chemicals, etc. are properly secured and that all work is properly containerized;
- changing of wash and rinse water for hands, face and equipment when the water becomes visibly dirty; and,
- periodic (daily minimum) removal of all garbage bags and containers used to dispose of food products, plastic inner gloves and contaminated disposable clothing.

URS SMS 021, Housekeeping, presents additional information on this subject.

6.9.6 Sanitation

Potable Water

- An adequate supply of potable water will be provided.
- Portable containers used to dispense drinking water will be capable of being tightly closed and equipped with a tap. Water will not be "dipped" from the container.
- Containers used to distribute drinking water will be clearly marked and not used for any other purpose.

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- When single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups will be provided.

Non-Potable Water

- Outlets for non-potable water will be identified to clearly indicate that the water is unsafe and is not to be used for drinking, washing or cooking purposes.
- There shall be no cross-contamination (open or potential) between potable and non-potable water systems.

Toilet Facilities

- Permanent toilet facilities are provided in several locations on the site including the treatment facility and the IPark building.

Food Handling

- Food handling will not be permitted in the CRZ or EZ.
- URS SMS 030, Sanitation, presents additional information on this subject.

6.9.7 Notifications

All personnel must inform the SSO before entering a CRZ or EZ.

IF ANY PREVIOUSLY UNIDENTIFIED HAZARDS ARE DISCOVERED DURING ANY FIELD WORK, LEAVE THIS AREA OF THE FACILITY IMMEDIATELY AND CONTACT THE SSO FOR FURTHER INSTRUCTIONS.

6.9.8 OSHA Information Poster

In accordance with the Occupational Safety and Health Act of 1970, a copy of the OSHA information poster must be present on all facilities. This poster is provided in Appendix C. It should be posted at full size (11 inches x 17 inches) in the office trailer or other conspicuous area. If the Facility does not have such a facility, it should be maintained in the copies of the HASP.

See URS SMS 023, Lockout Tagout, for additional information about securing equipment in service.

6.9.9 Management of Change

In the event of unaccounted for events or unforeseen circumstances arising which disrupts the standard operating procedures or work plans set forth, changes will need to be adapted in a safe manner to limit the chance of a "quick change" impacting the safety of personnel. Examples of temporary changes are changes due to weather, alterations to facility layout, or absent workers. Examples of permanent change are changes in organizational structure or reporting lines, alterations in client requirements, or reworking of the scope of work. Regardless of the duration of the change, operators must identify the risk, analyze the risk impact of the change, obtain authorizations from management, and finally implementing the

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change. As the OMM of the Treatment Plant transitions from the Start Up phase, changes to documents such as equipment specifications, Job Safety Analysis, and OMM Manual are expected, all of which may impact the risks on the job and this HASP. Impact to the facility risk will be evaluated for the impact that may occur downstream. Additional information including the "Management of Change Authorization Form" (Attachment 098-1 NA) is included in SMS 098 Management of Change and will be available in Appendix A.

6.10 PERSONAL PROTECTIVE EQUIPMENT

The level of PPE required for each of the tasks will be continually reevaluated as work progresses. It is expected that there will be increases or decreases in the level of PPE required for particular tasks. The PPE requirements for specific operations shall be agreed upon beforehand by the URS Project Manager, the HSR and the SSO. A document to that effect will be drawn up, dated and signed by the URS Project Manager and SSO. At facility safety meetings, as required, the SSO shall inform personnel of the PPE requirements and announce changes and justification for these changes. The HSR will publish a change to this HASP if PPE changes are permanent and if the HSR considers the changes substantive.

Selection of the PPE specified for the Project is based on a review of the identified or suspected hazards, routes of potential exposure to workers (i.e., inhalation, skin absorption, ingestion, and skin or eye contact) and the performance of the PPE in providing a barrier to these hazards. In addition, the choice of PPE has been reviewed to match the work requirements and task-specific conditions to provide adequate protection without causing unnecessary physical impairment to the worker. The levels of PPE anticipated to be required for this project are Level D, and modified Level D.

6.10.1 Level D Personal Protective Equipment

Level D PPE may be used when the atmosphere contains no known hazard and when work functions preclude splashes, immersion or the potential for unexpected inhalation of or contact with hazardous levels of any chemical substance. Level D PPE consists of:

- cloth coveralls/work clothes;
- chemical resistant, steel-toed work boots; or steel-toed rubber boots; or rubber overboots or disposable boot covers over steel-toed work boots;
- American National Standards Institute (ANSI) Z87.1 – 2003 High Impact – compliant safety glasses (equipped with polycarbonate sideshields, as necessary, if prescription eyeglasses are worn) or goggles (hereinafter, safety glasses or goggles) when conducting, or in the vicinity of, any activity covered by this HASP;
- ANSI 107-2004 Class 2 or Class 3-compliant high-visibility safety vest (hereinafter, safety vest);
- ANSI Z89.1 – 2003, Type I, Class E – compliant hard hat (hereinafter, hard hat) when physical hazard to head exists;

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- latex, Nitrile®-butadine rubber or polyvinyl chloride (PVC) gloves (when handling potentially contaminated soil, water or other material) and work gloves for clean tasks; and,
- ANSI S3.19 – 1974 – compliant hearing protection (i.e., ear plugs or ear muffs) of an appropriate Noise Reduction Rating (hereinafter, hearing protection) if noise levels exceed 85 dBA (eight hour average) or 100 dB peak (impact/impulse).

6.10.2 Modified Level D Personal Protective Equipment

Modified Level D PPE may be used in areas that normally can qualify for Level D PPE, but where a potential hazard requiring a minor upgrade in the level of protection may exist. Modified Level D PPE consists of:

- uncoated, polyethylene-coated or Saranex®-impregnated Tyvek® coveralls or equivalent;
- chemical-resistant, steel-toed rubber boots; or steel-toed rubber boots; or rubber overboots or disposable boot covers over steel-toed work boots;
- safety vest;
- latex, Nitrile®-butadiene rubber or PVC gloves, and work gloves for clean tasks;
- hard hat (when physical hazard to head exists);
- safety glasses or goggles (when conducting, or in the vicinity of, any activity covered by this HASP); and,
- hearing protection (i.e., ear plugs or ear muffs) if noise levels exceed 85 dBA (eight hour average) or 100 dB peak (impact/impulse).

6.10.3 Limitations of Protective Clothing

The PPE ensembles selected for this Project are anticipated to provide protection against the types and concentrations of hazardous materials that may be encountered during 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 Tyvek® or equivalent coveralls, don a clean new garment after each rest break or at the beginning of each shift or when they become damaged or torn.
- Inspect all clothing, gloves and boots, both prior to and during use, for:
 - imperfect seams;
 - non-uniform coatings;
 - tears; and,
 - poorly functioning closures.

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- 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 must be discarded.

6.10.4 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® or equivalent coveralls). 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:

- 15 minutes midway between shift startup and lunch;
- lunch break (30 to 60 minutes); and,
- 15 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 018, Heat Stress.

6.11 EMERGENCY EQUIPMENT

In addition to emergency equipment specified elsewhere in this HASP (e.g., fire extinguishers), the following emergency equipment must be available at each location of intrusive activity:

- appropriately-sized first aid kit including CPR barrier;
- first aid directions; and,
- bottle of buffered, preservative-free saline eyewash solution (16 ounces minimum).

SDS requirements are 15 minute rinse of eyes. For this reason the 16 ounce eyewash solution is an interim measure for a worker until the eyewash station can be access for a longer duration rinse. The eyewash station is located on the west end of the process area.

6.12 EQUIPMENT DECONTAMINATION PROCEDURES

Field instruments should be decontaminated in accordance with the instructions of the manufacturer.

6.13 AIR QUALITY MONITORING INSTRUMENTATION

Air quality monitoring will be dependent on the specific operation, specific location and available data concerning that location. Personal air monitoring is conducted to provide real time warning of excessive exposure to contaminants and also to provide a characterization of personnel exposure for this work.

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While performing activities including carbon vessel sampling, pressure verification at sub-slab monitoring points, condensate disposal, air quality surveys must be performed and the results recorded. Several instruments which may be used to monitor air quality are discussed below:

- **Photoionization Detector**

The Thermo Model 580B OVM Photoionization Detector (PID) with an 11.7 electron volt lamp or equivalent will be used to detect trace concentrations of certain organic gases and a few inorganic gases in the air. This PID was selected for the Project due to its ability to quantify the group of contaminants of concern at this Facility (the ionization potential for other types of PIDs should be similar). A PID detects mixtures of compounds simultaneously. PID readings do not measure concentrations of any individual compound when a mixture of compounds is present. Concentrations of these chemical constituents are measured in parts per million (ppm).

The PID will be calibrated twice during each 8-hour work shift (i.e., before start of work and at the conclusion of work) using an isobutylene standard for calibration. Calibrations will be documented. PID readings must be measured in the breathing zone of the most highly exposed worker (i.e., closest to the source) at least each 30 minutes.

6.14 AIR QUALITY MONITORING PROGRAM

6.14.1 Air Quality Monitoring Locations and Frequency

Air quality monitoring will be initially performed using a PID at least each 30 minutes in the breathing zone of the most highly exposed worker (i.e., closest to the source) at the Facility. All air quality measurements should be made in the breathing zone of personnel who, in the opinion of the SSO, are most exposed to airborne contaminants.

Air quality monitoring frequencies and locations using these and other instruments may be modified by the SSO based on actual conditions.

6.14.2 Determination of Background Levels of Organic Vapors, and Aerosols and Fugitive Dust

Background levels for the purpose of evaluating PID readings will be taken at least twice per work shift (i.e., before start of work and at the conclusion of work). Background levels will be taken in an area free of contaminants. Once work at the Facility commences, alterations may require relocation of the originally established background measurement area. Although background measurements will be taken, air quality monitoring response levels as shown in Table 2, are not to be affected by these measurements unless background contaminants are identified and an Addendum addressing this issue is prepared by the HSM.

6.14.3 Initial Levels of Protection and Air Quality Monitoring Response Levels

A number of response levels will be used during work if airborne contaminants are encountered during air monitoring. The HSR will be notified as soon as possible of

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upgrading from the initial levels of protection. Initial Levels of Protection and response levels applying to the activities covered by this HASP are contained in Table 2.

6.15 RESPIRATORY PROTECTION PLAN

Respiratory protection is not anticipated for the work activities authorized by this HASP. Should actual work procedures require respiratory protection, an addendum to this HASP must be prepared by the HSR and approved by the URS Project Manager and the HSM. Activated carbon replacement in the carbon tanks is anticipated to be performed by others. The removal and replacement procedure will not be determined until the activated carbon replacement is needed. When a procedure is determined anticipated respiratory protection needs will be included by way of addendum.

6.16 HEAT STRESS MONITORING

To monitor the worker, the following should be measured:

- Heart Rate – The radial pulse should be counted during a 30-second period as early as possible in the rest period.
 - If the heart rate exceeds 110 beats per minute at the beginning of the rest period, the next work cycle should be shortened by one third and the rest period should be kept the same.
 - If the heart rate still exceeds 110 beats per minute at the next rest period, the following work cycle should be shortened by one third.
- Oral Temperature – A clinical thermometer (3 minutes under the tongue) or similar device should be used to measure the oral temperature at the end of the work period (before drinking).
 - If the oral temperature exceeds 99.6 °F (37.6 degrees Celsius (°C)), the next work cycle should be shortened by one third, without the rest period being changed.
 - If the oral temperature still exceeds 99.6 °F (37.6 °C) at the beginning of the next rest period, the following work cycle should be shortened by one third.
 - A worker should not be permitted to wear a semi-permeable or impermeable garment when his/her oral temperature exceeds 100.6 °F (38.1 °C).

Proper training and preventative measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important, because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat injuries (see a table below). To avoid heat stress, the following steps should be taken:

6.16.1 Signs and Symptoms of Heat Stress

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

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

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

Heat exhaustion occurs from increased stress on various body organs, including inadequate

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blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale, cool and moist skin
- Heavy sweating
- Dizziness, fainting and nausea.

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

- Red, hot and usually dry skin
- Lack of or reduced perspiration
- Dizziness and confusion
- Strong, rapid pulse
- Coma is possible if left untreated.

Prevention. Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or diluted drinks) before beginning work. Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6) of fluid per day are recommended, but more may be necessary to maintain body weight.

Encourage workers to maintain an optimal level of physical fitness. Where indicated, acclimatize workers to facility work conditions.

Provide cooling devices to aid natural body heat exchange during prolonged work or severe heat exposure.

Train workers to recognize, identify and treat heat stress. At a minimum, this training should include basic first aid procedures such as moving the individual to the shade and loosening their clothes.

To ensure operational and personal safety of personnel, initial heat stress monitoring for workers wearing protective clothing will be conducted based on the table below. Additional information on heat stress is included in URS SMS 018, Heat Stress.

ADJUSTED TEMPERATURE	TIME INTERVALS FOR HEAT STRESS MONITORING
90°F or above	After each 15 minutes of work
87.5 to 90°F	After each 30 minutes of work
82.5 to 87.5°F	After each 60 minutes of work
77.5 to 82.5°F	After each 90 minutes of work
72.5 to 77.5°F	After each 120 minutes of work

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6.17 COLD STRESS MONITORING

Persons working outdoors in temperatures at or below freezing may be frostbitten. Areas of the body most susceptible are the extremities. Workers should be aware of loss of feeling in these areas. A more serious form of cold stress is hypothermia. This results when the body loses heat faster than it can produce it and can result in death. Cold stress procedures are discussed in URS SMS 059, Cold Stress.

6.18 WORK DURING DARKNESS

Work may be performed at times when low light conditions exist, although it is not anticipated for the work activities authorized by this HASP. If the level of lighting impacts safety of work operations, work must cease until appropriate procedures can be established. Adequate illumination (i.e., a minimum of 5 foot-candles throughout the work area) will be provided using lanterns and/or spotlights to enable personnel to conduct their work. Each work crew will consist of a minimum of two individuals.

All illumination will meet the requirements of OSHA Regulation 29 CFR Part 1910.120(m).

6.19 CONFINED SPACE WORK

Confined space entry is anticipated for the work activities authorized by this HASP. Instances where a URS employee or Contractor enters a space that is:

- Large enough and so configured that personnel may bodily enter and perform assigned work,
- Limited or restricted by means of entry or exit,
- Not designed for continuous occupancy

A permit will be required at any spaces which meets the above definition until it has been determined that one or more potential hazard does not exist in the space. Examples of hazards are atmospheric, thermal, chemical, biological, mechanical force, electrical, and engulfment. So long as anybody part crosses the plane of entry, the space has been "entered" and the consequential controls are required.

The trained and appointed supervisor assesses the confined space, evaluates the hazards using the Confined Space Entry Permit (SMS Attachment 010-1 NA), determines the requirements to make the space fit for entry such as ventilation, prepares the authorized entrants, attendants, and rescuers.

Preparing the team includes identifying the equipment necessary and assigning operators. Once the space has been isolated from as many hazards as possible, electrical equipment is introduced into the space as well as atmospheric tests so the entry team can see into the space and evaluate the conditions prior to entry. If ventilation is necessary, the space will be vented until conditions are suitable for entry. Once the rescue plan is coordinated, the actual entry by the authorized entrant will be permitted and the operation will begin.

This procedure is applicable for entry into carbon vessels or the condensate separator pit. Once the operation is concluded, the supervisor verifies the entrant is out safely and closes the permit and maintains the permit on facility for one year

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6.20 HOT WORK

If hot work is required, an addendum to this HASP must be prepared in accordance with applicable URS SMSs.

6.21 FACILITY SECURITY, FACILITY CONTROL AND FACILITY EVACUATION PROCEDURES

In emergency situations, the following actions will be enforced:

- All personnel will report to a prescribed designated area as soon as possible. If access to that area is prohibited due to the nature of the emergency, all personnel will meet at a location upwind from the emergency. These areas will be designated by the SSO at the Daily Facility Safety Briefing.
- Security and control of the work area will be the responsibility of the SSO. The SSO will coordinate the emergency situation with appropriate personnel and emergency responders (e.g., fire department, ambulance squad, haz-mat responders).
- If present, facility security personnel will not permit any additional personnel (with the exception of emergency response personnel) from entering the work area.
- The SSO will communicate with supervisors during emergencies. Supervisors will then relay information to their employees. Two-way portable radios, if available, or audio and/or visual signals will be used to communicate the nature of the emergency and response actions.

6.22 URS SUBCONTRACTORS

Subcontractors retained by URS and its subsidiary companies must follow the requirements of URS SMS 046, Subcontractor Health and Safety Requirements. The provision of URS SMS 046 are applicable to the operations of URS-retained subcontractors and sub-subcontractors of any tier. URS SMS 046 does not apply to "third party" contractor operations where there is no subcontract relationship between the contractor and URS. Health and safety issues regarding "third party" contractor operations are governed by project-specific contracts and are not covered by URS SMS 046.

URS SMS 046 provides requirements for the pre-evaluation of subcontractor safety programs. It also provides requirements on contractual risk management, subcontractor safety performance, and responsibilities of the URS Project Manager.

Completed Subcontractor Safety Evaluation forms (Attachment 46-1 to URS SMS 046) must be kept in the project files; in addition, a copy of this form must be submitted to the HSR prior to that subcontractor being contracted to perform work at the Facility. If the subcontractor meets the requirements of URS SMS 046 as defined in the Subcontractor Evaluation Criteria (Attachment 46-2 of URS SMS 046), no additional verification is required. If a potential subcontractor does not meet URS SMS 046 safety requirements, a Subcontractor Variance Form (Attachment 46-3 of URS SMS 046) must be completed and submitted to the HSR for review by the URS Project Manager. Once the variance has been approved by the HSR, a copy of the approved form must be placed in the project files and provided to the HSR. This variance must be obtained prior to the subcontractor being

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retained by URS. Variances are facility-specific; they are applicable to only a single project and the scope of work defined in the variance when it is approved (i.e., variances obtained for a subcontractor on a project may not be applied to a different project for that subcontractor even if the scope of work is similar or, even, identical).

To facilitate review of safety programs of potential subcontractors, a list of contractors which have previously submitted safety information is provided on URS's Health, Safety, and Environment (HSE) webfacility, "The Source." To access this list, click on "Related Links"; the list may be found under "Subcontractor Safety PreQualification."

Subcontractors are required to have appropriate worker, supervisor or manager Hazwoper certifications to perform work at the facility.

6.23 BEHAVIOR BASED SAFETY

URS has implemented a behavior based safety program to enhance the performance of our Corporate HSE Programs. Behavior based safety is a process that provides a higher level of safety excellence by promoting proactive responses, building ownership and developing opportunities which relate to employee safety. A primary concept of behavior based safety is that most accidents are due to unsafe behavior, and that behavioral changes may be made that significantly reduce accident risk. URS SMS 072, Behavior Based Safety, provides additional information about this program. As stated in URS SMS 072, it is the responsibility of the URS Project Manager to implement the behavior based safety procedures. The URS Project Manager must mandate the implementation of safety observations to personnel using the Behavior Based Safety Checklist (Attachment 72-1 of URS SMS 072); copies of completed checklists must be kept in the project files. If any "unsafe" observations are indicated on the checklist, a copy of that checklist must be provided to the HSR within two working days of the date of the observation.

6.24 ELECTRICAL SAFETY

Electrical hazards exist in areas holding specialized equipment as well as in the office, restrooms, tenant spaces, and throughout the IPark campus. When electricity is used, installed, maintained, or live circuits are access, workers will reduce the risk of shock, burn, arc-blast, fire, & explosions due to the electrical work. Injuries due to work with electrical hazards can lead to the risks mentioned as well as death due to electrocution and, in the case of electrical control rooms such as the one in the Treatment Plant, arc-flash exposure. The energy entering into the Treatment Plant is greater than 20 kilovolts and steps down to 480 volts. Work performed on live systems greater than 50 volts must be done by qualified licensed or journeyman electrician or HVAC mechanic. Refer to the OMM Manual for the names of URS prequalified subcontractors who fit this description. Work done on or near live circuits equal to or exceeding 50 volts should not be done without arc-flash protection protocols as outlined in Section L of the URS SMS 012 Electrical Safety in Appendix A. Additionally, successful fulfillment of Lockout and Tagout procedures are critical to the safe completion of electrical work. Lockout and Tagout procedures remind operators that all electrical systems are live until verified as de-energize and grounded. Further, no work is to be done near electrical circuits unless verification has been provided that the circuit is de-energized, grounded, or guarded.

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Operators will also consider hazardous locations for future electrical work plans and will consider the use of barriers. Further details on general safe work practices including details on extension cords and work planning are described in URS SMS 012.

Section 7 Emergency Recognition and Prevention

The purpose of this section of the HASP is to address how personnel will respond to on-facility emergencies. The types of potential emergencies which are addressed by this HASP include:

- fires;
- chemical exposures to personnel; and,
- physical injuries to personnel.

After any emergency, the SSO will document in a detailed emergency summary report the nature of the emergency, causes for occurrence, chemical exposures or physical injuries to personnel, physical damage and emergency responses taken. This report will be in addition to the Injury/Illness/Incident Report. Copies of this report must be submitted to the URS Project Manager and the HSR within 24 hours of the emergency. The HSR will review this report as soon as possible and issue a critique of the response to the emergency within 48 hours of receiving the report; this critique will be distributed to all personnel receiving copies of the Injury/Illness/Incident Report. If this critique indicates that additional emergency response equipment, training, personnel or response procedures are required at the Facility; these actions will be implemented as soon as possible.

7.1 EMERGENCY RECOGNITION AND PREVENTION

The provision of URS SMS 003 are applicable to the operations of URS-retained subcontractors and sub-subcontractors of any tier.

7.1.1 Fires

Fires are possible whenever flammable gases or vapors are present in proper concentrations and an ignition source is present. Construction equipment itself provides an ignition source. Ignition sources (including construction equipment) will be turned off and the area evacuated if vapors or gases reach 10 percent of the LEL.

7.1.2 Chemical Exposures

Work will be performed in such a manner that exposure to contaminants through skin or eye contact, inhalation or ingestion is minimized. Work practices that will be followed to reduce chemical exposures include:

- PPE, as specified in Section 6, for the appropriate work activities and areas as defined by the SSO, will be used by all personnel. An addendum to the HASP must be prepared by the HSR and authorized by the URS Project Manager and HSR in order to modify the PPE requirements.
- Keep hands away from face during work activities.
- Minimize all skin and eye contact with contaminants.

Early recognition of chemical exposure symptoms is essential to the prevention of serious chemical exposure incidents. Symptoms of exposure to the type of compounds potentially present at the Facility include the following: fatigue; weakness; eye, nose or throat irritation; headache; dizziness; nausea; vomiting; malaise; tremors; aggressive confusion; cyanosis (i.e., blue color to skin); anemia and muscle spasms.

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If a person experiences any of these symptoms or others, or recognizes any of the symptoms in a fellow worker, the person experiencing the symptoms will stop work and report his/her symptoms to the SSO. If the symptoms persist or appear to be damaging in any way, the SSO will make arrangements to have the individual taken to a hospital for medical treatment as soon as possible. If symptoms are serious, work activities in the area where the person was exposed will be discontinued until more is known about the incident.

7.1.3 Physical Injuries

Personnel should constantly look for potential safety hazards such as holes or ditches; precariously positioned objects such as drums or equipment that may fall; sharp objects such as nails, metal shards and broken glass; protruding objects at eye or head level; slippery surfaces; steep grades; uneven terrain or unstable surfaces such as walls which may cave in or flooring that may give way. Personnel will inform the SSO of any potential hazards identified so that corrective action can be taken.

7.2 EMERGENCY ALERTING PROCEDURES

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"

The SSO will use a portable radio or direct contact to alert the appropriate work groups when and if an emergency occurs. The SSO and any isolated work group will carry two-way radios if reasonable contact cannot be maintained. If radios fail, blast(s) from an alarm horn will be used to signal workers. The following signals will be used:

- one long blast evacuate area
- two short blasts localized problem (no danger to workers)
- two long blasts all clear
- three short blasts medical emergency

7.3 EMERGENCY TELEPHONE

The closest accessible telephone during all working hours will be identified by the SSO prior to commencing activities. When working in remote areas, a portable telephone must be available. Emergency telephone numbers will be posted in URS vehicle(s) and any office trailer and will be available from the SSO present at all facility activities.

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7.4 EMERGENCY MEDICAL RESPONSE

The SSO will have the primary role in responding to all emergencies in the work area. All personnel present in the work area will contact the SSO in case of emergency. The SSO or designee must be present at the Facility during all work activities in the work zone. If reasonable contact cannot be maintained, the SSO will carry a two-way portable radio and each isolated work activity group will also have a two-way portable radio. If any emergency such as a fire, chemical exposure or physical injury occurs, the SSO will be immediately contacted. The SSO, or designee performing in this capacity, must have First Aid and bloodborne pathogens training, and be familiar with universal precautions. In cases of emergency response, all personnel will take direction from the SSO. If the SSO or designee is not present or has been injured, the Facility Manager will respond to emergencies.

7.5 EMERGENCY RESPONSE PROCEDURES

To obtain emergency medical treatment and ambulance service at the Facility, dial 911 (for cellular phones, be prepared to give the operator your name and location address). Other emergency telephone numbers are included in Table 3. This table will be maintained by the SSO and kept readily available in URS vehicle(s) and office. It will be revised and updated to reflect any and all new emergency information. The revised table will be approved by the URS Project Manager before distribution.

The SSO will have the primary role in responding to all emergencies in the work area. All personnel present in the work area will contact the SSO in case of emergency. The SSO or designee must be present at the Facility during all work activities in the work zone. If reasonable contact cannot be maintained, the SSO will carry a two-way portable radio and each isolated work activity group will also have a two-way portable radio. If any emergency such as a fire, chemical exposure or physical injury occurs, the SSO will be immediately contacted. The SSO, or designee performing in this capacity, must have First Aid and bloodborne pathogens training, and be familiar with universal precautions. In cases of emergency response, all personnel will take direction from the SSO. If the SSO or designee is not present or has been injured, the Facility Manager will respond to emergencies.

7.5.1 Physical Injury

In the event of physical injury, the following steps will be taken:

- evaluate the extent of injuries;
- summon emergency help (dial 911; for cellular phones, be prepared to give the operator your name and location address) as deemed necessary by the SSO or the SSO's designee;
- modify decontamination procedures as appropriate considering the actual levels of contaminants on the person, if any, and type or severity of injuries; and,
- apply First Aid.

If minor injuries occur, decontaminate and transport the individual to First Med Urgent Medical Care (see Figure 5 for a map and directions). Contact the URS Occupational Nurse

Section 7 Emergency Recognition and Prevention

about the nature of the injury prior to obtaining medical attention for minor injuries. Medical attention must be sought regardless of how minor the injuries appear to be.

7.5.2 Injury Due to Chemical Exposure

If a suspect chemical exposure occurred use the following procedure:

Skin Contact: Flush with water. Remove clothing, if necessary. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide appropriate medical attention.

Inhalation: Move person away from area; decontaminate and transport person to the hospital for medical attention.

Ingestion: Decontaminate and transport person to the hospital for medical attention.

Eye Contact: Irrigate with water for at least 15 minutes. Decontaminate and transport person to the hospital for medical attention.

7.5.3 Contacting Emergency Services

Emergency telephone numbers are listed in Table 3. If emergency medical treatment is required, the following procedures will be taken:

- Call 911 (for cellular phones, be prepared to give the operator your name and location address) to request an ambulance.
- **Contact the URS Occupational Nurse (Jeanette Schrimsher)**

The Emergency Hospital selected for this project is:

Long Island Jewish Medical Center
270-05 76th Avenue
New Hyde Park, NY 11040
Phone: (718 or 516) 470-7000

Route to Emergency Room is through the Lakeville Road entrance to the hospital complex (See Figure 4 for a map and directions).

7.5.4 First Aid Medical Services Facility

If the injury is clearly minor (e.g., a minor burn or cut) contact the URS Occupational Nurse (Jeanette Schrimsher). After decontamination if needed, the injured individual may be driven to the First Aid Medical Services Facility. If there is any question of the severity of an injury, call for emergency services by dialing 911.

The First Aid Medical Services Facility selected for this project is as follows:

First Med Urgent Medical Care
292 Herricks Road
Mineola, New York 11501
Phone: (516) 294-8910

See Figure 5 for a map and directions to the facility.

Section 8

Personnel Records

8.1 GENERAL

Records shall be kept documenting the facility safety program. Logs and records will be kept for training, safety meetings, injury/exposure and air monitoring data. A daily project safety log will be maintained by the SSO. This log shall include a description of the work being conducted, any changes in the operations, names of all personnel working at the Facility, types of air monitoring equipment being used and how calibrated, air monitoring results, level of PPE being worn, accidents and injuries, and a description of any unusual occurrences or physical complaints.

8.2 PERSONNEL RECORDS

Records shall be kept for each on-facility individual. Records may include a medical clearance statement from a qualified physician, and fit test and training documentation. When facility safety meetings are conducted, an attendance sheet, including topics discussed, must be kept.

The following forms must be completed, as appropriate, by the SSO:

- Job Safety Analysis Forms
- Equipment Calibration Log;
- Project Safety Log;
- Compliance Agreement Form;
- URS Injury/Illness/Incident Report; and,
- Safety Orientation Meeting/Daily Facility Briefings Form.

The SSO will be responsible for completing the Equipment Calibration Log, the Project Safety Log, the URS Injury/Illness/Incident Report and the Facility Safety Briefing Form. The SSO will also ensure that all URS and Contractor personnel working on the Facility complete the Compliance Agreement Form and sign the Facility Safety Briefing Form. The URS Project Manager will be responsible for completing any accident or investigation information required by the Client. All completed forms will be provided to the URS Project Manager for placement in the project files.

Copies of these forms (with the exception of the URS Injury/Illness/Incident form which is contained in URS SMS 049) are provided on the following pages.

EQUIPMENT CALIBRATION LOG

Project Name: _____

Project No. _____

DATE	TIME	INITIALS	INSTRUMENT	CALIBRATION SOLUTION OR GAS CONCENTRATION	ADJUSTMENTS REQUIRED AND COMMENTS

Section 9

Forms

Project _____

PROJECT SAFETY LOG

Date: _____

Logged by: _____

Weather: _____

Field Tasks: _____

URS Personnel (or contractors) working on facility (name and affiliation):

URS Personnel (or contractors) working in exclusion zone:

Visitors to Facility:

Air Quality Monitoring Measurements:

Type		Time		Instrument Parameter		Reading		Locations
Background								
Exclusion Zone								

Level of PPE: _____

Comments on other safety-related matters (including infractions, accidents, injuries, unusual occurrences, physical complaints):

**URS CORPORATION HEALTH AND SAFETY PLAN
COMPLIANCE AGREEMENT FORM**

PROJECT: LMC Great Neck SSDS Project OMM
Lake Success, New York

CLIENT: Lockheed Martin Corporation
Cranbury, New Jersey

URS PROJECT NO.: 11130685

I, _____, have received a copy of the Health and Safety Plan (HASP) dated June 10, 2013 for the above-referenced project to review. I have read the HASP, understand it, and agree to comply with all its provisions. I understand that I can be prohibited from working on the Project for violating any of the safety requirements specified in the HASP.

Signed:

Signature

Date

Company

Section 9

Forms

SAFETY ORIENTATION MEETING / DAILY SAFETY BRIEFING FORM

Project Name _____

Project Number _____ Date _____ Time _____

Location _____

Type of Work _____

SAFETY TOPICS PRESENTED

Yes/No

Names and Responsibilities of Personnel _____

Drilling Procedures _____

Work Area Facility Control Measures _____

Personal Protective Equipment _____

Chemical Hazards _____

Physical Hazards _____

Biological Hazards _____

Review of Job Safety Analysis Forms _____

Required Work Procedures _____

Air Monitoring _____

Personnel and Equipment Decontamination _____

Respiratory Protection _____

Emergency Procedures _____

Other _____

ATTENDEES

Name (Printed)

Signature

Meeting Conducted by: _____

Facility Safety Officer: _____

Section 10

Bibliography

1. American Conference of Governmental Industrial Hygienists, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
2. American Conference of Governmental Industrial Hygienists, Guide to Occupational Exposure Values.
3. National Institute for Occupational Safety and Health, Pocket Guide to Chemical Hazards.
4. U.S. Occupational Safety and Health Administration, 29 CFR 1910.

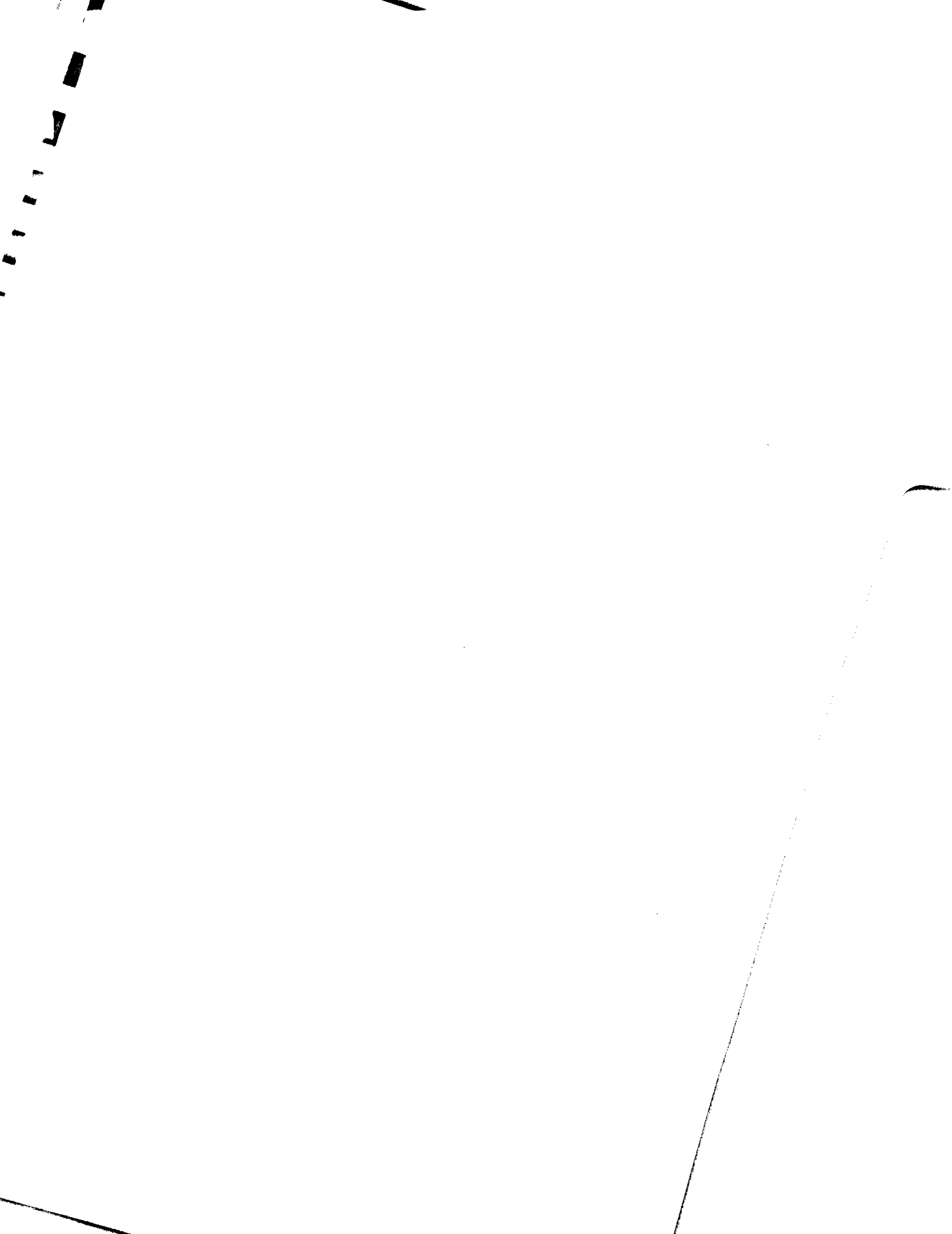


TABLE 1: HEALTH AND SAFETY RESPONSIBILITIES AND AUTHORITIES

URS REGIONAL HEALTH AND SAFETY MANAGER: Benjamin J. Bertolotti, CIH

Responsibilities

- direct the implementation of the health and safety program of the Operating Group and provide recommendations for improvement of the program;
- coordinate health and safety activities of the Operating Units in the Operating Group;
- determine need for project HASPs;
- maintain a high level of understanding regarding health and safety regulations affecting URS;
- review and approve HASPs;
- monitor implementation of HASPs;
- investigate reports of incidents or accidents and report to URS Health and Safety Director;
- provide employee health and safety training in the Operating Group;
- determine whether an accidental exposure or injury merits a change in the affected individual's work assignments and whether changes in work practices are required;
- coordinate Operating Units with regard to health and safety equipment needs; and,
- supervise HSMs through a matrix management system, in cooperation with the Operating Unit Managers.

Authority

- approve or disapprove HASPs;
- direct Operating Unit HSR to prepare project HASPs;
- access and review project files;
- direct changes in personnel work practices to improve health and safety of employees;
- remove individuals from projects, if their conduct jeopardizes their health and safety or that of co-workers; and,
- suspend work on any project that jeopardizes the health and safety of personnel involved.

URS PROJECT MANAGER: Van Ekambaram

Responsibilities

- assure that projects are performed in a manner consistent with the URS health and safety program;
- assure that the project HASPs are prepared, approved and properly implemented;
- implement HASPs;
- assure that adequate funds are allocated to fully implement project health and safety; and,
- coordinate with the HSR on health and safety matters.

Authority

- assign HSM-approved SSO to project and, if necessary, assign a suitably qualified replacement;

- suspend activities if health and safety of personnel are endangered, pending an evaluation by the HSM; and,
- suspend an individual from activities for infractions of the HASP, pending an evaluation by the HSM.

OPERATING UNIT HEALTH AND SAFETY REPRESENTATIVE: Mona Parekh

Responsibilities

- administer the health and safety program within the Operating Unit;
- maintain a working understanding of key government health and safety regulations and URS health and safety policies;
- interface with Project Managers in matters of health and safety;
- report to HSR on health and safety matters;
- develop or review, approve or disapprove project HASPs prior to submittal to the HSR for review;
- conduct staff training and orientation on health and safety related activities;
- appoint or approve SSOs;
- monitor compliance with HASPs and conduct facility audits;
- assist Project Managers in obtaining required health and safety equipment;
- approve personnel to work on hazardous waste management projects with regard to medical examinations, and health and safety training; and,
- answer employee questions and concerns regarding health and safety.

Authority

- suspend work or otherwise limit exposures to personnel if health and safety risks are unacceptable;
- direct personnel to change work practices if existing practices are deemed to be hazardous to health and safety of personnel; and,
- remove personnel from projects, if their actions or conditions endanger their health and safety or the health and safety of co-workers.

FACILITY SAFETY OFFICER: Robert Cebula

Responsibilities

- direct health and safety activities on-facility;
- report immediately all safety-related incidents or accidents to the HSR and Project Manager;
- verify that URS and Contractor personnel working on-facility have met current training and medical clearance requirements;
- determine that air quality monitoring equipment is used properly by URS personnel in accordance with manufacturer's instructions and that the monitoring results are properly documented and filed;
- coordinate with the URS Project Manager and HSR to identify URS personnel on-facility for whom special personal protective equipment, exposure monitoring or work restrictions may be required;

- conduct safety meetings, as required;
- conduct daily facility safety inspections;
- assist the Project Manager in all aspects of implementing the HASP and addenda, if any; and,
- maintain health and safety equipment on-facility.

Authority

- implement emergency procedures as required;
- temporarily suspend activities if health and safety of personnel are endangered, pending further consideration by the HSM; and,
- temporarily suspend an individual from activities for infractions of the HASP pending further consideration by the HSM.

URS PROJECT PERSONNEL

Responsibilities

- take all reasonable precautions to prevent injury to themselves and to their fellow employees;
- perform only those tasks that they believe they can do safely and immediately reporting any accidents and/or unsafe conditions to the SSO or URS Project Manager;
- implement the procedures set forth in the HASP and reporting any deviations from the procedures described in that HASP to the SSO or URS Project Manager for action;
- notify the URS Project Manager and SSO of any special medical conditions (i.e., allergies) and seeing that all on facility URS personnel are aware of such conditions; and,
- reviewing the project-specific HASP and addenda, if any, and signing the Safety Plan Compliance Agreement.

Authority

- all personnel following this HASP have "stop work" authority in situations where they believe that injury to themselves, their fellow employees, Contractor or Client personnel or the public, and/or property damage may occur.

TABLE 2: ACTIVITY-SPECIFIC INITIAL LEVELS OF PROTECTION AND ACTION LEVELS

Location	Activity	Initial Level of Protection	Monitoring Requirements	Action Levels
Throughout Facility	All work activities authorized in Section 4, Work Activities.	Level D PPE	Organic vapors using PID with 11.7 eV lamp	>1 ppm reading corrected for Carbon Tetrachloride, Chloroform, Tetrachloroethene or Trichloroethene above background in the breathing zone (sustained reading). • Evacuate the work zone If free product is encountered or if visible contamination is observed, e.g., stains, odors, etc.: • Donn Modified Level D PPE

TABLE 3: EMERGENCY TELEPHONE NUMBERS

Emergency Rescue Services¹

Fire/Rescue:	911
Ambulance:	911
Police:	911

Hospital

Long Island Jewish Medical Center (516) 470-7000

270-05 76th Avenue

New Hyde Park, NY 11040

First Aid Medical Services Facility

First Med Urgent Medical Care (516) 294-8910

292 Herricks Road

Mineola, New York 11501

Government

National Response Center (800) 424-8802

Poison Control Center (800) 962-1253

NYSDEC (800) 457-7362 (Spill Hotline)

(518) 402-9543 (Tech Support)

USEPA National Response Center (800) 438-2327

Chemtrek (800) 262-8200

URS Corporation

Project Manager: Van Ekambaram (973) 883-8692 (office)

(201) 303-1393 (cell)

OMM Manager: Ralph Fasano (973) 883-8500 x8661 (office)

(201) 452-0271 (cell)

OMM Assistant Manager: John Lewyta (201) 983-3821 (cell)

Assistant Op/Facility Safety Officer: Robert Cebula (973) 883-8617 (office)

(973) 981-1166 (cell)

Regional HS Manager: Benjamin Bertolotti (973) 777-3003 (office)

(973) 572-3916 (cell)

URS Occupational Nurse: Jeanette Schrimsher (512) 419-6440 (office)

(512) 656-0203 (cell)

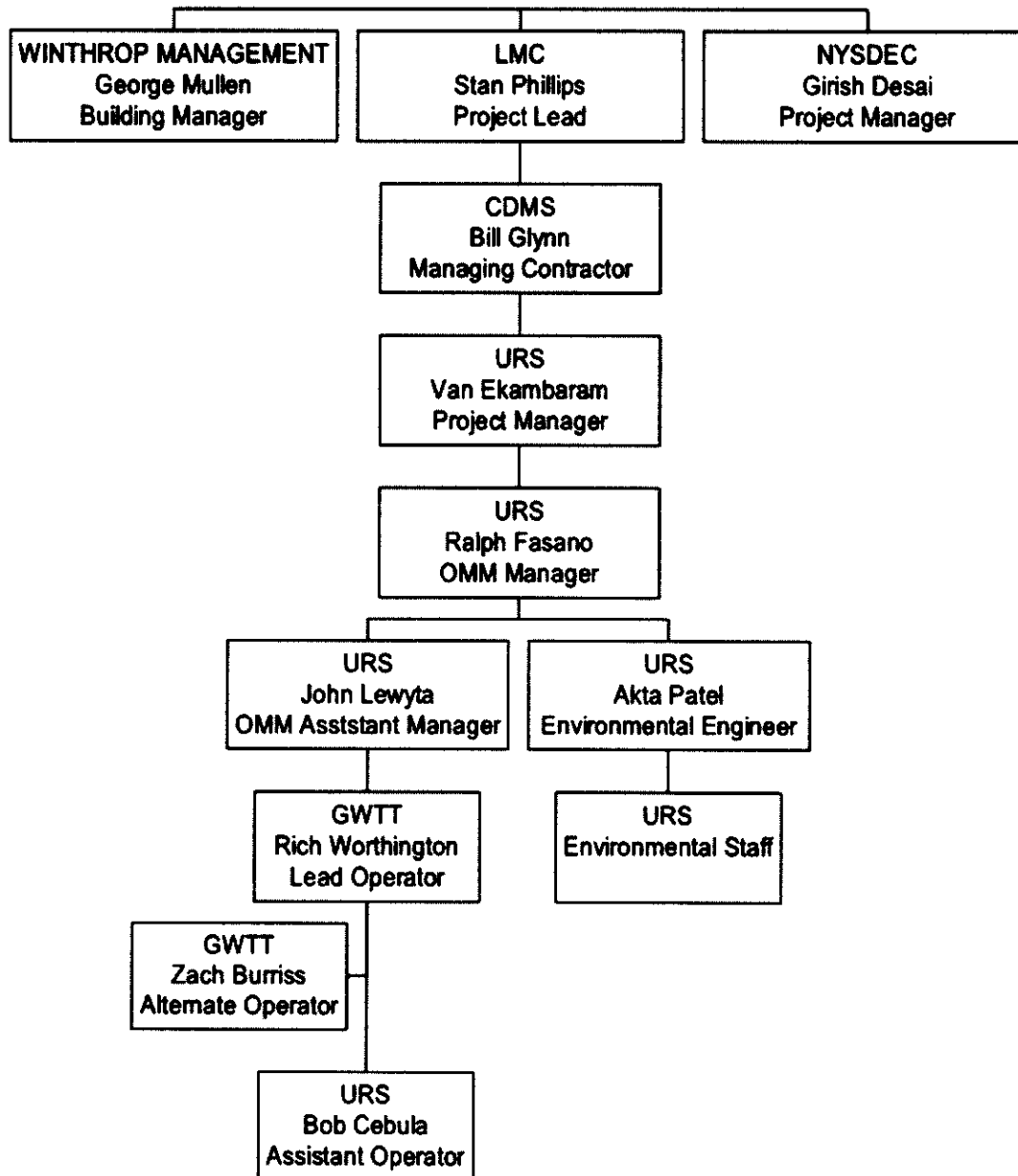
GWTT

Lead Operator: Rich Worthington (973) 534-4248 (cell)

¹ For cellular phones, be prepared to give the operator your name and location address.

FIGURE 1 – ORGANIZATION CHART

**FIGURE 1
LMC GREAT NECK
CONTRACT 3 SSDS PROJECT
OMM ORGANIZATION CHART**



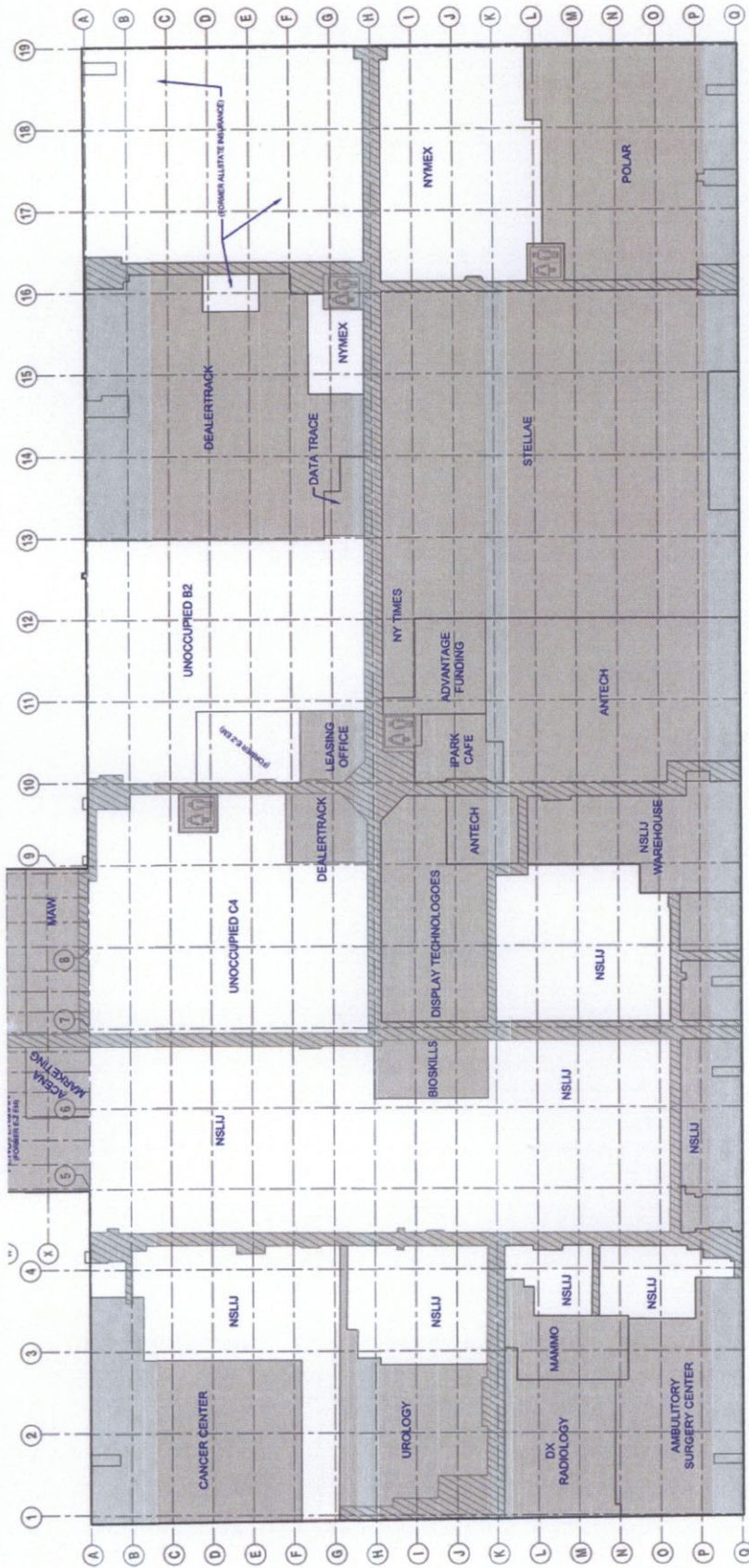


FIGURE 2
SITE PLAN
LMC GREAT NECK SSDS PROJECT
 scale 1" = 100'



FIGURE 4 - DIRECTIONS FROM FACILITY TO HOSPITAL

“A” = FIELD OFFICE IN INTERNAL ROAD AT FACILITY

“B” = LONG ISLAND JEWISH MEDICAL CENTER



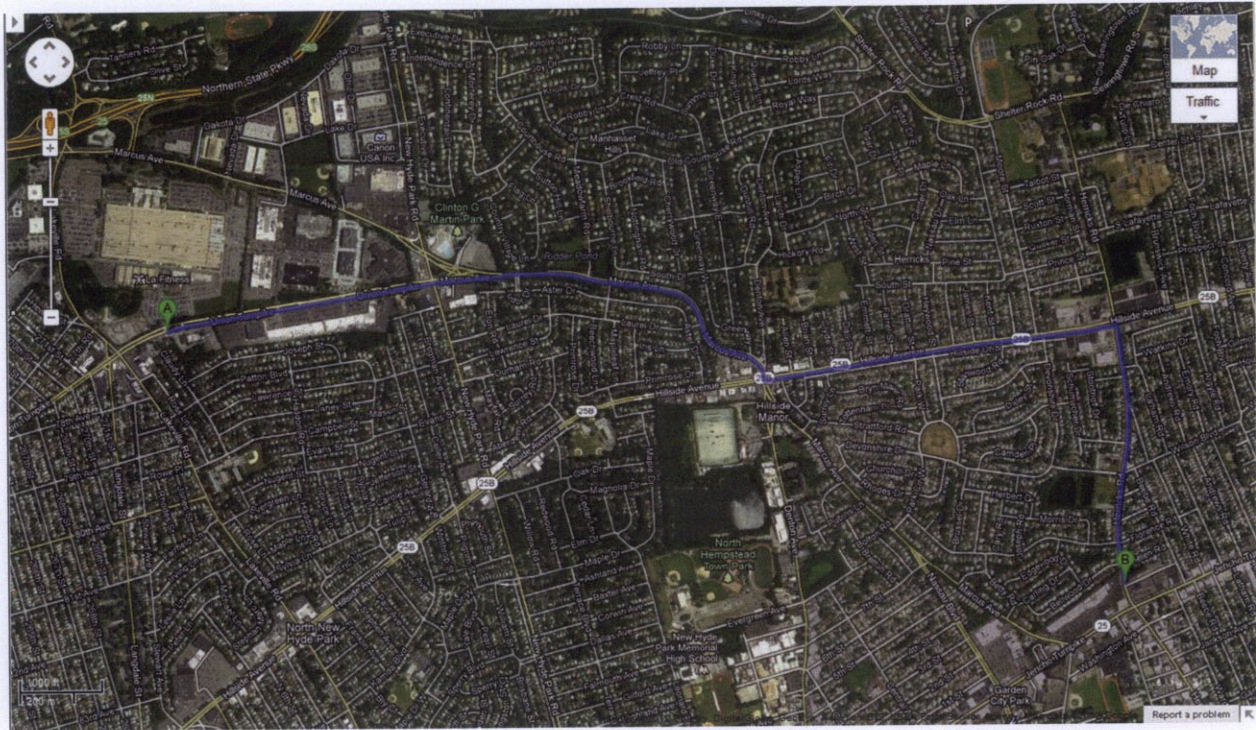
Directions to Long Island Jewish Medical Center:

- Head west on internal road at the Facility
- Proceed straight across Lakeville Road to entrance to hospital complex
- Follow signs to Emergency Room

FIGURE 5 - DIRECTIONS FROM FACILITY TO
FIRST AID MEDICAL SERVICES FACILITY

“A” = FIELD OFFICE IN INTERNAL ROAD AT FACILITY

“B” = FIRST MED URGENT MEDICAL CARE



Directions to First Med Urgent Medical Care:

- Exit the Facility through the Union Turnpike driveway.
- Turn left onto Union Turnpike.
- Continue across New Hyde Park Road; road name changes to Marcus Avenue.
- Turn left onto Hillside Avenue.
- Turn right onto Hendricks Road.
- Facility is on your left.

APPENDIX A

URS SAFETY MANAGEMENT STANDARDS

Hard copies available in URS office.

SMS 002	Hazard Communication (Worker Right-to-Know)
SMS 003	Emergency Preparedness
SMS 010	Confined Space Entry
SMS 012	Electrical Safety
SMS 014	Fire Protection and Prevention
SMS 017	Hazardous Waste Operations
SMS 021	Housekeeping
SMS 023	Lockout Tagout
SMS 024	Medical Screening and Surveillance
SMS 026	Noise and Hearing Conservation
SMS 029	Personal Protective Equipment
SMS 030	Sanitation
SMS 032	Work Zone Traffic Control
SMS 034	Utility Clearances and Isolation
SMS 038	Cranes & Derricks
SMS 040	Fall Protection
SMS 042	Respiratory Protection
SMS 046	Subcontractor Health and Safety Requirements
SMS 047	Biological Hazards
SMS 049	Injury/Illness/Incident Reporting & Notifications
SMS 055	Health, Safety and Environment Training
SMS 057	Vehicle Safety Program
SMS 059	Cold Stress
SMS 061	Machine Guarding
SMS 065	Injury Management
SMS 069	Manual Material Handling
SMS 070	Powered Industrial Trucks
SMS 072	Behavior Based Safety
SMS 098	Management of Change

Appendix A

URS Safety Management Standards
Health and Safety Plan
Contract 3 SSDS

Prepared for:
Lockheed Martin Corportion
Infrastructure & Services
3 Executive Campus, 6SE
Cherry Hill, NJ 08002

Prepared by:
URS Corporation
1255 Broad Street
Clifton, NJ 07013

URS SAFETY MANAGEMENT STANDARD

Hazard Communication (Worker Right-to-Know)

1. Applicability

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

This standard is not applicable to chemical laboratory operations that are covered under 29 Code of Federal Regulations (CFR) 1910.1450 (Occupational Exposure to Chemicals in Laboratories).

2. Purpose and Scope

The purpose of this Hazard Communication standard (also known as worker right-to-know program) is to provide URS personnel with information and training about safety and health hazards associated with the chemicals they may encounter in the workplace. This procedure describes how chemical safety hazards are communicated to URS personnel and how information is to be provided to employees of other companies working at the location. The requirements include steps to acquire this information, maintain the information, and train personnel in the hazard communication program.

3. Implementation

Implementation of this standard is the responsibility of the URS manager who directs activities at the facility, site, or project location. For office locations and large projects, this program may be incorporated into the general site orientation and training program or administered by project management.

Note: Manufacturers are permitted to ship chemicals under existing classification systems until December of 2015. As such, many of the requirements listed here may be gradually phased in by the manufacturers until that time. Where noted within the SMS, deviations from the existing procedure are allowed until December 2015 or until otherwise noted by URS.

4. Requirements

A. Hazardous Material Inventory

Maintain a hazardous material inventory that lists all of the hazardous materials used at each workplace (i.e., office, field location). Use chemical identifiers consistent with and referenced on the applicable safety data sheet (SDS). (Note that the terms material safety data sheet (MSDS) and SDS may be used interchangeably until December 2015.)

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

B. Site-Specific Written Program

A site-specific written program may be prepared as a stand-alone document or included within a site-specific health and safety plan. The program must cover hazardous materials in all physical forms (liquids, solids, gases, vapors, fumes, and mists), regardless of whether they are “contained.”

C. Safety Data Sheets (SDSs)

1. The safety representative will obtain an SDS for each chemical before it is used. SDSs will generally be received by the person ordering the product. SDSs for products frequently used should be kept on file because additional copies may not be included in repeat shipments.
2. The safety representative will review each SDS when it is received to evaluate whether the information is complete and to determine whether existing protective measures are adequate.
3. Each office or project location will assign a responsible person or department to maintain a collection of all applicable and relevant SDSs in an area that is accessible by all employees at all times. An electronic database is an acceptable method of maintaining the SDSs.
4. The assigned person or department will replace SDSs when updated sheets are received and will communicate any significant changes to those who work with the chemical.
5. SDSs are required for all hazardous materials brought on site by project personnel.
6. General consumer products to be used for their specific purpose, as well as food, drugs, cosmetics, and tobacco products brought into the workplace for employee consumption, are exempt, as are supplies in the first aid kit, such as isopropyl alcohol and antibacterial wipes.
7. Subcontractors bringing hazardous materials onto a site or project must submit SDSs to the safety representative. The safety representative may restrict the use of certain hazardous materials on a site or project due to occupational health risk, hazardous

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

physical properties of the material, or potential employee sensitivity to odor or irritating properties of the material.

D. Labels

Unless each container has appropriate labeling, label all chemical containers with the following information:

1. Product identifiers (codes or product names matching those on the SDS).
2. Signal word (key words used to emphasize hazards and indicate the relative severity of the hazard).
3. Appropriate hazard statements (standard phrases assigned to a hazard class and category which describe the nature of the hazard).
4. Pictograms (graphic elements intended to convey specific information about the hazard).
5. Precautionary statements (supplement the hazard statements by briefly providing measures to be taken to minimize or prevent adverse effects from the hazard).
6. Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.

Labels on incoming containers of hazardous materials will not be removed or defaced.

Labels are also required when a hazardous substance is transferred from a primary container to a secondary container. Labels on secondary containers must indicate the product identifier, as well as words, pictures, or symbols, or combination thereof, which will provide general information about the hazards of the chemical, including the physical and health hazards.

Note that until December 2015, manufacturers will be in a transitional period as they gradually meet the requirements of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). As such, the labels on incoming containers from the manufacturer are only required to indicate product names and identities of the hazardous chemicals, appropriate hazard warnings, and the name and address of the manufacturer, importer, or other responsible party, rather than the items

URS SAFETY MANAGEMENT STANDARD

Hazard Communication (Worker Right-to-Know)

listed above in D.1 through D.6. Labels may incorporate words, pictures, symbols, or combinations thereof to ensure the appropriate information is provided to the end user. Examples of acceptable labeling systems include the National Fire Protection Association (NFPA) Diamond, the Hazardous Materials Identification System (HMIS), the Chemical Hazard Identification and Training (CHIT) system, or similar.

E. Hazardous Non-routine Tasks

Periodically, employees are required to perform hazardous non-routine tasks. Prior to starting work on such projects, each employee must be provided with information about hazards to which they may be exposed, as follows:

1. Specific chemical and physical hazards.
2. Protective/safety measures that must be taken.
3. Measures that have been taken to lessen the hazards, including ventilation, respirators, presence of another employee, and emergency procedures.

F. Informing Contractors/Subcontractors

Provide other contractors/subcontractors working in the same area with the following information on chemicals used by or provided to URS personnel:

1. Identification of hazardous chemicals to which they may be exposed while on the jobsite.
2. Precautionary measures the contractors/subcontractors need to take to protect their employees during both normal operating conditions and foreseeable emergencies.
3. Location of SDSs.
4. Applicable labeling systems in use in the workplace.

G. Training

1. Provide training to all employees who have the potential to be exposed to hazardous materials, on the following schedule:
 - a. At the time of the initial task assignment,

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

- b. Whenever new chemicals are introduced into the workplace, or
 - c. More frequently where required by site-specific conditions or client-specific requirements.
- 2. This training will include the following:
 - a. Applicable regulatory requirements.
 - b. Any operations in the work area where hazardous chemicals are present.
 - c. Location of the program, inventory, and SDS.
 - d. Site-specific chemicals used and their hazards (chemical, physical, and health), including:
 - 1. General characteristics of chemicals
 - 2. Signs and symptoms of exposure
 - e. How to detect the presence or release of chemicals including the location, types, and usage of any portable and fixed monitoring or detection equipment and their associated alarms, where applicable.
 - f. Safe work practices and methods employees can take to protect themselves from chemical hazards, including work practices, emergency procedures, and the use of personal protective equipment.
 - g. How to read an SDS.
 - h. Site- or project-specific information on hazard warnings and labels in use at the location, if applicable.
 - i. Site-specific evacuation and rescue procedures in the event of chemical release, including the location of staging areas and personnel accounting procedures.
- 3. Document the training.
- 4. Arrange provisions for training in the language of the user.
International Chemical Safety Cards (see Section 6, ILO) may be

URS SAFETY MANAGEMENT STANDARD

Hazard Communication (Worker Right-to-Know)

used in conjunction with SDS information to provide non-English-language information. SDSs are required to be on site, but there is no requirement for the SDSs to be in a language other than English.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Hazardous Material Inventory.
- B. SDSs.
- C. Training records.
- D. Contractor/Subcontractor notifications.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) General Industry Standards – Hazard Communication – 29 Code of Federal Regulations (CFR) [1910.1200](#)
- B. U.S. OSHA Construction Standards – Hazard Communication – [29 CFR 1926.59](#)
- C. Mine Safety and Health Administration – Hazard Communication – [30 CFR 47](#)
- D. OSHA Administration Technical Links – <http://www.osha.gov/dsg/hazcom/index.html>
- E. International Labour Organization (ILO) – International Chemical Safety Cards (information about 1613 chemicals in 18 languages). <http://www.ilo.org/public/english/protection/safework/cis/products/icsc/index.htm>
- F. Agency for Toxic Substances and Disease Registry (ATSDR) – Tox FAQs and Tox FAQs en Español, 2003. <http://www.atsdr.cdc.gov/toxfaqs/index.asp>
- G. United Nations – Globally Harmonized System of Classification and Labeling of Chemicals (GHS). http://www.unece.org/trans/danger/publi/ghs/ghs_rev04/04files_e.html

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

7. Supplemental Information

- A. [Hazard Communication Program – Template](#)
- B. [Hazard Communication Employee Training Program](#)

	Health, Safety and Environment HAZARD COMMUNICATION PROGRAM - TEMPLATE	SMS 002 NA Supplemental Information A Issue Date: February 2009 Revision 3: September 2012

HAZARD COMMUNICATION PROGRAM

Table of Contents

- A. Purpose
- B. Identification of Hazardous Substances
- C. Container Labeling
- D. Safety Data Sheets (SDS)
- E. Employee Training and Information
- F. Non-Routine Task Training
- G. Access to Information by Other Employees

Appendices

- I. Hazard Communication Checklist
- II. Potentially Hazardous Substances
- III. List of Jobsite Hazardous Substances
- IV. Sample Letter to Suppliers to Obtain SDS

	Health, Safety and Environment HAZARD COMMUNICATION PROGRAM - TEMPLATE	SMS 002 NA Supplemental Information A Issue Date: February 2009 Revision 3: September 2012

A. PURPOSE

- A-1 To protect the health and safety of our employees, URS Corporation has developed this Hazard Communication program.
1. As an organization we intend to provide information about chemical hazards and other hazardous substances, and the control of hazards via our comprehensive Hazard Communication Program, which includes container labeling, Safety Data Sheets (SDS), and training.
 2. This written Hazard Communication Program applies to all operations that MAY expose employees to hazardous substances because of normal work conditions (including non-routine tasks) or as the result of a reasonably foreseeable emergency.
 3. This written Hazard Communication Program is available, upon request, to employees, their designated representatives and to appropriate representatives of state and/or federal safety and health agencies.

A-2 Scope

This program is part of URS Corporation's comprehensive health and safety program and shall be applied in conjunction with that overall program.

A-3 Responsibilities

1. The Project Manager is responsible for implementing and ensuring compliance with this written hazard communication program. The Hazard Communication checklist found in Appendix I is provided to assist the Project Manager in carrying out this responsibility.
2. The designated Project Safety Representative is responsible for coordinating and administering the program, in developing and assisting in the presentation of training materials and in providing technical assistance to project supervision.
3. Each Project Supervisor shall become familiar with the hazard communication procedures and shall supervise the application of these procedures to tasks for which they are responsible.
4. The Safety Manager is the designated safety professional for the project or office location and is responsible for providing technical assistance to the Project Supervisor or Safety Representative to implement the hazard communication program.

	Health, Safety and Environment HAZARD COMMUNICATION PROGRAM - TEMPLATE	SMS 002 NA Supplemental Information A Issue Date: February 2009 Revision 3: September 2012

B. IDENTIFICATION OF HAZARDOUS SUBSTANCES

- B-1 “Hazardous Substances” are materials or mixtures that are or have physical or health hazards (See Appendix II for examples of potentially hazardous materials).
- B-2 “Exposure” is any situation arising from work conditions where an employee may ingest, inhale, absorb or otherwise come in contact with a hazardous substance.
- B-3 An inventory of all hazardous substances to which employees may be exposed on this jobsite, as well as an accompanying SDS, shall be maintained in the project office (see Appendix III).

C. CONTAINER LABELING

- C-1 When hazardous substances are received, the Project Safety Representative shall examine the containers to determine if the labels provide the following information (primary containers):
 - 1. A product identifier;
 - 2. Signal words;
 - 3. Appropriate hazard statements;
 - 4. Pictograms;
 - 5. Precautionary statements; and
 - 3. The name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.
- C-2 When hazardous substances are transferred into portable or secondary containers, the responsible Project Supervisor shall ensure that these containers are labeled with an extra copy of the manufacturer’s label or with a printed label that includes the information above.

EXCEPTION: When an employee transfers a hazardous substance into a portable container for his/her own immediate use, the portable container need not be labeled.

- C-3 Each Project Supervisor shall ensure that the labels on containers of hazardous substances are not removed or defaced, unless the containers are immediately relabeled with the information in C-1 above. The labels shall be written legibly in English. However, for non-English speaking employees information may be presented in their native language as well.

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- C-4 Containers without complete labels or with defaced labels will not be used on the job.
- C-5 The Project Supervisor or Safety Representative shall review the jobsite labeling procedure at least quarterly and update as required.

D. SAFETY DATA SHEETS (SDS)

- D-1 Safety Data Sheets (SDSs) are documents that supply information about a particular hazardous substance or mixture. Manufacturers are required to provide SDSs when the hazardous substances are sold to distributors or purchasers. In most cases, SDSs are sent to the purchaser of the project (e.g., the procurement department or Project Supervisor), not the safety department.
- D-2 The Safety Manager / Project Safety Representative or Project Supervisor in coordination with the purchasing agent or project business manager, will be responsible for obtaining and maintaining the master sets of SDSs and other information on all hazardous substances used (see sample letter in Appendix IV).
- D-3 The Project Safety Representative will review SDSs for completeness. If an SDS is missing or obviously incomplete, a new SDS will be requested from the manufacturer. In some cases, SDSs may be obtained on-line through the manufacturer's web site. The Project Safety Representative should review products for highly toxic or dangerous constituents prior to use and consult with the Safety Manager for any items considered hazardous or toxic.
- D-4 SDSs are available to all employees in their work area for review during each work shift. If SDSs are not available or new hazardous substance(s) in use do not have SDSs, contact the Project Safety Representative immediately. Additional information such as chemical safety cards and the NIOSH Pocket Guide to Chemical Hazards may be used for additional information.
- D-5 Project Supervisors shall be alert to other employees (such as subcontractors) whose work on the jobsite may expose employees to additional hazardous substances. When it appears such exposure will occur, SDSs for the substances must be obtained.
- D-6 When doing renovation or remodeling work, the Project Supervisor shall coordinate SDSs of hazardous materials used by contractors. Contractors bringing hazardous materials on to a site or project must submit SDSs to the Project Supervisor. The Project Supervisor should consult with the Safety Manager if there are any questions regarding hazardous constituents of products.

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E. EMPLOYEE TRAINING AND INFORMATION

E-1 Initial Orientation

Before starting work, each new employee must attend a health and safety orientation. URS Corporation's on-line training program on Hazard Communication may be used as a component of the initial training but employees still require site specific information on hazards of chemicals in use, site specific spill and emergency procedures, and site specific labeling systems as described below.

E-2 Training shall be provided before employees are assigned duties that may cause exposure to hazardous substances. Training shall also be given when new hazardous substances are introduced into the work area or when an SDS is changed. In general, this training shall include:

1. Information on which hazardous substances are in the work area.
2. How to read and interpret information on SDSs and labels.
3. Any physical or health hazards associated with the use of a hazardous substance or mixture being used in the work area.
4. Proper precautions for handling hazardous substances, including specific procedures the company has implemented to protect workers from exposure such as personal protective equipment and work practices.
5. Proper procedures for reporting of releases or threatened releases of hazardous substances.
6. Emergency procedures for spills, fires, disposal and first aid.
7. The methods and observations that can be used to detect the presence of a hazardous substance in the work place (odor, visual appearance or monitoring).
8. The right of employees, their physicians or their collective bargaining agents to receive information on hazardous substances to which they may be exposed.
9. The right against discharge or discrimination due to an employee's exercise of the rights afforded by law.
10. The details of this written Hazard Communication Program; the availability and location of this written Hazard Communication Program and of SDSs or other information.

E-3 Hazard communication training must be documented.

E-4 Additional training shall be provided as needed during the weekly safety and health training ("toolbox") meetings in order to emphasize the safe handling, use and storage of onsite hazardous substances.

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F. NON-ROUTINE TASK TRAINING

- F-1 When employees are assigned to a non-routine task that may expose them to a hazardous substance for which they have not been trained, they shall be trained in the manner required by Section E.
- F-2 Some examples of non-routine tasks are:
- Confined space entry.
 - Tank cleaning.
 - Repair of pipes or tanks containing hazardous substances.

Prior to starting work on such projects, each affected employee will be given information about the hazardous substances he or she may encounter during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps the jobsite is using to reduce the hazards, including ventilation, respirators, presence of another employee and emergency procedures including site specific warnings, evacuation routes, and assembly points.

G. ACCESS TO INFORMATION BY OTHER EMPLOYERS

- G-1 It is the responsibility of the Project Safety Representative or Project Supervisor to provide contractors and subcontractors with information about hazardous chemicals their employees may be exposed to on a jobsite and suggested precautions for the contractor's employees to follow to avoid exposure to hazardous conditions.
- G-2 Contractors and subcontractors on the job site with potential exposure or risk will be contacted before work is started, to gather and distribute information concerning any chemical hazard that they may bring or be exposed to, in areas that are under URS Corporation control.

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APPENDIX I

HAZARD COMMUNICATION CHECKLIST

- _____ 1. Have we prepared a list of all the hazardous substances in our workplace?
- _____ 2. Are we prepared to update our hazardous substance list?
- _____ 3. Have we obtained or developed a safety data sheet for each hazardous substance we use?
- _____ 4. Have we developed a system to ensure that all incoming hazardous substances are checked for proper labels and data sheets?
- _____ 5. Do we have procedures to ensure proper labeling or warning signs for containers that hold hazardous substances?
- _____ 6. Are our employees aware of the specific information and training requirements of the Hazard Communication Standard?
- _____ 7. Are our employees familiar with the different types of chemicals and the hazards associated with them?
- _____ 8. Have our employees been informed of the hazards associated with performing non-routine tasks?
- _____ 9. Do our employees understand how to detect the presence or release of hazardous substances in the workplace?
- _____ 10. Are employees trained about proper work practices and personal protective equipment in relation to the hazardous substances in their work area?
- _____ 11. Does our training program provide information on appropriate first aid, emergency procedures and the likely symptoms of overexposure?
- _____ 12. Does our training program include an explanation of labels and warnings that are used in each work area?
- _____ 13. Does the training describe where to obtain safety data sheets and how employees may use them?
- _____ 14. Have we worked out a system to ensure that new employees are trained before beginning work?
- _____ 15. Have we developed a system to identify new hazardous substances before they are introduced into a work area?
- _____ 16. Do we have a system for informing employees when we learn of new hazards associated with a chemical we use?
- _____ 17. Have the employees been advised of the consequences for failure to follow established procedures?
- _____ 18. Do we have a system to ensure subcontractors are sharing information with one another, concerning the hazardous substances they have brought to the site?

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APPENDIX II

EXAMPLES OF POTENTIALLY HAZARDOUS MATERIALS THAT MAY BE FOUND ON URS CORPORATION CONSTRUCTION/GENERAL INDUSTRY PROJECTS

Acetone	Kerosene
Acetylene gas	Lead
Adhesives	Lime (calcium oxide)
Aluminum etching agent	Limestone
Ammonia	Lubricating oils
Anti-freeze	Lye (sodium hydroxide, potassium hydroxide)
Arsenic compounds	Magnesium
Asbestos	Metals (aluminum, nickel, copper, zinc, cadmium, iron, etc.)
Asphalt (Petroleum) fumes	Methanol (methyl alcohol)
Battery Fluids	Methyl ethyl ketone (2-butanone)
Benzene (and derivatives)	Motor oil additives
Bleaching agents	Muriatic acid (hydrochloric acid)
Carbon black	Naptha (coal tar)
Carbon monoxide (in cylinders)	Nitroglycerin
Caulking, sealant agents	Oxalic acid
Caustic soda (sodium hydroxide)	Ozone
Chromate salts	Paint remover
Chromium	Paint stripper
Cleaners	Paints/lacquers
Cleaning agents	Particle board
Coal tar pitch	Pentachlorophenol
Coal tar epoxy	Pesticides
Coatings	Photographic developers and fixers
Cobalt	Photogravure ink (copy machine)
Concrete curing compounds	Plastics
Creosol	Polishes for metal floors
Cutting oil (oil mist)	Propanol
De-emulsifier for oil	Putty Resins, epoxy/synthetics
Diesel gas, diesel oil	Sealers
Drywall	Shellac
Dusts (brick, cement block)	Solder, flux (zinc chloride, fluorides, etc.)
Enamel	Solder, soft (lead, tin)
Etching agents	Solvents
Ethyl alcohol	Sulfuric acid
Fiberglass, mineral wool	Thinner, paint/lacquer
Foam insulation	Tin
Freon 20, R20 (and others)	Transite
Gasoline (petrol, ethyl)	Turpentine, gum spirit, oil of turpentine
Glues	Varnishes
Graphite	Waterproofing agents
Greases	Waxes
Helium (in cylinders)	Welding Rods
Hydraulic brake fluid	Wood alcohol (methanol)
Hydrochloric acid	Wood preservative
Hydrogen (in cylinders)	Xylene
Inks	Zinc
Insulations	
Iron	

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APPENDIX III

LIST OF PROJECT SPECIFIC HAZARDOUS SUBSTANCES

On the following page(s) is a current list of the specific hazardous substances, along with the manufacturer's product identifier, known to be present at this jobsite.

This list uses the product identifier referenced on the SDS. Specific information on each substance may be found on the SDSs located in the project office.

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APPENDIX IV

(PROJECT LETTERHEAD)

Date

Product Manufacturer's (Importer/Distributor/Responsible Party) Name
Product Manufacturer's (Importer/Distributor/Responsible Party) Address

Subject: Safety Data Sheet Requisition

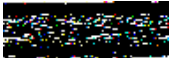
Dear Manufacturer (Importer/Distributor/Responsible Party):

Please provide the following safety data sheet(s):

Thank you for your support and assistance in this matter.

Sincerely,

Requestor's Name
Requestor's Address

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This document presents information that can be used for hazard communication training.

This information has been developed based on groups (types) of hazardous substance(s) used and the common hazards associated with them.

For specific hazard information on each brand of material the Safety Data Sheets (SDS) must be reviewed.

OVERVIEW OF THE HAZARD COMMUNICATION REGULATION

The Hazard Communication Regulation is intended to ensure that both employers and employees are aware of the dangers associated with hazardous substances in their workplaces. The following information is a review of the specific requirements of a hazard communication program, including container labeling, SDS and training.

WRITTEN HAZARD COMMUNICATION PROGRAM

We have a written program that outlines how we will provide information and control your exposure to hazardous substances. This plan is available for your review during our training and at the project office for review during your work shift.

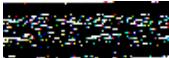
HAZARDOUS SUBSTANCES USED IN OUR WORKPLACE

On this job, we use a variety of products. Many of these products contain one or more hazardous substances. Let's review the hazardous substance inventory in your work area.

READING LABELS AND SDS

LABELS: A product label on both the original and secondary containers should be reviewed prior to working with the material. Each label will have several important pieces of information you should be familiar with:

1. Product identifier (codes or product names matching those on the SDS).
2. Signal word (key words used to emphasize hazards and indicate the relative severity of the hazard).
3. Appropriate hazard statements (standard phrases assigned to a hazard class and category which describe the nature of the hazard).
4. Pictograms (graphic elements intended to convey specific information about the hazard).
5. Precautionary statements (supplement the hazard statements by briefly providing measures to be taken to minimize or prevent adverse effects from the hazard).

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6. Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.

The label should act as a visual reminder of the information we have presented in this training session and of the information found in more detail on the SDS. It is essential for your safety that you read the label only use the hazardous substance(s) within the guidelines prescribed. Questions concerning the label should be directed to your supervisor/foreman.

SAFETY DATA SHEETS (SDS): The SDS is the primary means we will use to convey the necessary information about the hazards of the substances we use. The manufacturers and importers are responsible for providing us with the SDS. The manufacturer must provide us with adequate information to use the substance safely.

PHYSICAL AND HEALTH HAZARDS OF THE HAZARDOUS SUBSTANCE(S) USED

Employees are to be trained specifically about the hazards of the substances in their work areas. This may be done by specific hazardous substances or by categories of hazards, but in any case, the employee is to be aware that information is available on the specific hazards of individual hazardous substances through SDSs.

Employees may be trained using the common type or generic chemical group or by reviewing the specific SDS as long as the training includes the following information:

1. Measures to protect employee from the hazards (i.e., work practices, engineering controls and the use of personal protective equipment).
2. The physical and health hazards of the hazardous substances.
3. Detection of release of the substance; emergency and first aid procedures.

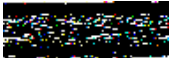
EXAMPLE OF GENERAL HAZARDOUS SUBSTANCE GROUP TYPE TRAINING

Product/Chemical Group: Hydrocarbon Solvents.

Health Effects – Effect of Overexposure: High concentrations of solvent vapors are irritating to the eyes, nose, throat and lungs, may cause headaches and dizziness and sleepiness. Even higher levels may cause unconsciousness and may have other brain and central nervous system effects.

Prolonged or repeated liquid contact with the skin may cause defatting of the skin, leading to dryness, possible irritation and dermatitis (reddening and inflamed skin). Some solvents are absorbed right through the skin and the health effects are just as if the solvent vapor was inhaled.

Each organic solvent's possible long term health effects will vary; however, prolonged solvent exposures are related to possible liver, kidney and central

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nervous system and brain damage (Note: The variety of solvent types should be reviewed).

Physical Hazards: Hydrocarbon solvents are flammable and combustible and represent fire and explosion hazards if the materials are not handled correctly. Hydrocarbon solvents are generally stable and will not react violently with water. Review the SDS section on Physical and Chemical Properties. Most solvents will vaporize rapidly and become airborne.

Detection of Release: Odor – Solvent vapor may produce an odor or cause your nose or eyes to be irritated, but do not depend on odor to warn you. Odor thresholds (lowest level that can be detected) for most solvents vary widely from person to person. Also, some solvents produce “olfactory fatigue” - the rapid loss of ability to smell the odor. However, odor can warn you of exposure to some solvents (confirm this with industrial hygiene monitoring).

Appearance – Most solvent vapors are invisible so do not rely on appearance to warn you for exposure.

Instrumentation – A variety of industrial hygiene instruments can be used to measure employee exposure. This equipment should be operated only by qualified personnel.

Emergency Response – For Flammable Solvents: If the material is spilled or leaks, shut-off and eliminate all sources of ignition. Recover the free product by adding absorbents to the spill. Minimize breathing vapors and skin contact. Ventilate the area by opening windows and doors. Follow the established hazardous waste disposal procedures.

Exposure Control: Protective Equipment, Engineering Controls and Proper Work Practices:

- Protective Equipment – Use chemical-resistant gloves, aprons or clothing if prolonged or repeated skin contact may occur. Use splash goggles and face shield when eye or face contact may occur. Use approved respiratory protective equipment as established by our Safety Program (Note: If needed, a review of the respiratory protective program may be appropriate).
- Engineering Controls/Work Practices – Ventilation is to be used when it is necessary to prevent build-up of vapors from both a health or fire and explosion concern. Keep containers closed when not in use. Do not handle or store near heat or sources of ignition or strong oxidants. No smoking, burning or welding is permitted near the flammable vapors. Use the bonding and/or grounding system when transferring materials. Most solvents will vaporize rapidly and become airborne.

APPROPRIATE EMERGENCY AND FIRST AID PROCEDURES

Eye contact – If splashed into the eyes, flush with water for 15 minutes or until irritation subsides. If irritation continues, call a physician.

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Skin contact – In case of skin contact, remove any contaminated clothing and wash skin thoroughly with water and soap.

Inhalation – If overcome by vapors, remove from exposure and call a physician immediately. If breathing is irregular or has stopped, start resuscitation.

Ingestion – If ingested, DO NOT induce vomiting, call emergency medical aid immediately.

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HAZARD COMMUNICATION TRAINING

Date: _____

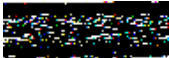
I have received hazard communication training as described in the URS Corporation Hazard Communication Program.

Employee Name (Print)	Employee Signature	Employee Number

I hereby certify that the above named employees have been provided with hazard communication training.

Supervisor/Instructor's Name

Supervisor/Instructor's Signature

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HAZARDOUS PROPERTIES OF CHEMICALS TRAINING

Chemicals are a part of every aspect of our lives. A minute does not go by that we do not use something that contains chemicals, or chemicals were used in the manufacturing process. The chemicals you use in the work place only present potential health and physical hazards when they are mishandled, improperly used, incompatible mixtures combined, improperly stored or labeled.

Depending upon the chemical and the level of exposure, health hazards can vary from minor skin irritations to serious chemical burns, nerve damage, different forms of cancer and even death. Physical damage may include fires, explosions, property and environmental damage.

Hazard awareness is recognizing and understanding the potential injuries and illnesses or physical damage the chemicals can cause. The communication of this information is essential for your being aware of, understanding and respecting the potential hazards. This knowledge is important for the decisions you make concerning how you use the chemicals and the safe work practices you follow.

Remedial action response personnel may be exposed to a number of substances that are hazardous because of their properties. These properties can be summarized into three broad categories:

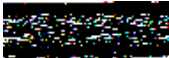
- a. Physical/chemical
- b. Biological
- c. Radiological

It should be noted that many hazards may be present at any one time. It is important to understand the fundamentals of each of these properties and their relationships so that effective safety practices may be employed to reduce the risk to the public and remedial response personnel. Some hazards that may be encountered at this work site are toxic substances, flammable materials, explosive materials, corrosive materials, biological agents, excessive noise, heat or cold stress, oxygen deficient work areas, and radioactive materials.

PHYSICAL/CHEMICAL PROPERTIES

Physical hazards. Chemical compounds possess inherent properties, which determine the type and degree of the hazard they represent. Evaluating risks of an incident depends on understanding these properties and their relationship to the environment.

- a. Solubility. The ability of a solid, liquid, gas or vapor to dissolve in a solvent is solubility. An insoluble substance can be physically mixed or blended in a

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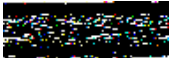
solvent for a short time but is unchanged when it finally separates. The solubility of a material is important when determining its reactivity, dispersion, mitigation and treatment.

- b. Density. The density of a substance is its mass per unit volume, commonly expressed in g/cc.
- c. Specific gravity. Specific gravity is the ratio of the density of a substance to the density of water. If the specific gravity of a substance is greater than 1 it will sink in water. The substance will float in water if its specific gravity is less than 1.
- d. Vapor density. The vapor density is the density of a gas compared to the density of air. If the density of a gas is greater than that of air then the gas will tend to pocket and settle into the lowest points. If the vapor density is close to air or lower than air then the gas will disperse. If the vapor or gas displaces oxygen in the low spots then it can become an asphyxiant problem. If the gas or vapor is an explosive, when it pockets it will become an explosive hazard.
- e. Flashpoint. If the ambient temperature in relation to the material of concern is right, then it may give off enough vapor at its surface to allow ignition by an open flame or spark. The minimum temperature at which a substance produces sufficient flammable vapors to ignite is its flashpoint. If the vapor does ignite, combustion can continue as long as the temperature remains at or above the flashpoint. The relative flammability of a substance is based on its flashpoint. An accepted relation between the two is:

Highly flammable:	Flashpoint <100°F
Moderately flammable:	Flashpoint >100°F & <200°F
Relatively inflammable:	Flashpoint >200°F
- f. Chemical Hazards. Hazardous conditions that may exist because of the chemical nature of substances may be summarized as fire hazards, explosive hazards, corrosive hazards, and chemical reactivity.

Fire Hazards

- a. Combustibility. Combustibility is the ability of a material to act as a fuel, that is, to burn. Materials that can be readily ignited and sustain a fire are considered to be combustible, while those that cannot are called noncombustible. Three elements are required for combustion to occur: fuel, oxygen, and heat. The concentration of the fuel and the oxygen must be high enough to allow ignition and maintain the burning process. Combustion is a chemical reaction that requires heat to proceed. Heat is supplied by the

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ignition source and is maintained by the combustion, or it must be supplied from an external source. The relationship of these three fire components can form a triangle. If one leg of the triangle is removed, then the fire can be extinguished. For example, water applied to a fire removes the heat, thereby extinguishing the fire. When a material generates enough heat by itself to self-ignite and combust, spontaneous combustion occurs, either as a fire or explosion (e.g., diesel greater than 140 degrees Fahrenheit is combustible.)

- b. **Flammability:** Flammability is the ability of a material (liquid or gas) to generate a sufficient concentration of combustible vapors under normal conditions to be ignited and produce a flame. It is necessary to have a proper fuel-to-oxygen (oxygen) ratio (% fuel in air) to allow combustion. A flammable material is considered highly combustible if it can burn at ambient temperatures. However, a combustible material is not necessarily flammable because it may not be easily ignited or the ignition maintained. Pyrophoric materials will ignite at room temperature in the presence of a gas or vapor or when a slight friction or shock is applied.

The substances listed below are easily ignited (pyrophorics), require little oxygen to support combustion, have low flammability limits and explosive limits and a wide flammable and explosive range.

Flammable liquids

Aldehydes
Ketones
Amines
Ethers
Aliphatic Hydrocarbons
Aromatic Hydrocarbons
Alcohols
Nitroaliphatics

Flammable solids

Phosphorus
Magnesium Dust
Zirconium Dust
Titanium Dust
Aluminum Dust
Zinc Dust

Water Reactive Flammable Solids

Potassium
Sodium
Lithium

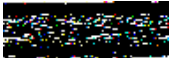
Pyrophoric Liquids

Organometallic compounds
Dimethyl Zinc
Tributyl Aluminum

Some of the hazards related to fires and explosions can cause physical destruction due to shock waves, heat, and flying objects. Secondary fires can be created as well as other flammable conditions. Toxic or corrosive compounds may also be released to the surrounding environment as well.

Explosives

An explosive is a substance, which undergoes a very rapid chemical transformation producing large amounts of gases and heat. The gases

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produced, for example, nitrogen, oxygen, carbon monoxide, carbon dioxide, and steam, due to the heat produced, rapidly expand to velocities exceeding the speed of sound. This creates both a shockwave (high pressure front) and noise. The main categories of explosives are listed below.

High or detonating – produces a shock wave followed by combustion.

Primary high explosive – detonation occurs in a short time. Examples: lead azide, mercury fulminate, and lead styphnate.

Secondary high explosive – needs a booster to detonate. Examples: Tetryl, cyclonite, dynamite and TNT

Low or deflagrating – Explosive rate very fast. Combustion followed by a shock wave. Examples: smokeless powder, magnesium, and molotov cocktail.

Corrosive Hazards

Corrosion is a process of material degradation. Upon contact, a corrosive material may destroy body tissues, metals, plastics, and other materials. Corrosivity is the ability of material to increase the hydrogen ion concentration of a material or to transfer electron pairs of or from itself or another material. A corrosive material is a reactive compound or element that produces a destructive chemical change in the material it is acting on. Common corrosives are:

Halogens

Bromine
Chlorine
Fluorine
Iodine

Acids

Acetic acid
Hydrochloric acid
Hydrofluoric acid
Nitric acid
Sulfuric acid

Bases (Caustics)

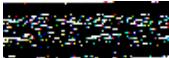
Potassium Hydroxide
Sodium Hydroxide

Skin irritation and burns are typical results when the body contacts an acidic or basic corrosive material.

The measure of an acid or a base is the pH scale. The pH scale ranges from 0 to 14 with a pH <7 being acidic and a pH >7 being basic. The lower the pH of the acid the more acidic is the material, and the higher the pH of the base the more basic the material. A pH of 7 is considered neutral.

Chemical Reactivity

- Reactivity hazards. A reactive material is one that undergoes a chemical reaction under specified conditions. Generally, the term “reactive hazard” is used to refer to a substance that undergoes a violent or abnormal reaction in

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the presence of water or under normal ambient atmospheric conditions. Among this type of hazard are the pyrophoric liquids that will ignite in air at or below normal room temperature in the absence of added heat, shock, or friction, and the water-reactive flammable solids that will spontaneously combust upon contact with water.

The most common reactive mixture in construction is found in gas welding or brazing. Acetylene gas mixes with oxygen to provide an extremely powerful reaction in the form of a very intense flame.

- b. Compatibility. If two or more hazardous materials remain in contact indefinitely without reaction, they are compatible. Incompatibility, however, does not necessarily indicate a hazard. For example, acids and bases (both corrosive) react to form salts and water, which may not be corrosive.

The compatibility of materials must be determined before the materials are used or stored. Some examples of incompatibilities are sulfuric acid and plastics (toxic gas or vapor is produced), acids and metal (flammable gas or vapor is produced), chlorine and ammonia (chlorine gas is created, toxic gas). There are many other incompatibilities that may be found. Check to make sure that the materials used for a project are compatible.

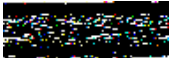
All of the hazards listed above will be found on the safety data sheet (SDS). The SDS is a short technical report that provides you with the known hazards of a specific material. The SDS explains how to properly use the material, handle any problems related to the material and how to store the material. Know what the SDS says for the materials that you work with.

All materials should have a label on them. This is the first and easiest place to look to see if a material is hazardous. Labels should tell you any precautions that must be taken when handling the material. Read the label on the materials that you use and abide with the cautions and warnings. If a material is not properly labeled, notify your supervisor so that the problem is corrected.

BIOLOGICAL HAZARDS

Biological agents are living organisms that can cause sickness or death to exposed individuals. Biological hazards can cause infection or disease to persons who are exposed.

Biological hazards may involve plants or animals including microorganisms. Biological hazards, such as disease causing agents, may be present at a hazardous waste site or involved in a spill. Like chemical hazards, they can be dispersed throughout the environment via wind and water.

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Many biological agents require a carrier to inoculate a person. For instance, rabid rodents at a landfill may be a biological hazard. Deer carry ticks may have Rocky Mountain Spotted fever; prairie dogs will not.

The same personnel protective requirements for a response to a chemical hazard apply to biological hazards. Body coverings and respiratory protective equipment might have to be utilized. Especially important is the need to maintain personnel cleanliness. Before eating, drinking or smoking residual contamination should be washed off.

BIOHAZARDS

Biohazard training will be provided to employees as per the blood borne pathogen program (SMS 051).

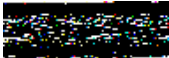
HAZARDOUS MATERIAL PROTECTION

The routes of exposure for hazardous materials include the following:

- Inhalation – Breathing contaminated air (e.g., welding fumes.)
- Skin Absorption – Contact with harmful liquids, gases, solids or contaminated clothing, equipment, medications, cosmetics, etc. A good example is solvents. Materials can also enter through an open wound.
- Ingestion – Eating or drinking contaminated foods, water or medications. (Remember food and cigarettes can become contaminated by your unwashed hands, gloves, equipment. Good hygiene practices are very important.)
- Injection – A contaminated material can be injected into some part of the body.

Protection from potentially hazardous materials includes the following:

- Use good personal hygiene. This is the simplest control measure to chemical hazards.
- Know what protective equipment is required for the specific job you are doing. Ask your supervisor what risks you might encounter and what hazardous substances you are working with.
- Know what potential explosive and or flammable conditions may exist with the job you are doing.
- Have all confined spaces checked for explosives, hydrogen sulfide, carbon monoxide, and oxygen deficiency. Know what hazards are involved with confined spaces.
- Know where emergency equipment is located and how to use it. For example, know where the nearest fire extinguisher is from your work area.

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- Know the standard operating procedures for rescue and emergency situations.
- Know the proper method for decontamination when working with hazardous materials.
- Use the buddy system when at all possible. Keep communication lines open when working with hazardous materials.
- Stay out of contaminated areas if you are not properly trained, equipped, or authorized to enter. Do not take chances with life-threatening materials or situations.

PERSONAL PROTECTIVE EQUIPMENT

Different types of protective equipment will be required depending on the substances to be handled, the existing conditions, and the particular situation. Personal protective equipment includes a variety of special suits, hard hats, goggles, face shields, aprons, boots, gloves, and respirators. Each is designed to protect you from certain hazards. It is important for you to know the advantages and disadvantages of all the equipment you may use or need. Use all equipment as instructed and follow all written procedures for the specific equipment.

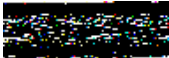
STANDARD OPERATING PROCEDURES FOR EMERGENCY SITUATIONS

Standard operating procedures exist for any unexpected event such as an accident, fire, explosion, etc.

If you know or suspect that you have been contaminated with a hazardous substance, **TELL YOUR SUPERVISOR**. You should know the general symptoms of over-exposure to toxic substances. These include:

- Irritation of skin, eyes, nose, throat, or respiratory tract
- Changes in complexion or skin discoloration
- Headache
- Difficulty in breathing
- Nausea
- Dizziness or light-headedness
- Excessive salivation (drooling)
- Lack of coordination
- Blurred vision
- Cramps and/or diarrhea
- Changes in behavior patterns

You should know the location of emergency eyewash and shower facilities.

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Before you enter, and periodically while you are working in confined spaces such as tanks, crawl spaces, ditches, etc., the air in the space should be tested by a qualified individual for oxygen content, explosive levels, toxic gases, and other hazardous materials.

Understand the site emergency response procedures and know the locations of response equipment before the need arises. If you must rescue someone, use proper precautions and protective equipment. **DO NOT BECOME A CASUALTY YOURSELF**. Move the affected person from the hazardous exposure if possible. Get help and follow emergency rescue procedures.

For spills and leaks of hazardous materials limit the leak or spill as quickly as possible. Small spills should be cleaned up immediately. If a valve must be closed to prevent a spill from continuing then do so. If the spill is large, or your skin, eyes or clothing are contaminated, leave the work area immediately. Wash eyes, skin, and clothes off with lots of water to remove the material. Get to fresh air. Notify your foreman or supervisor as soon as it is safe for you to do so. Unless you have special training and the proper protective equipment, do not try to clean up large spills yourself.

If a corrosive material is splashed in your eyes or on your skin and clothes, deal with it immediately. Wash the affected area with plenty of water (at least 15 minutes with a continuous stream). Remove any contaminated clothing. Get to fresh air if you feel burning in the nose, throat or lungs. Do not vomit if you have swallowed a corrosive material. Drink large quantities of water to dilute the material, and seek immediate medical attention.

EXAMPLES OF HAZARDOUS MATERIALS POSSIBLY FOUND ON SITE

SOLVENTS

Solvents are among the most common toxic materials in the workplace. Many processes, mixing and cleaning, use or give off solvent vapors. They are also used as thinners in paints and adhesives. Solvents vary in their toxicity from practically non-toxic materials such as the alcohols, ketones, halogenated solvents, to the very toxic such as dimethyl acetamide, methyl acrylate and other materials. Some solvents are also flammable or reactive.

Solvents can cause irritations to the eyes and skin when in high concentrations. Most will dissolve the protective layer of oils on the skin and leave it looking white in the small cracks. They should never be used to clean the skin; if there is a problem with contamination, some form of glove or barrier cream should be used to protect the skin. The early signs of overexposure often include headaches, dizziness, nausea and other related symptoms.

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METALS AND SOLID PARTICULATES

Examples: Babbitt metal, cadmium, galvanized metal, lead, manganese, nickel, zinc

Metals and other particulate solids can be toxic and are usually given off when welding or grinding. Some, like gypsum dust are only nuisance dusts, while others, like zinc fume from welding cause flu-like symptoms. Others, like asbestos have been linked to cancer and other chronic diseases. Dusts can irritate the skin and be ingested with food, drinks or smoking materials if they aren't washed off the hands and removed from clothing. They may also be carried home to family members and cause problems there if they are not washed off before leaving the work area.

When the welding, brazing, grinding or cutting of metal is performed, care should be taken to avoid breathing the fumes or dusts. Local exhaust ventilation should be used to reduce your exposure. If fumes and dust cannot be controlled with exhaust ventilation, appropriate approved respirators should be used. Approved safety goggles and gloves should be worn when working with metals. Gloves may be necessary to prevent skin sensitization and dermatitis.

ACIDS

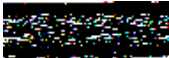
Examples of acids found on URS Corporation sites are sulfuric acid (used in water treatment plants and found in batteries), hydrochloric acid, and nitric acid. Acids are considered corrosives and cause material degradation. Acids destroy tissues, metals and other materials. Acids can cause skin irritations in the form of rashes or other types of dermatitis, and more severe problems such as skin or eye burns. When working with acids proper eye and face protection should be worn as well as hand protection.

LUBRICANTS, COOLANTS AND MACHINE OILS

Lubricants, coolants and machine oils are common in construction sites. There are three types: petroleum based (straight oils), water based, and synthetic fluids that contain no oils. Many cutting oils contain additives to inhibit corrosion, prevent bacterial growth and permit high temperature operation. The fumes and mist from cutting operations can be irritating to the eyes and lungs. Skin exposure can result in acne-like conditions and can cause other problems. Avoid breathing mist and fumes and use gloves and aprons to minimize contact with materials.

GASES

Examples: Acetylene, ammonia, carbon dioxide, carbon monoxide, freon, oxygen, hydrogen, liquefied petroleum gas, propane

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Gases present a range of problems. Some, like nitrogen, are simple asphyxiates. They prevent the body from getting enough oxygen by displacing it from the air stream. Some are chemically hazardous, like carbon monoxide, or nitrous oxide, which cause poisoning of the body systems. Some are very toxic, like arsine and phosphine. Some are very reactive and should be dealt with in very careful manners. Other gases, like hydrogen, oxygen and acetylene are explosives and must be treated with great care. Chains and stands should secure all compressed gas cylinders at all times, and only the proper fittings should be used. Liquefied and petroleum gases are extremely flammable and considered simple asphyxiates.

PLASTICS, EPOXIES AND POLYMERS

Plastics, epoxies and polymers are a growing group of industrial chemicals. Materials such as polystyrene, polypropylene, acrylates, vinyl, and polyurethane are but a few. Although most of these materials are not toxic in their final form, where they are being molded, extruded, laid up, there can be significant hazards. When burned, these materials can be very hazardous.

CLEANERS

Cleaners contain acid, alkalis, aromatics, surfactants, petroleum products, ammonia and hypochlorite. Because of these ingredients these materials are considered to be irritants, and can be harmful to you if swallowed or inhaled. Many may cause eye, nose, throat, and skin and lung irritation. Some cleaners are flammable and burn easily. Others may be caustic or corrosive and cause severe skin burns. Because many cleaners used in the job area are consumer products commonly found in our homes, you may underestimate the hazard they pose. Protect yourself from these hazards by reading the labels and following the recommended precautions. Wear gloves and eye protection. Avoid inhaling the vapors and mists. Wash your hands and face thoroughly before eating, drinking or smoking.

Specific emergency procedures for each chemical will be detailed on that cleaner's safety data sheet. In general, if a cleaning chemical gets into your eyes, flush the eyes with clean running water for at least 15 minutes, then seek medical attention. If the chemical gets on your skin, wash the area of contact and seek medical attention.

Do not mix two cleaning chemicals together, unless specifically told to do so by your supervisor. For example, the dangerous gas, chlorine, will be created if you mix bleach and ammonia or bleach and drain cleaner together.

Examples: Abrasive cleaners, bleach, drain cleaner, general purpose cleaning spray, germicide, and glass cleaner, metal cleaner, rug and upholstery cleaners, stain remover.

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FUELS

Examples: Diesel oil, gasoline, propane, kerosene

The primary hazard posed by fuels is obviously, fire. Fuels are either flammable or combustible. Whether flammable (a material which is easily ignited and burns with extreme rapidity) or combustible (a material capable of fueling a fire), they should be handled with care.

Proper storage and transport of fuels in approved, self-closing, safety containers is extremely important and should be strictly adhered to at all times. When filling portable containers with flammable materials they should be properly grounded and bonded to the container to prevent ignition from static electricity.

Store gasoline in containers marked “gasoline”. Store kerosene in containers marked “kerosene”. Never use kerosene containers for the transport or storage of gasoline.

Excessive skin contact with fuels can result in dermatitis. Some petroleum products have been shown to cause skin tumors. Inhalation of fuel vapors over a long period of time can cause central nervous system depression, and may aggravate any existing respiratory problems that may exist. Ingestion of fuels can cause poisoning. Do not induce vomiting. If fuels get in your eyes, rinse with clean water for at least 15 minutes and seek medical attention.

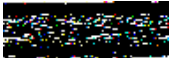
LABELING

Proper labeling of all chemical containers is another excellent control measure to chemical hazards. Container labels give a code or name identifying the chemical in the container, the name, address, and telephone number of the manufacturer, importer, or distributor; and symbols, signal words, and hazard statements that warn you of possible dangers. Read the label on all materials with which you work.

Examples of signal words and hazard statements:

- Danger, fatal if swallowed
- Danger, toxic if swallowed
- Warning, may be harmful if swallowed

Labels and their warnings should be taken seriously since they provide you with the first clue to the hazards posed to your health and safety. They also give information on personal protective equipment required, emergency response and first-aid steps in case of an exposure, proper procedures in case of a spill and emergency phone numbers.

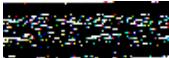
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SDS

Safety data sheets, if read and followed, are a powerful means of controlling chemical exposures. Chemical manufacturers are required to provide SDSs for the chemicals they produce or import. The purpose of the SDS is to communicate information on the recommended safe use and handling procedures for that chemical.

All SDS must provide certain categories of information about the chemical substance or mixture:

- Identification of the substance or mixture and of the supplier
- Hazards identification
- Composition/information on ingredients
- First aid measures
- Firefighting measures
- Accidental release measures
- Handling and storage
- Exposure controls/personal protection
- Physical and chemical properties
- Stability and reactivity
- Toxicological information
- Ecological information
- Disposal considerations
- Transport information
- Regulatory information
- Other information including information on preparation and revision of the SDS

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HAZARD COMMUNICATION TRAINING QUESTIONS

NAME: _____ LOCATION: _____

1. Container labels must:
 - A. Give directions to the manufacturing plant.
 - B. Give price of the product.
 - C. Notify the user of the physical and health hazards.
 - D. Provide translation in Spanish.

2. What is an SDS?
 - A. Main Statistical Data Service.
 - B. Safety Data Sheet.
 - C. New accident reporting system.
 - D. Both A and C.

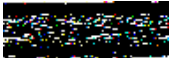
3. What are the requirements of the Hazard Communication Standard?
 - A. Chemical inventories.
 - B. Container labeling.
 - C. Negotiations for purchase price of chemicals.
 - D. SDSs.
 - E. Employee Training.
 - F. All of the above except C.

4. What is one way to determine if a chemical has been spilled or released in your work area?
 - A. When you smell something out of the ordinary.
 - B. By reading the SDS and being knowledgeable of the chemical appearance and odor.
 - C. Call somebody.
 - D. Both A & B.

5. How can you protect yourself from chemical exposures?
 - A. Personal protective equipment and proper work practices.
 - B. Stay upwind of vapors and gases.
 - C. Use proper ventilation.
 - D. All of the above.

6. What are the main examples of chemicals found on site?
 - A. Solvent, fuel, metals, lubricants, gases.
 - B. Toxic, flammable, corrosive, reactive, pressurized.
 - C. Physical properties and health effects.
 - D. The good, the bad and the ugly.

7. New and transferred employees must be trained on the hazards of their new work area.
 - A. True
 - B. False

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8. An SDS provides what?
 - A. Supervisor guide to acid unloading.
 - B. Engineering data.
 - C. Health, safety and first-aid information.
 - D. Chemical process checklist.

9. Where is your site-specific Hazard Communication program located?
 - A. Accident Prevention Manual.
 - B. Employee Handbook.
 - C. Budget Manual.
 - D. SDS Book.

10. A new chemical used in your area is always considered a new hazard.
 - A. True
 - B. False

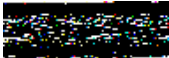
11. If an SDS is not available for the chemical you are using, you should?
 - A. Notify your supervisor.
 - B. Call the manufacturer.
 - C. Contact the Safety Department.
 - D. Nothing, most chemicals are safe.
 - E. Both A & C.

12. Labeling systems use words, graphics, geometric shapes, and colors to warn you of any possible danger to your health and safety, and to tell you about safe work practices you need to follow when handling chemicals.
 - A. True
 - B. False

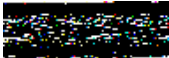
13. A flammable liquid is a liquid with a flashpoint:
 - A. Of 2,000 degrees Fahrenheit
 - B. Below 200 degrees Fahrenheit
 - C. At freezing
 - D. All of the above

14. Which Signal Word represents the most serious hazard?
 - A. Caution
 - B. Warning
 - C. Danger
 - D. Beware

15. Chemicals can enter the body through:
 - A. Breathing them in
 - B. Contact with body openings
 - C. Both A and B
 - D. None of the Above

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16. If you are not familiar with a chemical, you should check the Safety Data Sheets.
 - A. True
 - B. False
17. A primary/original container label for a chemical must include:
 - A. A code or name identifying the chemical
 - B. The chemical manufacturers or importer's name, address, and telephone number
 - C. Warnings of its hazardous content
 - D. All of the above
18. A container label should be checked only if you do not know the contents of the container.
 - A. True
 - B. False
19. If a label is torn or missing, you should report it right away to the proper personnel at your facility.
 - A. True
 - B. False
20. The Hazard Communication Standard is also referred to as the Right to Know Standard.
 - A. True
 - B. False
21. A Safety Data Sheet is required for all hazardous materials in your facility.
 - A. True
 - B. False
22. Safe work practices require a complete understanding and respect for the potential hazards.
 - A. True
 - B. False
23. The written emergency response plan contains the procedures to take in the event of an emergency.
 - A. True
 - B. False

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HAZARD COMMUNICATION TRAINING QUESTIONS ANSWER SHEET

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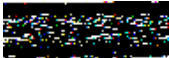
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 - A. **True**
 - B. False

23. The written emergency response plan contains the procedures to take in the event of an emergency.
 - A. **True**
 - B. False

URS SAFETY MANAGEMENT STANDARD

Emergency Preparedness & Crisis Management Plans

1. Applicability

This standard applies to URS Corporation and its subsidiary companies. Each location shall establish a site-specific emergency preparedness/incident management plan. In addition, each division will maintain a Crisis Management Plan to operate under the organizational structure and manage emergency operations.

2. Purpose and Scope

This standard establishes policy, assigns responsibilities, and provides guidance to URS offices/field projects regarding emergency preparedness. It includes general information on actions to be taken by URS management and employees in the event of an emergency that may endanger life or property.

The objectives of this standard are as follows:

- A. Promote a fast, effective reaction in coping with emergencies.
- B. Save lives, and avoid injuries and panic.
- C. Restore order and conditions to normal levels with a minimum of confusion and as promptly as possible.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility or project location. For EC projects and offices the EC Crisis Management Team is responsible for the overall management of Emergency Planning and the local Incident Management Team Leader is responsible for local implementation and management of the program.

4. Requirements

- A. Emergency Preparedness Plan (also known as Emergency Action Plan) Development

- 1. Gather Information

- Each URS office and field office must develop an Emergency Preparedness Plan (EPP) tailored to its specific location. Office Managers will check with their building manager or landlord regarding evacuation procedures they may have in place and incorporate these procedures into the EPP. Field office EPPs must

URS SAFETY MANAGEMENT STANDARD
Emergency Preparedness & Crisis Management Plans

comply with client requirements and specifications. The EPP must contain the following:

a. Reporting Procedures for Fires and Other Emergencies

Describe the procedures that personnel should follow to report emergencies (fires, hazardous substance release, etc.). List emergency telephone numbers for fire, paramedics, and police. Include local prefixes on emergency numbers, if required, such as 9-911.

b. Alarm System and Security Measures

Describe the emergency alarm system and security measures for the building/site as applicable. Include the description and location of fire alarm pull boxes and visual and audible alarms, security personnel, and secured access points. If a public address (PA) system is used to notify occupants of emergencies, include the procedures to activate the PA system, such as calling the receptionist or building manager's office, and a description of the announcements that will be made.

c. Evacuation Routes and Procedures

Develop a map or description of the evacuation routes and emergency exits to be used. A description of the building emergency lighting system, exit signs, and available fire suppression systems may also be included. Evacuation route maps may be posted in the offices. There should be a primary and alternate evacuation route and exit from each work area.

Describe procedures regarding the use of elevators, if applicable. In most cases, elevator use is prohibited during an emergency. The building manager should be consulted for these procedures.

Include procedures to determine that no employees have been inadvertently left behind.

d. Severe Weather Planning

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Emergency Preparedness & Crisis Management Plans

Describe potential severe weather that may impact the location and shelter areas that are available. Shelter areas should be designated on evacuation route maps.

If performing outdoor activities and thunder is heard, lightning is seen, or dark threatening clouds are observed overhead, take cover immediately in a safe location including a building or vehicle. Do not stay in (or on) convertibles, golf carts, riding mowers, open cab construction equipment or boats without cabins. Remain in the safe location until at least 30 minutes after the last thunder clap is heard.

e. Critical Equipment/Operations Procedures

Designate personnel responsible for shutting down and restarting critical equipment and the procedures for doing so, if applicable. Refer to SMS 098 - Management of Change prior to restarting operations.

f. Assisting Disabled Personnel

Describe the provisions that have been made for notifying and assisting personnel with disabilities during an emergency. Such provisions are to accommodate personnel in wheelchairs, those who are temporarily disabled (such as personnel on crutches), and those with impaired vision or hearing.

g. Personnel Accounting Procedures

Designate a primary and alternate assembly area for personnel who are evacuating. Require sufficient distance so that personnel will not be exposed to fire, debris, or traffic, nor interfere with emergency responders.

Designate an individual and an alternate to be responsible for taking a headcount in the assembly area and reporting missing personnel to emergency responders.

Define procedures on how employees will be informed that it is safe to re-enter the building or to leave for home.

Define emergency procedures for employees who remain on site.

URS SAFETY MANAGEMENT STANDARD

Emergency Preparedness & Crisis Management Plans

h. Rescue and Medical Duties

In some situations, URS personnel are in job positions that require the employees to engage in firefighting, medical treatment, rescue or other emergency response. Employees must be properly trained to perform these functions and must be identified in the EPP.

When applicable, include the following statement: "URS does not expect or encourage its employees to engage in firefighting, medical treatment, rescue, or other emergency response. Such activities should only be performed by properly equipped and trained emergency responders. URS recognizes that some of its personnel may have received training in first aid and cardiopulmonary resuscitation (CPR) and may wish to perform these duties on injured personnel."

Require that no employees leave the facility until all employees are accounted for.

i. Resources

The location or project/site specific EPP must include the name/title of staff who can respond to questions about the plan and/or the expectations of the individual employees in an emergency situation.

2. Develop EPPs based on the information gathered as described previously. EPPs may be stand-alone documents for office locations or may be included within site-specific health and safety plans.

B. Posting

1. Post the Emergency Preparedness Plan where it is available to all site employees.
2. Post evacuation maps at all exits and points of egress.

C. Training

1. Train all employees regarding the requirements of the Emergency Preparedness Plan for their office or facility location and his/her role in an emergency situation.

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2. Conduct evacuations drills and, where required, rescue procedures at office and facility locations at least annually.
3. Training will be conducted initially and as needed due to changes in procedures.

D. Coordination

During development and after implementation, it is critical to work with and coordinate emergency preparedness plan activities with local authorities, clients, representatives, building managers, property managers, security personnel, and designated office or project safety staff, and with local rescue and medical facilities.

E. Visitor and Crowd Control

When an emergency occurs at URS offices or field offices, it is important to ensure the safety of visitors or members of the public. Remember that visitors and members of the public are probably not familiar with the emergency procedures and may need to be escorted by URS personnel during the emergency.

F. Security

1. Keep visitors and unnecessary personnel from entering an office or jobsite after an emergency has occurred.
2. Safeguard property, equipment, and/or materials during an emergency. The in-house or contract security personnel should be integrated into the emergency preparedness plan and their expected response and areas of responsibility in response to emergencies should be designated. If not, it may be necessary to assign company employees to act as watchmen during and after the emergency.

G. Community Relations

If an emergency at a URS office, field office, or jobsite may place a community at risk, the appropriate local and/or community emergency response personnel should be notified and given pertinent information on the occurrence.

H. Division Emergency Preparedness/Crisis Management Plans

The division-specific Emergency Preparedness and Crisis Management Plan (CMP) is established for the purpose of protecting employees,

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property, assets, reputation, the general public, the environment, and the communities in which URS operates. The CMP provides an overview of emergency preparedness and its importance to URS. This CMP provides guidance to division management regarding roles and responsibilities in the event of a crisis requiring coordinated corporate and/or division response. This CMP also provides guidance for making decisions during natural or man-made emergencies or crises. The FS and IE CMPs are included in Attachment 003-1. Contact the EC Security Department regarding the EC CMP.

5. Documentation Summary

The following documentation will be maintained in the office/project files:

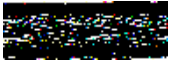
- A. Emergency Preparedness Plan.
- B. Evacuation maps.
- C. Training records.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [Emergency Action Plans](#) – 29 Code of Federal Regulations (CFR) 1910.38
- B. U.S. OSHA – [Emergency Exit Routes Fact Sheet](#)
- C. [Attachment 003-1 FS](#) – Federal Services Emergency Preparedness and Crisis Management Plan
- D. [Attachment 003-1 IE](#) – Infrastructure & Environment Emergency Preparedness and Crisis Management Plan
- E. Energy & Construction Crisis Management Plan (contact Security)

7. Supplemental Information

- A. Federal Services - [Emergency Preparedness and Incident Management Plan Template](#)

	Health, Safety and Environment EMERGENCY PREPAREDNESS & CRISIS MANAGEMENT PLANS	Attachment 003-1 IE Issue Date: September 2012

URS Infrastructure & Environment

Emergency Preparedness & Crisis Management Plan

INFRASTRUCTURE & ENVIRONMENT **Emergency Preparedness & Crisis Management Plan**

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LIST OF ACRONYMS AND ABBREVIATIONS

ACCC	Alternate Crisis Command Center
CCC	Crisis Command Center
CMP	Emergency Preparedness and Crisis Management Plan
CMT	Crisis Management Team
EP/CM	Emergency Preparedness and Crisis Management
EPP	Emergency Preparedness Plan
HSE	Health, Safety, and Environment
HR	Human Resources
ICC	Incident Command Center
IMT	Incident Management Team
IE	URS Infrastructure & Environment
IT	Information Technology
POC	Point of Contact
SMS	Safety Management Standard

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1.0 GENERAL INFORMATION

1.1 Introduction

The URS Infrastructure & Environment (IE) Emergency Preparedness and Crisis Management Plan (CMP) is established for the purpose of protecting employees, property, assets, reputation, the general public, the environment, and the communities in which URS IE operates. The CMP provides an overview of emergency preparedness and its importance to URS IE. This CMP provides guidance to IE management regarding roles and responsibilities in the event of a crisis requiring coordinated corporate and/or IE response. This CMP also provides guidance regarding decisions during natural or man-made emergencies, and addresses the approach to providing assistance to employees and their families following a crisis that results in an employee fatality.

1.2 Approach Summary

Most IE incidents are properly managed at the Project, Office, or Regional level. These incidents may involve property damage, temporary office closure due to weather, employee injuries, project performance concerns, or similar events. Although managed locally/regionally, these events are to be communicated to IE management through the appropriate channels.

Certain events have the potential for creating a crisis situation, with significant impacts on employee or public safety, continuity of IE operations, or URS reputation. The activation of the IE Crisis Management Team (CMT) is designated for those events that are at the crisis level, or have the potential to reach the crisis level.

1.3 Document Control

The IE Vice President for Health, Safety, and Environment (HSE) will maintain responsibility for consistency and currency of the CMP, and notify the appropriate level of managers to ensure proper dissemination to all the stakeholders. This CMP will be reviewed at least annually, and updated as necessary.

1.4 Applicability

This CMP applies to all URS IE operations, and as guidance for the IE CMT for its use in directing activities in preparing for and responding to emergency and crisis situations.

1.5 Scope

This document describes IE emergency preparedness policies and procedures, and covers crisis management organization and responsibilities.

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2.0 DEFINITIONS

Crisis: Any global, regional, or local natural or human-caused event or business interruption that runs the risk of (1) escalating in intensity; (2) causing wide-scale harm to people, property, or the environment; (3) adversely impacting shareholder value or the organization's financial position; (4) falling under close media or government scrutiny; (5) interfering with a company critical function; (6) jeopardizing the organization's reputation, products, or offices, therefore negatively impacting its future.

Crisis Management: Intervention and coordination by individuals or teams before, during, and after an event to resolve the crisis, minimize loss, and otherwise protect the organization.

Incident Command Center (ICC): A specific room or facility staffed by IE CMT personnel charged with commanding, controlling, and coordinating the use of resources and personnel in response to a crisis. Not all crises require the use of the ICC.

Crisis Management Team: A group identified by IE senior management and comprised of personnel from such functions as Operations, Human Resources (HR), Information Technology (IT), Facilities, Security, Legal, Administration, Communications, HSE, as well as other business-critical support functions that will lead crisis response efforts when the incident is of such magnitude that it requires senior management involvement. The duties and responsibilities of the CMT are considered collateral duties.

Critical Function: Business activity or process that cannot be interrupted or unavailable for several business days without having a significant negative impact on the organization or its ability to meet contractual deliverables.

Damage Assessment: The process used to appraise or determine the number of injuries and human loss, damage to public and private property, and the status of key facilities and services resulting from a natural or human-caused disaster.

Disaster: An unanticipated occurrence that causes widespread destruction, loss, or distress to an organization, including natural catastrophes, technological accidents, or human-caused events that may result in injuries or fatalities to employees or the public, or significant property damage.

Disaster Recovery: Immediate intervention taken by an organization to minimize further losses brought on by a disaster; and beginning the process of recovery, including activities and programs designed to restore critical business functions, and return the organization to an acceptable condition.

Emergency: An unforeseen occurrence or situation that happens unexpectedly and demands immediate action and intervention to minimize potential injury, loss of life, property, or profitability.

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Evacuation: Organized, phased, and supervised dispersal of people from dangerous or potentially dangerous areas.

Incident Management Team (IMT): A Regional, Country, Office, or Project-level group directed by the IE CMT who will lead incident response for incidents occurring in their respective offices or projects, domestically or internationally. The IMT is comprised of personnel from such functions as HR, IT, Facilities, Security, Legal, Administration, HSE, and other business-critical support functions at the office or project level.

Mitigation Strategies: Implementation of measures to lessen or eliminate the occurrence or impact of a crisis event or incident.

Point of Contact (POC): A person or team that has been designated by the URS IE office or business groups to be contacted any time an incident occurs.

Recovery/Resumption: Plans and processes to bring an organization out of a crisis that resulted in an interruption. Recovery/resumption steps should include damage and impact assessments, prioritization of critical processes to be resumed, and return to normal operations, or to reconstitute operations to a new condition.

Response: Executing the CMP and resources identified to perform those duties and services to preserve and protect life and property, as well as provide services to the surviving population. Response steps should include potential crisis recognition, notification, situation assessment, and crisis declaration, CMP execution, communications, and resource management.

Tabletop Exercise: A test method in which participants review, discuss, and practice the actions they will take in the event of CMP activation.

3.0 CRISIS MANAGEMENT ORGANIZATION

3.1 Purpose

The IE President will designate and assign a CMT to conduct and manage Emergency Preparation and Crisis Management activities. The CMT is the central POC for information collection, support, and distribution for official correspondence and information during all hours of operation, and is typically comprised of members of the Executive Management Team or their designees. The CMT will communicate with and provide support to all domestic and international offices and projects on all matters related to an emergency crisis situation in their respective areas. Operations may be called upon by the CMT to assist, support, and respond as necessary.

3.2 CM Roles and Responsibilities

3.2.1 IE President

The outcomes of incidents and problems encountered by the CMT and the IMT may influence future policies and strategies. Therefore, the IE President will be kept informed and updated at all times in the

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event of any significant incidents. The IE President should be updated daily at pre-determined times on the progress of response efforts in the event of an incident activating the requirements of this CMP. The CMT Lead will keep the IE President informed, and coordinate communications internal to URS Corporate.

3.2.2 Crisis Management Team

The CMT is led by the designated Crisis Management Team Leader. The CMT Lead manages IE incidents falling under the purview of this CMP, and reports to the IE President.

Responsibilities include:

- Monitoring and managing any incident reported to them.
- Ensuring implementation of IE policies consistent with this CMP.
- Reporting to the IE President on a daily basis, or at a frequency warranted by the situation throughout the incident.
- Maintaining accurate records of CMT proceedings.
- Providing and/or directing crisis management training, in coordination with Human Resources and HSE.

3.3 CMT Purpose and Scope

The CMT has overall responsibility for overseeing the development, maintenance, and implementation of the CMP. All CMT members ensure that current copies of the CMP are kept in secure locations, and that all authorized CMT personnel are trained to use and implement it as needed. The responsibilities of the CMT are:

- Establish, define, and implement IE policies, plans, and procedures.
- Distribute EP/CM policies, plans, procedures, and guidance to domestic and international offices/projects.
- Activate the IE Incident Command Center and implement the CMP when necessary.
- Manage emergencies to resolution.
- Authorize/implement domestic and international support as required.
- Assist offices/project with necessary resources for incident response.

3.3.1 CMT Leader

The CMT Leader will:

- Oversee the IE Crisis Management program.
- Direct the implementation of EP/CM policy decisions.
- Activate the CMT when warranted.
- Identify and assign CMT members with concurrence from the IE President.
- Convene CMT meetings as required.

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- Establish primary objectives for the CMT in management of the incident.
- Establish communications and meeting schedules for the CMT.
- Maintain situational awareness of the incident for use in planning, operational support, and briefings.
- Respond and track responsiveness to resource needs from the IMT members.
- Identify costs for incident management and potential impacts.
- Require that all offices and projects conduct emergency preparedness and response training and exercises.
- Release approval for communicating emergency announcements to employees, in coordination with Corporate Communications.
- Release approval for communicating with the media or general public in an emergency.
- Review and approve debriefing meeting minutes and critique emergency response reports following an emergency drill or actual incident.
- Oversee lessons-learned reports of drills or incidents, and implement correction actions.
- Establish and communicate the location/time for CMT meetings to key personnel.
- Brief individual CMT members as needed.
- Keep the IE President informed and coordinate communications internally between IE and URS Corporate.

3.3.2 Group General Managers/Vice Presidents

The Group Vice Presidents will:

- Ensure that each Office, Region, and Country has implemented an emergency/crisis notification system; the notification system will provide for reporting of significant incidents from offices/project sites through to the Regional Managers and Group Vice President.
- Notify the CMT Leader and IE President as appropriate of significant incidents.
- Ensure that all operations have an effective system for informing employees regarding emergencies/crises, and the status of the employees' work location.

3.3.3 Communications

The Communications Lead will perform the following tasks through the CMT or Incident Command Center:

- Assess and identify communication needs.
- Establish and control communications between the CMT and the projects.
- Identify and establish a liaison with influential members of the local communities and media personalities who may help control incident coverage, and assist in releasing public statements.
- Monitor national and international media coverage.
- Control media responses related to any emergency/crisis.

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- Discuss and approve media-release information with the IE President.
- Prepare press release(s), media advisories, and statement(s).
- Manage release of information to internal and external sources.
- Ensure confidentiality and verify accuracy of sensitive information before dissemination.
- Monitor and record external and third-party media coverage.
- Maintain records of any/all notifications of media, government representatives, and internal sources.

3.3.4 Security

The security role will vary with the type of crisis. Security will provide primary support in regard to crises involving political instability, personnel evacuation, and kidnap/hostage situations. The Security Lead will perform the following tasks as a member of the CMT:

- Provide information regarding the ongoing security situation at the crisis location.
- Recommend best practices in minimizing security risks to employees/subcontractors.
- Serve a lead role in communications with local law enforcement.
- Coordinate/obtain crisis location security contractors (if needed).
- Provide evacuation options for crises involving political unrest.

3.3.5 Health, Safety, and Environmental

The HSE Lead will:

- Provide assistance and support to the CMT Leader for all health, safety, and/or environmental-related activities.
- Review the safety plan for incident response activities involving IE staff or subcontractors.
- Coordinate with the IE Occupational Health Nurse and workers' compensation provider regarding the management of injured IE employees.
- Lead or assist in incident investigations/root-cause analyses of incidents involving serious employee injuries or fatalities.
- Lead the communications with safety or environmental regulatory agencies (e.g., U.S. Occupational Safety and Health Administration, UK HSE Executive) in coordination with IE Legal and Operations.

3.3.6 Finance and Administration

The Administration Lead reports to the CMT Leader, and will:

- Provide financial support to the CMT Leader.
- Provide financial impact data to the CMT Leader.
- Provide logistical support to the CMT Leader.
- Provide facilities, space, and infrastructure (telephone, computer network, power, water, food, etc.) for emergency operations.

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- Maintain records of all costs associated with a crisis.

3.3.7 Human Resources

HR is responsible for:

- Providing HR support to the CMT Leader.
- Providing access to the employee database.
- Obtaining additional internal or external HR resources.
- Managing family notifications.
- Maintaining POC for impacted employees/families.
- Coordinating employee benefits (e.g., medical, life insurance).
- Coordinating and activating the Employee Assistance Program.

3.3.8 Legal

The Legal Lead will provide legal counsel to the CMT Leader, including:

- Assessing the legal impact of the actions to be taken by the CMT.
- Providing a legal review of communications related to the crisis.
- Arranging external legal support as needed.
- Coordinating notification of insurance broker and insurer of possible claims.
- Managing any legal proceedings resulting from the incident.

3.3.9 Information Technology

The IT Lead will:

- Provide IT support to the CMT Leader.
- Oversee continuity of IT operations.
- Ensure the IT Disaster Recovery Plan is developed and tested.

3.4 Crisis Management Team Meetings

- The CMT Leader will initiate meetings with members of the team when it is determined there is a crisis or potential crisis.
- Due to the physical locations of team members, the CMT meetings will typically be held via conference call or video conference. For many crisis situations, daily calls or twice-daily calls are effective.
- The Central Command Center (CCC) will be activated for longer-term crisis situations, incidents with extensive media attention, and crises managed most effectively from one location.
- The meeting content will change as the crisis progresses. Initially, the focus will be on basic incident information (listed in Attachment A).

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4.0 TRAINING

All IE employees involved in emergency and/or crisis management will be trained for their specific responsibilities. Annual exercises will be conducted to ensure our ability to respond appropriately to emergencies/crises that affect our employees, customers, and property.

5.0 CENTRAL COMMAND CENTER

The CCC is a centralized management center for emergency operations. The CCC will be established in an area with sufficient workspace for the CMT to operate.

5.1 Primary Location

The primary CCC is at the URS Corporate office in San Francisco, California.

5.2 Alternate Location

The Alternate Crisis Command Center (ACCC) is at the URS New York City office, in the event that the primary CCC is impacted by the crisis event.

5.3 CCC Requirements

The Command Centers will have the following capabilities:

- Communications – an emergency communications system that will not be incapacitated by internal or external system demands. The center will have backup communications (e.g., Blackberry, cellular telephones, satellite telephones, etc.).
- Adequate Displays.
- Cable or satellite TV connection.
- Workstations – enough computer laptops to accommodate the CMT. CMT members should bring laptops to the CCC or ACCC to support response operations.
- Personnel – at least three support personnel to update displays, prepare reports, and provide messenger services. One support person per 8-hour shift is adequate.

6.0 INCIDENT RESPONSE

6.1 Planning

6.1.1 Office Locations

Each IE office will maintain a current Emergency Preparedness Plan (EPP), in compliance with URS Safety Management Standard (SMS) 003. The EPP will include the alarm system, reporting procedures for fire and medical emergencies, evacuation routes, personnel assembly points, and coordination with the building operator. The EPP will also include procedures for the most likely natural disasters in the area (e.g., earthquake, hurricane, flooding).

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The site-specific EPP will provide details on the communication of incidents to on-site management, including incidents that occur in the office, during travel, or on field projects. The EPP will also provide the plan for management communication to employees in case of temporary office closure, or other critical communication.

6.1.2 Field Projects

Emergency planning will be incorporated into all field project Health and Safety Plans/Safe Work Plans. The level of emergency planning will vary with the project scope, but must include basic incident notification procedures, including contact phone numbers of the appropriate URS supervisor/project manager. The emergency plan will also contain phone numbers for the appropriate emergency response organizations (e.g., fire department, ambulance, spill response).

6.1.3 International Regions

Each International Region will maintain an Incident Management Plan outlining the local role for response to significant incidents within the region or country.

6.1.4 International Travel Security Plan

If an employee is planning to travel to any country not listed in the “Low Risk” countries, an International Travel Security Plan must be prepared in compliance with Policies and Procedures Policy 074.021.

6.2 Incident Notification

URS SMS 049 “Injury/Illness/Incident Reporting & Notifications” provides the initial steps to be taken by employees and line management in regard to incidents, including notifications.

Significant incidents (potential crisis situations) require immediate notification up through the management organization to the CMT Leader. Initial notification of potential crisis-level incidents must include direct voice contact (not voicemail or email); alternates must be contacted if the primary contact is not reached.

6.3 Response Procedures

Response procedures are part of the protocols for each type of emergency. The procedures spell out how the facility will respond to emergencies. Whenever possible, these procedures are bulleted so they can be quickly accessed by senior management, department heads, response personnel, and employees. The procedures describe the actions necessary to:

- Assess the situation.
- Establish objectives, strategies, and tactics to protect employees, customers, visitors, equipment, vital records, and other assets, particularly during the first 3 days.
- Plan for the management of the incident, and the return to normal operations.

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Also included in the procedures are the following instructions:

- Warn employees and customers.
- Conduct an evacuation and account for all persons in the facility.
- Manage response activities.
- Activate and operate an ICC.
- Only fight fires if they are small enough to be handled with a fire extinguisher.
- Sound alarm.
- Shut down operations.
- Protect vital records.
- Restore operations.

7.0 COMMUNICATIONS

The Communications Lead will perform the following tasks through the CMT or ICC.

- Ensure that each operating unit has implemented an emergency/crisis notification system to ensure that all employees are informed of emergencies/crisis, and provide for notification of supervisors, managers, and senior IE Management.
- Prepare and maintain current IE profile, history, and historical incident information.
- Plan for and implement the communications systems necessary for the incident response and management.
- Organize internal emergency communications within IE.
- Assess and identify communication needs.
- Establish and control communications between the CMT and IE Operations.
- Identify and establish a liaison with influential members of the local communities and media personalities who may help control incident coverage, and assist in releasing public statements.
- Monitor national and international media coverage.
- Control media responses related to any emergency/crisis.
- Discuss and approve media-release information with the IE President and URS Corporate Communications.
- Prepare press release(s), media advisories, and statement(s).
- Manage release of information to internal and external sources.
- Ensure confidentiality and verify accuracy of sensitive information before dissemination.
- Monitor and record external and third-party media coverage.
- Establish a diary of events and take minutes of CMT meetings through a recorder (administrative employee).
- Maintain records of any/all notifications of media, government representatives, and internal sources.

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8.0 POST-INCIDENT RECOVERY

8.1 Resuming Operations

The recovery of facility operations and services will depend on the extent of damage suffered by the operating unit or facility. The IMT will need to prioritize activities that can be accomplished with available staff and resources. Immediately following the emergency phase of the incident, the IMT and facility management will begin the implementation of the facility-specific business continuity/recovery plan.

8.1.1 Documentation Requirements

Documentation of emergency activities is of critical importance following the emergency situation. All records and forms used during the incident to document activities must be retained for future reference.

8.1.2 Responsibility for Incident Documentation

Following an emergency situation, the IMT will have the responsibility for collecting all records and forms used during the incident. The emergency situation must be investigated as soon as possible following its occurrence. The investigation is designed to determine why the incident occurred, and what precautions can be taken to prevent a recurrence.

8.2 Investigation Responsibilities

Each IMT Leader is responsible for ensuring that an incident investigation is conducted following emergency situations that occur at their facility.

8.2.1 Damage Assessment

Following the incident, an assessment of damage to facility properties and equipment must be conducted. The major goal of this assessment will be to determine the extent of damage to facilities, safety hazards resulting from the incident, and repairs that must be initiated to minimize further damage and restore the facility for operational use. The IMT Leader will have the primary responsibility for conducting the damage assessment following an incident.

8.2.2 Critique

The critique of the incident is a review of what actions took place during the incident—both good and bad. A critique is not designed to place blame, but rather to allow for the flow of ideas and recommendations to improve the emergency action plan and the facility policies and procedures. After a crisis, an IMT meeting is required to ensure all necessary actions have been taken to control, resolve, and end the crisis. The IMT members will identify additional actions required to eliminate/minimize the development of a similar future crisis. The IMT members will prepare a full report of the crisis, which will include:

- A listing of incidents and activities.
- Incident response activities.
- Major decisions.
- Overall summary of activities and critique of the total operation.

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- Recommendations for reducing the risk of a repeat event.

The incident report will be shared with senior management in URS IE.

The critique should serve to improve the ability of IE to plan for and respond to emergency situations. "Lessons Learned" should be considered in planning and practice simulations by the CMT and IMTs.

9.0 EMPLOYEE/FAMILY SUPPORT

Some employees and family members may be profoundly impacted by the events surrounding the incident, especially those involving injuries or loss of life. It may be necessary to provide critical-incident stress-debriefing sessions following such incidents, using services provided by either our Emergency Assistance Program provider, or another qualified subcontractor. The CMT will determine if a requirement exists to activate the ACCC in Las Vegas, Nevada, from which trained Family Assistance personnel can respond. The ACCC will coordinate with Human Resources and provide or arrange for:

- Services to aid in the resolution of personnel problems and emergency situations as they arise (i.e., suicide and homicide threats, hostile expressions, demonstrations of irrational behavior).
- Establishing counseling services for employees, family members, and groups affected by the crisis.
- Arranging transportation for employees/family members as necessary to hospitals where injured family members may be hospitalized.
- Repatriation of remains.
- Return of personal property to family members.
- Restoration and return of personal effects to family members.

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ATTACHMENT A – INITIAL RESPONSE CHECKLIST

- ☐ Briefly assess the magnitude of the incident (e.g., injuries, fire, environmental spill, earthquake).
- ☐ Follow the available Emergency Preparedness Plan; contact needed emergency services: (e.g., police, fire, ambulance).
- ☐ Initiate site control as appropriate: shutting down operations/evacuation from hazardous areas.
- ☐ Provide first aid to injured.
- ☐ Make certain all employees are accounted for.
- ☐ Ensure that any incident evidence is protected.
- ☐ Communicate situation to Operations Management and HSE.
- ☐ Contact URS support organization as needed: HR, Corporate Communications, Legal, Security, HSE, IT, Occupational Nurse.
- ☐ Project Manager/Client Account Manager to notify client (as appropriate).
- ☐ Assure Regional Manager is aware of significant incidents.
- ☐ Incident documentation (i.e., witness statements, photos).
- ☐ Update employees: incident status, return to work schedule, not communicating with the media, employee questions.
- ☐ Recovery/Restore Operations.

NOTES:



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ATTACHMENT B – TELEPHONE THREAT CHECKLIST

Exact time of call: _____ AM ☐ PM ☐
 Date of call: _____
 Exact words of caller _____
 (use back if necessary): _____

How long did the conversation take? _____
 Did they say they would call back? _____
 When? _____
 On what number? _____
 Questions to ask if for a bomb threat:
 When is the bomb going to explode? _____
 Where is the bomb? _____
 What does it look like? _____
 What kind of bomb is it? _____
 What will cause it to explode? _____
 Did you place the bomb? _____
 Why? _____
 Where are you calling from? _____
 What is your address? _____
 What is your name? _____

Caller's Voice (*check box*)

Calm	☐	Disguised	☐	Nasal	☐	Angry	☐
Broken	☐	Stutter	☐	Slow	☐	Sincere	☐
Lisp	☐	Rapid	☐	Giggling	☐	Deep	☐
Crying	☐	Squeaky	☐	Excited	☐	Stressed	☐
Accent	☐	Loud	☐	Slurred	☐	Normal	☐

If the voice is familiar, who does it sound like? _____
 Describe background noises: _____
 Remarks: _____
 Person receiving call: _____
 Telephone number call received at: _____
 Incoming telephone number (if available): _____

Report call immediately to the Incident Management Team (IMT) Leader

Building evacuated? : YES ☐ NO ☐

Police notified? : YES ☐ NO ☐

URS INFRASTRUCTURE & ENVIRONMENT
Emergency Preparedness & Crisis Management Plan

ATTACHMENT C – IE CRISIS MANAGEMENT TEAM CONTACT LIST

[Contact List maintained by Vice President HSE]

URS SAFETY MANAGEMENT STANDARD

Confined Space Entry

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where confined space entry operations are performed by URS or any contractor and/or subcontractor on URS projects.

2. Purpose and Scope

The purpose of this standard is to protect personnel from the hazards associated with confined space entry.

A confined space is defined as follows:

- A. It is large enough and so configured that personnel may bodily enter and perform assigned work.
- B. It has limited or restricted means for entry or exit.
- C. It is not designed for continuous occupancy.

A non-permit space is a confined space that presents no existing or potential hazards, nor will the work performed or natural environment therein create a hazardous condition.

A permit-required space is a confined space that may present one or more potential hazards. A permit-required space may be changed to a non-permit space if all known and potential hazards are eliminated.

An alternate entry space is a confined space that was initially classified as a permit-required confined space, but has atmospheric hazards that can be completely controlled only through ventilation.

Entry into a non-permit, permit-required, or alternate entry confined space occurs whenever any body part crosses the plane of entry of the space. Note: All confined spaces will be considered to be permit-required spaces until further investigation reveals the nature and extent of the hazards.

3. Implementation

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

URS SAFETY MANAGEMENT STANDARD

Confined Space Entry

4. Requirements

- A. Determine whether a confined space is present and, if so, whether entry is required. Where a confined space has been identified but will not be entered, take positive measures to prevent entry, including setting up barriers and posting signs and warning labels.
- B. Where confined spaces are present and must be entered, determine the type of confined space present. A decision flow chart to assist in determining the type of confined space present is provided in Supplemental Information B.

Determining the type of confined space will require a thorough evaluation of the actual and potential hazards associated with the confined space. Common hazards associated with confined space entry include, but may not be limited to, atmospheric hazards, thermal hazards, chemical hazards, mechanical force, electrical hazards, and engulfment. Refer to Supplemental Information A for definitions of common confined space terminology, including hazards.

C. Permit-Required Confined Space Entry

1. Requirements of the Entry Supervisor:

- a. Conducts an assessment of confined space locations within the facility, gathering information about the spaces within the project boundaries. When the project is located within the boundaries of a client site, the Entry Supervisor will contact the facility representative to gather information about the confined space and to determine whether the facility has any entry requirements that must be followed.
- b. Performs a hazard evaluation using the Confined Space Entry Permit – Attachment 010-1 NA. More detailed discussion of hazard assessment criteria is provided in Supplemental Information C.
- c. Assesses whether those hazards that create the permit-required confined space can be eliminated without necessitating employee entry into the space. By eliminating hazards that are immediately dangerous to life or health, administrative and rescue requirements are lessened and risk to workers is reduced.
- d. Determines rescue requirements for the space.

URS SAFETY MANAGEMENT STANDARD
Confined Space Entry

- e. Arranges for Authorized Entrants, Attendants, and rescue service personnel, where required.
- f. Identifies all equipment necessary for the job. This may include the following:
 - i. Testing and monitoring equipment.
 - ii. Ventilating equipment.
 - iii. Communications equipment.
 - iv. Personal protective equipment.
 - v. Lighting.
 - vi. Barriers and shields to protect entrants from external hazards.
 - vii. Equipment necessary for safe ingress and egress.
 - viii. Rescue and emergency equipment.
 - ix. Any other equipment required for safe entry and exit from the confined space.
- g. Obtains all equipment and verifies that it is functional.
- h. Coordinates confined space entry activities with other onsite contractors who may be affected by the entry and provides them with a copy of this written program.
- i. Cancels the entry and the permit in the event of an emergency or permit expiration.

2. Space Isolation

- a. Verify that the confined space is emptied, purged, flushed, ventilated with air, or otherwise made free of hazardous substances.
- b. Isolate the confined space as described on the permit. Isolation procedures typically include disconnection or blocking of lines, pipes, or other material conveyances to or through the confined space that may be carrying fuels, liquids, or gases.

URS SAFETY MANAGEMENT STANDARD

Confined Space Entry

- c. Isolate and lockout/tagout all forms of potential energy inside the confined space, including the following:
 - i. Electrical.
 - ii. Mechanical.
 - iii. Thermal.
 - iv. Pneumatic.
 - v. Hydraulic.
- d. Develop alternate procedures for protection of entrants for lines that may not be controlled (e.g., lines through storm water or sewer vaults).
- e. Open the entry point to the confined space.
- f. Provide barricades and post the entrance of the space with a sign stating "Danger Confined Space Do Not Enter" or equivalent wording.

3. Electrical Equipment

- a. Provide electrical equipment that meets the electrical classification of the area. Refer to SMS 012 – Electrical Safety, for additional information.
- b. Route all portable electrical equipment through ground fault circuit interruption (GFCI) devices.

4. Atmospheric Tests

- a. Calibrate monitoring equipment before and after sampling and record information.
- b. Make initial atmospheric tests of the space with the ventilation OFF.
- c. Attach extension probes or lengths of silicone or similarly inert tubing material to the monitoring equipment to reach the bottom of the space. For horizontal spaces, the probe may need to be attached to a pole.

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Confined Space Entry

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

Consult the monitoring equipment's operating manual to determine the additional response time required.

- e. Obtain readings for oxygen first, followed by %Lower Explosive Limit, (%LEL) then for other contaminants of concern (if applicable).
- f. Record all results on the permit, and sign and initial where indicated.
- g. Determine whether acceptable entry conditions exist with respect to oxygen, %LEL, and other hazardous atmospheres.
- h. If unacceptable entry conditions are indicated, correct the limiting condition.
- i. If acceptable entry conditions exist, determine times that the monitoring will be repeated or determine whether continuous monitoring will be needed.
- j. Monitor continuously for oxygen and %LEL if hot work will be performed in the space.

5. Ventilation

- a. Open as many openings as possible in the space to aid in cross ventilation.
- b. Never ventilate confined spaces with oxygen.
- c. Ensure that air supply for the ventilation equipment originates from a clean source.
- d. Provide five (5) air changes per hour or at least 10,000 cubic feet/minute (cfm) for large spaces.
- e. If a generator is used to provide power, be sure that the exhaust does not enter the space. Carbon monoxide monitoring may be required.

URS SAFETY MANAGEMENT STANDARD

Confined Space Entry

- f. Place blower ductwork such that it does not create a hazard by impairing the line of vision of attendants observing space entrants or by blowing contaminants to other workers.
- g. Provide at least 2,000 cfm of active exhaust ventilation for each welder or torch operating under a Hot Work Permit within the space.
- h. Use fire/explosive proof ventilating equipment that is in compliance with National Fire Protection Association (NFPA) 70, Articles 502 and 503, as applicable when exhausting flammable gases, vapors, and dusts from confined spaces.

6. Authorizing the Permit

- a. The Entry Supervisor personally inspects the work area and signs the permit after confirming that all necessary precautions have been taken and all relevant information concerning the entry parameters is documented on the permit.
- b. Conduct a briefing informing all entrants and attendants of conditions in the space.
- c. Require entrant(s) and attendant(s) to each print their names and sign the permit.
- d. Affix the permit to a location near the space entrance.

7. Entry Operations

- a. Prohibit entry when oxygen-deficient or flammable atmospheres are detected in the space.
- b. Limit entry to Authorized Entrants listed on the permit and only for the purpose stated on the permit.
- c. Require entrants to follow all requirements listed on the permit.
- d. Attach a body harness, if required, to a lifeline. Attach the other end of the lifeline to a fixed point or to a mechanical lifting device outside the space at all times the entrant(s) is in the space.

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Confined Space Entry

- e. Require that the attendant or attendants remain at the entrance whenever an entrant is inside the confined space. The attendant may not be assigned other duties that may distract him/her from maintaining uninterrupted contact with the entrant(s). The attendant may attend to only one confined space entry at any one time. Each space must have its own attendant.
- f. The attendant will order entrant(s) out of the space whenever
 - i. A prohibited condition on the entry permit develops.
 - ii. The surrounding work area becomes unsafe.
 - iii. Any monitoring instrumentation, rescue equipment, ventilation, etc. becomes compromised.
 - iv. Possible symptoms of exposure are noted in the entrant(s).
 - v. Entrant(s) expresses any type of concern regarding the safety of the entry.

8. Rescue

- a. Require non-entry rescue procedures to be used for every entry, where feasible. Typically, non-entry rescue will require the use of a retrieval line and full-body harness. Mechanical extraction devices, usually consisting of a tripod, winch, and lanyard affixed to the full-body harness, are required for non-entry extraction of personnel from vertical spaces more than 5 feet (1.5 meters) in depth.
- b. Wristlets will not be used for non-entry rescue procedures unless it can be demonstrated that the use of a chest or full-body harness is not feasible or unsafe and that the use of wristlets is the most effective alternative.
- c. Contract for qualified entry rescue services. This may be local emergency services personnel, contract rescue teams, or response teams provided by the host facility. If response teams are provided by the host facility, this must be noted in the health and safety plan and agreed to by both parties.

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Confined Space Entry

- d. Entry rescue must be staged on site adjacent to the space for the duration of the entry. Ensure that rescue service personnel are provided prior access to all confined spaces to allow for development of appropriate rescue plans and to practice rescue operations, as needed.
- e. Entry rescue personnel must be staged at the entry site any time conditions within the confined space are or could become immediately dangerous to life or health (IDLH).
- f. URS will not place staff at risk by allowing confined space entry when qualified rescue teams cannot be identified.

9. When the Entry Is Complete

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

D. Non-Permit Confined Space Entry

1. Reclassification of a Permit-Required Confined Space

- a. The first step toward reclassification of a permit-required space as a non-permit space is to eliminate all its hazards without entering the space. If this is not practical and it becomes necessary for an employee to enter a permit-required space in order to eliminate its hazards, the entry must occur in accordance with the written permit-required confined space program.
- b. If the space requires cleaning, determine whether cleaning activities performed in the space would create a hazardous atmosphere. Determine whether activities outside the space would negatively affect the atmosphere inside the space. If not, the space may be reclassified as a non-permit space.
- c. Permit-required spaces with actual or potential atmospheric hazards that can be controlled but not eliminated by ventilation cannot be downgraded to non-permit spaces. The control of atmospheric hazards using forced air ventilation does not constitute elimination of those hazards

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and thus cannot be used to downgrade a permit-required space to a non-permit space.

2. Space Reevaluation

If hazards arise within a space that had been classified as a non-permit space, each employee in the space must immediately exit the space. The space must then be evaluated to determine whether it should be reclassified as a permit-required space.

3. Recordkeeping

To document that all hazards in a non-permit space are eliminated, a Non-Permit Required Confined Space Work Form (Attachment 010-2 NA) must be completed. This form must be made available to each employee for review and signature prior to entering the space.

E. Alternate Entry Confined Space Criteria

Alternate procedures for entering permit-required spaces containing atmospheric hazards can be used if it can be demonstrated that forced air ventilation alone will control all hazards in the space.

1. Alternate Entry Criteria

- a. There may be no hazardous atmosphere within the space whenever any employee is inside the space.
- b. Continuous forced air ventilation will be used, as follows:
 - i. An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere.
 - ii. The forced air ventilation will be so directed as to ventilate the immediate areas where an employee is or will be present within the space and will continue until all employees have left the space.
 - iii. The air supply for the forced air ventilation will be from a clean source and may not increase the hazards in the space.
- c. The atmosphere within the space will be periodically tested as necessary to ensure that the continuous forced air

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ventilation is preventing the accumulation of a hazardous atmosphere.

- d. If a hazardous atmosphere is detected during entry:
 - i. Each employee will leave the space immediately.
 - ii. The space will be evaluated to determine how the hazardous atmosphere developed.
 - iii. Measures will be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

2. Recordkeeping

Monitoring and inspection data are to be documented in writing on the Alternate Entry Confined Space Work Form – Attachment 010-3 NA. When alternate procedures are used for entering a permit-required space, verify that the space is safe for entry and that all required procedures and safety measures have been taken.

F. Audits of the Confined Space Entry Standard

Annual audits of this Safety Management Standard will be conducted in accordance with the procedures set forth in the SMS 068 – Health and Safety Compliance Assurance.

The Project Manager, or his/her designee, will review Entry Permits (if completed) on an annual basis (or more frequently as necessary depending on client requirements and project duration) and document this review by notation on the permits. The purpose of this review is to determine compliance with this SMS and ensure that employees performing entry operations are adequately protected from confined space hazards.

G. Training

Require Entry Supervisors, Entrants, and Attendants to be trained prior to the initial assignment, prior to a change in assigned duties, if a new hazard has been created, or if special deviations have occurred. Suggested baseline training requirements for permit-required and non-permit spaces are provided in Supplemental Information D.

URS SAFETY MANAGEMENT STANDARD

Confined Space Entry

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Entry Supervisor, Authorized Entrant, and Attendant qualifications.
- B. Confined Space Entry Permits or Work Forms.
- C. Additional Work Permits, as necessary (e.g., Hot Work).
- D. Monitoring equipment calibration logs.
- E. Lockout/Tagout records (if used).
- F. Daily worker briefing records.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [Permit-Required Confined Spaces](#) – 29 Code of Federal Regulations 1910.146
- B. U.S. OSHA Technical Links – [Confined Spaces](#)
- C. American National Standards Institute/American Society of Safety Engineers – [ANSI/ASSE 117.1-2003](#) – Safety Requirements for Confined Space
- D. [SMS 012](#) – Electrical Safety
- E. [SMS 068](#) – Health and Safety Compliance Assurance
- F. [Attachment 010-1 NA](#) – Confined Space Entry Permit
- G. [Attachment 010-2 NA](#) – Non-Permit Required Confined Space Work Form
- H. [Attachment 010-3 NA](#) – Alternate Entry Confined Space Work Form

7. Supplemental Information

- A. [Definitions](#)
- B. [Type of Confined Space Decision Flow Chart](#)
- C. [Confined Space Hazard Assessment Criteria](#)
- D. [Confined Space Training](#)

	Health, Safety and Environment	Attachment 010-1 NA
	CONFINED SPACE ENTRY PERMIT	Issue Date: October 2000 Revision 7: December 2009

Space to be Entered: _____		Permit No. _____	
Location/Description: _____		Purpose of Entry: _____	
Authorized Duration of Permit:		Date: _____ to: _____ Time: _____ to: _____	
PERMIT SPACE HAZARDS (Indicate specific hazards with initials.) _____ Oxygen deficiency (less than 19.5%) _____ Oxygen enriched (greater than 23.5%) _____ Flammable gases or vapors (greater than 10% of LEL) _____ Airborne combustible dust (meets or exceeds LEL) _____ Toxic gases or vapors (greater than PEL or TLV) _____ Mechanical Hazards _____ Electrical Hazards _____ Chemical Hazards _____ Engulfment _____ Other: _____		EQUIPMENT REQUIRED FOR ENTRY AND WORK Specify as required: Personal Protective Equipment: _____ Respiratory Protection: _____ Atmospheric Testing/Monitoring: _____ Communication: _____ Permits: _____ Rescue: _____ Hand/Power Tools: _____ Blocking/Blanking: _____ Other: _____	
PREPARATION FOR ENTRY (Check after steps have been taken.) ☐ Notify affected groups of service interruption. ☐ Isolation Methods ☐ Lockout/Tagout ☐ Blank/Blind ☐ Purge/Clean ☐ Inert ☐ Ventilate ☐ Atmospheric Test ☐ Barriers ☐ Other: ☐ Personnel Awareness: ☐ Pre-entry briefing on specific hazards and control methods ☐ Notify contractors of permit and hazard conditions ☐ Other: ☐ Additional Notifications required:		AUTHORIZED ENTRANTS (List by name or attach roster): 	
RESCUE PERSONNEL / SERVICE RESCUE EQUIPMENT: Phone Number: _____ Contact Method: _____ Phone Number: _____ Contact Method: _____		AUTHORIZED ATTENDANTS (List by name or attach roster): 	
ATMOSPHERIC TESTING FREQUENCY: _____ Name of Atmosphere Tester: _____		PERMIT CANCELLED BY (if required): Date: _____ Time: _____ Reason for Cancellation: _____ _____	

	Health, Safety and Environment	Attachment 010-1 NA
	CONFINED SPACE ENTRY PERMIT	Issue Date: October 2000 Revision 7: December 2009

Testing	Result	Result	Result	Result	Result	Result	Result
Time (Indicate am/pm)	_____	_____	_____	_____	_____	_____	_____
Oxygen (%)	_____	_____	_____	_____	_____	_____	_____
Flammability (%)	_____	_____	_____	_____	_____	_____	_____
H ₂ S (ppm)	_____	_____	_____	_____	_____	_____	_____
Toxic-(Specify)	_____	_____	_____	_____	_____	_____	_____
Cl ₂ (ppm)	_____	_____	_____	_____	_____	_____	_____
CO (ppm)	_____	_____	_____	_____	_____	_____	_____
SO ₂ (ppm)	_____	_____	_____	_____	_____	_____	_____
Temperature °F/°C	_____	_____	_____	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____	_____	_____
Tester Initials	_____	_____	_____	_____	_____	_____	_____

AUTHORIZATION BY ENTRY SUPERVISORS

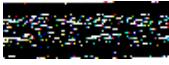
I verify review of this permit and verify that all necessary precautions have been taken to provide for a safe entry into and work in this confined space.

Printed Name _____	Signature _____	Date _____	Time _____
Printed Name _____	Signature _____	Date _____	Time _____
Printed Name _____	Signature _____	Date _____	Time _____
Printed Name _____	Signature _____	Date _____	Time _____

THIS PERMIT MUST BE POSTED AT THE CONFINED SPACE.
THIS PERMIT EXPIRES AT THE END OF THE SHIFT ON WHICH IT WAS ISSUED.
A NEW PERMIT MUST BE ISSUED FOR WORK THAT CONTINUES INTO THE NEXT SHIFT.

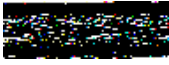
	Health, Safety and Environment DEFINITIONS	SMS 010 NA Supplemental Information A Issue Date: February 2009 Revision 1: December 2009

1. **Alternate Entry Confined Space:** A confined space, initially classified as a permit-required confined space that only has an atmospheric hazard that can be completely controlled through ventilation.
2. **Attendant:** A person stationed outside one or more permit spaces. An attendant monitors the location and condition of authorized entrants and performs all other assigned duties listed in the permit space program.
3. **Authorized Entrant:** An employee designated by the employer to enter a permit space. The duties and training for an authorized entrant are specified in the permit space program.
4. **Blanking or blinding:** The absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.
5. **Confined Space:** Spaces large enough and so configured that an employee can bodily enter and perform assigned work; has limited or restricted means for entry and exit, and is not designed for continuous employee occupancy. Confined spaces include, but are not limited to, storage tanks; vessels; manholes; pits; bins; boilers; digesters; ventilation ducts; utility vaults; tunnels; pipelines; trenches; vats; open top spaces more than 4 feet deep, such as pits; tubs; and excavations; or any space with limited ventilation or suspect atmosphere.
6. **Double block and bleed:** The closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.
7. **Emergency:** Any failure of hazard control or monitoring equipment, or other event(s) inside or outside a confined space that could endanger entrants within the space.
8. **Engulfment:** The surrounding and effective capture of a person by a fluid (i.e., liquid or finely-divided particulate) substance that can be aspirated and cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction or crushing.
9. **Entry:** The action by which a person passes through an opening into a permit-required-confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.
10. **Entry permit:** Permit means the written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified in Attachments III, IV, and V.
11. **Entry Supervisor:** An entry supervisor is an employee, foreman or crew chief that authorizes and/or supervises confined space entry operations. After the initial entry authorization, the duties of an entry supervisor may be passed from one individual to

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another during the course of an entry operation. Entry supervisors can serve as attendants or as authorized entrants, so long as they are properly trained.

- 12. Flammable Atmosphere:** Any atmosphere that contains a concentration of flammable or combustible material in excess of 10% of the lower explosive limit (LEL) or lower flammable limit (LFL).
- 13. Hazardous Atmosphere:** Hazardous atmosphere means an atmosphere that can expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (i.e., that is escape unaided from a permit space), injury, or acute illness from one or more of the following causes:
1. Flammable gases, vapor, or mist in excess of 10 percent of its LFL.
 2. Airborne combustible dust at a concentration that meets or exceeds its LFL or obscures vision at 5 feet.
 3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
 4. Atmospheric concentration of any substance for which a threshold limit value (TLV) or a permissible exposure limit (PEL) is exceeded.
 5. Any other atmospheric condition that is immediately dangerous to life or health. The material safety data sheet (MSDS) can provide guidance in establishing acceptable atmospheric conditions when a TLV or PEL is not given.
- 14. Hot work permit:** The employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.
- 15. Immediately Dangerous to Life or Health (IDLH):** Any condition that poses an immediate or delayed threat to life or that could cause irreversible and adverse health effects or potentially interfere with an individual's ability to escape unaided from a confined space.
- 16. Inerting:** The displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible. This procedure produces an IDLH oxygen-deficient atmosphere.
- 17. Isolation:** The process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.
- 18. Line breaking:** The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.
- 19. Lockout/Tagout:** A method for keeping equipment from being set in motion and endangering workers. A disconnect switch, circuit breaker, valve or other energy-isolating mechanism is put in the safe or off position, and a written warning is attached to

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it. Tagout is always to be used in conjunction with lockout. A device is often placed over the energy-isolating mechanism to hold it in the safe position. A lock is attached so that the equipment can't be energized.

20. Non-Permit Required Confined Space: A confined space that does not contain or have the potential to contain any hazard or hazardous atmosphere capable of causing death or serious physical harm.

If it can be demonstrated that the only hazard posed by the permit space is an actual or potentially hazardous atmosphere and continuous forced air ventilation can safely maintain the permit space, then the space can be considered non-permit required pending satisfactory air monitoring results.

21. Oxygen-Deficient Atmospheres: Any atmosphere having less than or equal to 19.5% available oxygen content should not be entered without wearing an approved SCBA, or approved supplied air, full face respirator.

22. Oxygen-Enriched Atmosphere: Any atmosphere having 23.5% or more available oxygen content. Oxygen enriched atmospheres will cause flammable materials to burn violently when ignited. Never use pure oxygen when ventilating a confined space. Always ventilate with a clean source of air.

23. Permit-Required Confined Space (PRCS):

Any confined space that has one or more of the following characteristics:

1. Contains or potentially contains a hazardous atmosphere.
2. Contains a material that could potentially engulf an entrant such as hoppers and silos for sand and gravel.
3. Has an internal configuration that could potentially cause an entrant to be trapped or asphyxiated by inwardly converging walls or by floors that slope downward or taper to a smaller cross section.
4. Contains any other recognized serious safety or health hazard.

The following can also be characteristics of a confined space:

1. Unfavorable natural ventilation.
2. Has potential for toxic or oxygen deficient atmosphere, etc.
3. Limited openings for entry and exit.
4. Space is not designed for continuous worker occupancy.

Permit-Required Confined Spaces may contain or produce dangerous concentrations of airborne contaminants that can cause serious injury or death.

24. Prohibited Condition: Any condition in a permit space that is not allowed by the permit during the period in which entry is authorized.

25. Rescue Service: The personnel designated to rescue employees from permit spaces.

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26. Retrieval System: The term “retrieval system” includes equipment-such as retrieval lines, harnesses, wristlets (if appropriate), lifting devices and anchors used for non-entry rescue of persons from permit spaces. Note that a retrieval line differs from a lifeline, which is a type of fall-arrest system.

27. Self-Rescue: The act of escaping unaided from a hazardous atmosphere or IDLH situation in a permit space.

28. Serious Safety Hazard: Any non-atmospheric hazard that may expose entrants to the risk of death, incapacitation or impaired ability to self-rescue.

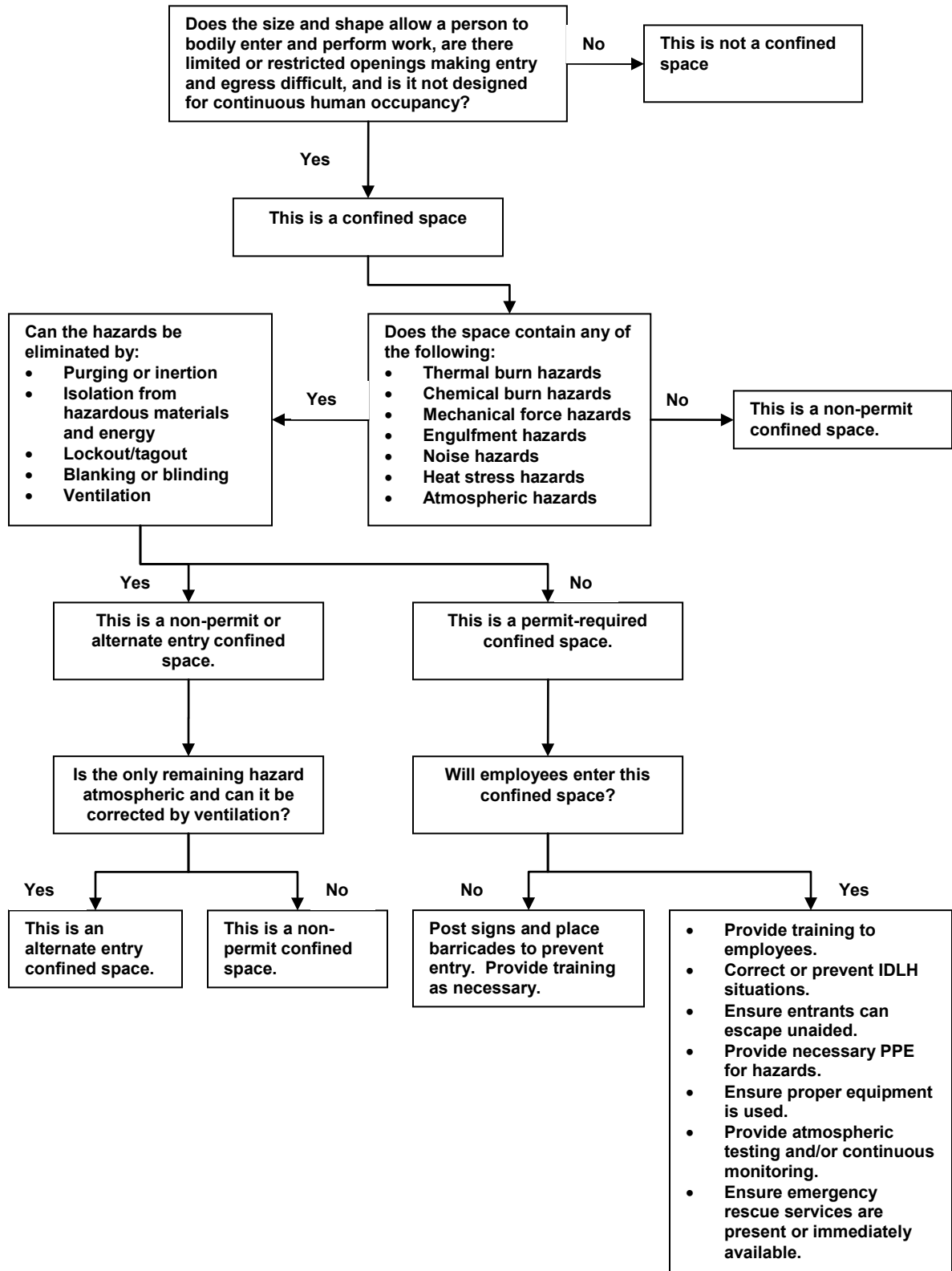
Examples of serious safety hazards include:

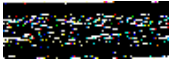
1. Energized and exposed electrical systems
2. Fall hazards.
3. Extreme temperatures.
4. Personal protective equipment that may cause a physical or health hazard or may compromise an individuals’ ability to react appropriately to a hazard.
5. Unguarded mechanical systems.
6. Performing valve lineups on hazardous systems such as steam, inert gas, and hazardous materials.

29. Testing: The process by which the hazards that may expose entrants of a permit space are identified and evaluated. Testing includes specifying the tests to be performed in the permit space.

30. Toxic Atmospheres: Toxic atmospheres have poisonous physical effects, which may be immediate, delayed, or a combination of both. Substances such as poisonous liquids, vapors, gases, mists, dusts, fumes, and biological agents in the air should be considered hazardous in a confined space. Hydrogen sulfide and carbon monoxide are the most common toxic agents that can be found in a confined space.

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A thorough inspection of a confined space must be performed to verify acceptable entry conditions. This frequently includes a physical inspection not only of the space to be entered, but also of adjacent and connected spaces that might pose a threat to entrants. The hazards of greatest concern are those considered immediately dangerous to life or health (IDLH), which pose one or more of the following threats:

- An immediate or delayed threat to life;
- A threat that would cause irreversible adverse health effects; and/or
- A threat that would interfere with an individual's ability to escape unaided from a permit space.

The major IDLH hazards that workers can encounter when they enter confined spaces include:

- Atmospheric hazards;
- Thermal or chemical hazards;
- Mechanical force or electrical hazards; and/or
- Engulfment in liquids or finely-divided solid particles.

1. ATMOSPHERIC HAZARDS

A hazardous atmosphere in a confined space can expose workers to the risk of death, injury, acute illness, incapacitation or impairment of their ability to escape unaided from the permit space (self-rescue). One or more of the following can cause a hazardous atmosphere:

- A flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL).
- An airborne combustible dust at a concentration that meets or exceeds its lower flammable limit (LFL; approximated as a condition in which the dust obscures vision at a distance of 5 feet [1.52 m] or less).
- An atmospheric oxygen concentration below 19.5 percent (oxygen-deficient) or above 23.5 percent (oxygen-enriched).
- An atmospheric concentration of any substance that could result in employee exposure to toxic air contaminants in excess of published exposure limits.
- Any other atmospheric condition that is immediately dangerous to life or health.

2. ATMOSPHERIC TESTING OF CONFINED SPACES

Before entering a confined space, the work environment shall be tested using properly calibrated and approved equipment to determine potential hazards.

1. Oxygen content must be at greater than 19.5 %, and less than 23.5 %.
2. Flammables must be less than 10% of the lower flammable limits of chemicals involved.
3. Toxic gases must be less than the OSHA PEL, ACGIH TLV, or NIOSH REL, whichever is used.

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If contamination or generation of toxic hazards is suspected while workers are in a confined space, testing the confined space atmosphere for oxygen content, flammability, and toxic gases will be performed before entry and on a continuous basis.

Testing shall be performed in a manner to ensure detection of heavier-than-air and lighter-than-air contaminants.

Important - If the atmosphere cannot be tested, then it will be considered an IDLH situation. IDLH requires ventilation, purging, or flushing and use of a SCBA or airline respirator.

3. PROCEDURES FOR ATMOSPHERIC TESTING IN CONFINED SPACES

Atmospheric testing is required to evaluate hazards of the permit space and to verify that acceptable conditions exist for entry into that space. The testing of actual or potentially hazardous atmospheres is accomplished by:

1. Safely removing the entrance cover.
2. Guarding the entrance with a barrier.
3. Testing the internal atmosphere with a calibrated, direct-reading instrument, which is listed certified or approved for the use in the hazardous conditions expected, in the following order given:
 - a. Oxygen content (lack of oxygen will cause erroneous readings of flammables and toxics).
 - b. Flammable gases and vapors.
 - c. Potential toxic air contaminants.

Testing methods are:

- **Evaluation Testing** - The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any existing or potentially hazardous atmospheres, so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space. Evaluation and interpretation of these data and development of the entry procedure should be performed and reviewed by the project safety representative.
- **Verification Testing** - Any residual concentrations of contaminants identified in a permit space should be verified to be within the range of acceptable entry conditions. Results of testing (i.e., actual concentrations) should be recorded on the permit.
- **Testing Stratified Atmospheres** - When monitoring for entries involving a descent into stratified atmospheres, the atmospheric envelope should be tested, at a minimum, every four (4) feet (1.22 meters) in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.

NOTE: Gases have different densities and may stratify in layers. Test spaces before entering and at least at four foot intervals in the direction of travel and side to side.

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4. Periodically retest to verify and document that the atmosphere remains within acceptable entry conditions. Retesting shall be done prior to entry of personnel and at the discretion of the Entry Supervisor.
5. Eliminate hazardous atmospheres by continuous forced air ventilation from a clean air source. Testing should be redone periodically to ensure that ventilation is sufficient.

4. OXYGEN-DEFICIENT ATMOSPHERES

Oxygen deficiency (less than 19.5% O₂) within a confined space can be caused when oxygen is:

- Absorbed by other substances, such as activated charcoal.
- Consumed by chemical reactions, such as rusting and burning, or biological processes, such as bacterial decomposition.
- Displaced by another gas, such as when a confined space is intentionally inerted by a nitrogen blanket or other non-reactive atmosphere that contains no oxygen.

Breathing oxygen-deficient air causes poor judgment, loss of coordination, fatigue, vomiting, unconsciousness, and may ultimately lead to death. Asphyxiation from insufficient oxygen frequently occurs when victims, unaware of the problem, reach the point where they cannot save themselves or call for help.

5. OXYGEN-ENRICHED ATMOSPHERES

The atmosphere in a confined space can also have too much oxygen. An oxygen-enriched atmosphere is not an asphyxiation hazard; however, a concentration of oxygen greater than 23.5% in a confined space can be a serious fire hazard, since oxygen-enriched air can cause combustible materials to burn violently.

6. TOXIC ATMOSPHERES

Toxic atmospheres in confined spaces can cause serious health problems and even death. Poisonous physical effects may be immediate, delayed, or a combination of both.

Toxic contaminants can be gases, vapors, fumes, or airborne dusts. The most common gases encountered in confined spaces are carbon monoxide and hydrogen sulfide. Other sources of toxic atmospheres in confined spaces include fuel vapors, protective tank coatings, inerting media, fumigants, and residues from previous tank contents.

7. ENGULFMENT HAZARDS

Engulfment in a confined space occurs when the victim is immersed in liquid or trapped and enveloped by finely-divided dry bulk materials, such as grain or sawdust.

Engulfment hazards include asphyxiation from aspirating (inhaling) the engulfing material, which causes death by filling or plugging the respiratory system. Another

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asphyxiating effect of engulfment is compression of the torso by the weight of the engulfing material, preventing the victim's lungs from moving.

8. NOISE HAZARDS

Work performed inside a confined space can be deafening. Scaling, chipping, grinding, hammering, riveting, power scrubbing, the use of power and pneumatic tools, and airline leaks create hazardous noise levels. When work is done inside a vessel, tank, or other space with non-absorbing surfaces, noise increases as it reflects off the walls and floors.

Even ventilation adds sound and noises outside the space, which can sound louder inside a confined space.

9. HEAT STRESS HAZARDS

A tank or vessel can become a health hazard to the entrant if the heat inside is allowed to climb too high. The sun on a metal tank or lack of air circulation and hot work can contribute to an entrant being overcome by heat stress. If pre-entry hazard identification indicates heat stress can become a problem, it is a safe practice to plan periodic temperature testing.

10. ELECTRICAL HAZARDS

The effect of electrical energy is a frequent contributor to confined space accidents. It is difficult in confined spaces to avoid contact with electrical components. An effective lockout/tagout program can prevent nearly all-electrical hazards.

11. FLAMMABLE HAZARDS

Flammable and explosive atmospheres contain gases, vapors, or airborne dusts at concentrations great enough to burn rapidly upon contact with ignition sources such as heat, open flames or electrical sparks. The LFL is the lower limit at which a flammable substance will ignite into sustained combustion.

Changes in oxygen concentrations must also be monitored. While it is not flammable itself, oxygen is necessary for all combustion to take place. Materials that are normally nonflammable, such as clothing, can burst into flames at the smallest spark in a confined space containing a high volume of oxygen.

12. MECHANICAL HAZARDS

The effects of mechanical energy are an also frequent contributor to confined space accidents. An effective lockout/tagout program can prevent nearly all-mechanical hazards.

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A confined space has the following characteristics:

- Its size and shape allow a person to enter it.
- It has limited openings for workers to enter and exit.
- It is not designed for continuous occupancy.

A permit-required-confined space has one or more of the following characteristics:

- Contains or has potential to contain a hazardous atmosphere
- Contains a material that has the potential for engulfing an entrant
- Has an internal configuration such that the entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section
- Contains any other recognized serious safety or health hazard.

Some examples of confined spaces are reactor vessels, tanks, silos, boilers, sewers and pipelines.

PERMIT SPACE HAZARD

- Hazardous atmosphere: The air might not have enough oxygen, or might be flammable or toxic
- Entry is defined as placing any part of your body in the permit space
- Engulfment - being trapped in liquid or solid material
- Danger from unexpected movement of machinery
- Electrocution
- Heat stress
- Becoming wedged into a narrow part of the space and suffocating
- Physical dangers such as slips, trips, falls, accumulation of debris, ladders, etc.

Hazards become more serious in a confined space, because rescuers may have a difficult time reaching you if you need help.

The work being done can cause conditions in a confined space to become more hazardous.

- Hot work uses up oxygen and can release hazardous substances. Any hot work in a permit space requires special authorization and a hot work permit.
- Sanding, scraping and loosening residue can stir up hazardous materials.
- Workers sometimes bring hazardous materials, such as solvents, into the permit space.
- Work outside a permit space can produce harmful substances that collect inside.

The confined space entry permit tells us what hazards are in the permit space and how to control them. It usually includes a checklist of necessary safety measures.

Before anyone enters the permit space, the entry supervisor goes through the permit to make sure all necessary hazard controls are in place and signs the permit. Re-evaluation of conditions by the entry supervisor is required at intervals and when a replacement entry supervisor takes over.

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GENERAL INFORMATION

Safe confined space entry takes teamwork between the entrant, the attendant and the entry supervisor. Everyone must do his or her part, so that any worker who goes into a permit-required confined space will come out of it in good health.

Although permits vary in size, length and number of conditions covered, complete information is very important.

Permits should include:

- Specific permit space identification
- Purpose and date of entry
- Duration of authorization
- Authorized entrants by name
- Names of authorized attendant and entry supervisor
- Actual hazards of the identified space
- Control and isolation methods to be used
- Acceptable entry conditions
- Results of initial and periodic atmospheric testing
- Rescue and emergency services to be summoned
- Communication procedures authorized between attendant and entrants
- Equipment to be provided
- Other information as necessary
- Other permits, such as hot work.

PREPARATION OF THE PERMIT SPACE

This section lists the steps required to prepare the space before anyone enters it. The entry supervisor checks to see that each required precaution has been taken.

- All departments likely to be affected by service interruption must be notified.
- Post signs and put up barriers to protect entrants from vehicle traffic and pedestrians from falling into the space.
- Blind or disconnect and cap all input lines, so that no hazardous materials can enter the space.
- Make sure no hazardous energy can be released. Follow applicable lock-out/tag-out rules.
- Empty the space of any materials that may be hazardous. If necessary, clean, purge or inert hazardous residue in the space.
- When ventilation is needed, begin long enough in advance so that the air will be safe before anyone enters. Verify breathable atmospheres by measuring oxygen content, flammable gases, etc.
- Assignment and training of entry supervisors, attendants, and entrants is required to comply with the Permit Space Entry Program and Emergency Response Plan.
- Attach completed hot work permit, if required, to Confined Space Entry Permit.
- Add emergency contact telephone numbers.

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ATMOSPHERIC TESTING

Test the air in all areas and levels of the space before entry. Monitor continuously or retest periodically for as long as the space is occupied and as is appropriate for the hazard involved.

For most items, allowable limits should be given on the permit. After tests are conducted, results are entered on the permit.

- First, test to make sure the oxygen content is between 19.5 and 23.5%.
- Test the concentration of flammable gases, which must be less than 10 percent of the lower flammable limit (LFL).
- Airborne combustible dust cannot meet or exceed its LEL.

NOTE: THE CONFINED SPACE IS NEVER ENTERED TO DETERMINE AIR QUALITY UNLESS SCBA OR AIRLINE RESPIRATORS ARE USED.

- Toxicity: List any toxic materials that could be present and their applicable permissible exposure limit. Test to make sure none of these materials has a concentration greater than its exposure limit.
- If the air is unsafe according to any of these tests, the hazard must be controlled before entry is allowed.
- If the air becomes hazardous later on, the permit must be canceled and everyone must leave the space.
- Evaluate for heat stress potential.
- The person performing the atmospheric tests signs or initials the permit after each test result.
- Entrant or their representatives have the right to review all testing data.

EQUIPMENT REQUIRED FOR ENTRY AND WORK

- Appropriate personal protective equipment, such as hard hats, face shields and encapsulated suits must be made available at the site and listed on the permit.
- Decide whether respirators and portable air monitors are required and which types match the hazard.
- If continuous communication between the attendant and entrant will be difficult, choose and list communication devices to be used, such as radios, hand signals, camera equipment, etc. Test this equipment before entry.
- List any special light sources, spark-proof tools and other electrical equipment that must be on hand before entry begins and make sure this equipment is intrinsically safe and in good condition.
- List any measures needed to guard against shock, such as ground-fault circuit interrupters (GFCI), grounding or bonding straps, etc.
- List devices such as ladders, scaffolding and work platforms. Test this equipment before entry begins.

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PERMIT AUTHORIZATION

- The entry supervisor types or prints a description of the entry on the entry permit.
- After verifying that acceptable entry conditions exist, the entry supervisor signs and dates the permit.
- Only then are workers allowed to enter the permit space.

EMERGENCY AND RESCUE PROCEDURES

- The safest method of rescue from a confined space when conditions deteriorate is self-rescue, when an entrant evacuates the space with no help at the first sign of trouble, and non-entry rescue.
- Only workers trained in rescue operations or procedures can enter the space for emergency and rescue operations.
- Notify your rescue service in advance of the entry to ensure that they are available for an emergency.
- List the name and phone number of the rescue service for the attendant to use.

ENTRY SUPERVISOR

Any individual empowered by the employer to authorize or to directly supervise entry operations in a permit space is designated an entry supervisor.

The entry supervisor makes sure conditions are safe.

- Before entry, the supervisor verifies that the permit is filled out completely and all safety steps listed on it are taken, then signs the form.
- If conditions become unsafe, the permit is canceled and everyone is ordered out of the space.
- The entry supervisor sees that any unauthorized people are removed.
- Every entry supervisor is responsible for canceling the entry authorization and terminating entry whenever acceptable entry conditions are not present.
- The entry supervisor directly in charge of entry operations at the time the work authorized by the permit is completed must terminate the entry and cancel the entry permit. This includes taking necessary measures for concluding the entry operation and closing off the permit space.
- The entry supervisor on each shift must determine, at appropriate intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.
- Whenever responsibility for a permit space entry operation is transferred, the outgoing entry supervisor determines that entry operations are still consistent with the terms of the permit and that acceptable entry conditions are present, before turning operations over to the incoming entry supervisor.

DUTIES OF THE ENTRY SUPERVISOR

Persons acting as the entry supervisor may also serve as authorized entrants or attendants for an entry if they have the proper training.

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Each entry supervisor:

- Knows the potential hazards during entry and work
- Determines if acceptable entry conditions are present at a permit space where entry is planned
- Authorizes entry and oversees entry operations
- Terminates entry as required by the OSHA standard
- Verifies that rescue services are readily available and the means for summoning them are operable
- Removes unauthorized individuals who enter or try to enter the permit space during entry and work
- Determines that entry and work operations remain consistent with entry permit terms and that acceptable entry conditions are maintained.

ATTENDANT

The attendant stays at his or her post to observe conditions and support the entrant.

- As an attendant, you must know the hazards of the permit space and the signs of exposure.
- Keep a current count and be able to identify all entrants.
- Stay in continuous contact with the entrants.
- Be sure only authorized people enter the space or the area surrounding the space.
- Order all workers out of the space in any of these situations:
 - You see a condition not allowed by the entry permit.
 - You notice signs of exposure in any entrant.
 - You see something outside the permit space that could cause danger inside.
 - You must focus your attention on the rescue of entrants from another permit space.
- An attendant must never leave the observation post for any reason and remains outside the permit space.
- If the entrants need to escape, call the rescue team at once.
- In case of emergency, do not enter the permit space unless you are trained in confined space rescue, have proper emergency equipment and another attendant is there to replace you.
- Knows behavioral effects of exposure
- Performs no conflicting duties.

DUTIES OF THE ATTENDANT

The attendant continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants can accurately identify those in the permit space. This requires that the attendant keep track of entrants as they enter and exit the space.

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The attendant must know the exact count at all times so that no one is accidentally left in a confined space. During emergencies, an accurate count also ensures that no useless searches are made to find entrants no longer in the permit space.

The attendant must remain outside the permit space during entry operations until relieved by another attendant. Keeping unauthorized persons out of the space, being alert for hazards and providing information to rescue services are three duties requiring the attendant to remain posted until actually replaced by another attendant.

A well-trained attendant always monitors the permit space itself-as well as the immediate areas around the space-to detect potential hazards. Knowing that all attendants have adequate training frees up an entrant's attention for work and ensures the entrant's confidence that hazards will be detected.

The attendant orders entrants to evacuate the permit space immediately whenever the attendant:

- Detects a prohibited condition
- Detects the behavioral effects of hazard exposure in an entrant
- Detects a situation outside the permit space that could endanger entrants in the space
- Cannot effectively and safely perform all the duties required.

The attendant must summon rescue and other emergency services as soon as he or she has any concern for an entrant who may need assistance escaping from permit space hazards.

The attendant takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:

- Warn unauthorized persons to stay away from the permit space.
- Advise unauthorized persons to exit immediately if they have entered the permit space.
- Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.

Attendants can be permitted to perform any type of rescue, including non-entry rescue, as long as they are still acting as attendants. The attendant can respond to an emergency affecting one or more of the other permit spaces being monitored if it does not distract from the attendant's responsibilities.

The attendant may perform no other duties that might interfere with the attendant's primary duty to monitor and protect authorized entrants.

ENTRANT

The entrant must do his part to control the hazards of confined space entry.

- As an entrant, be sure you know the hazards of the space and the signs of exposure. For example, lack of oxygen can cause:
 - Loss of muscle control
 - Mental confusion
 - Breathing difficulty
 - Misguided feeling of well-being
 - Ringing in the ears

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- Death.
- Follow your personal protective equipment training carefully.
- Keep in contact with the attendant, and leave the space at once if you are ordered to evacuate.
- Always be ready to evacuate quickly and, if possible, without help.
- If you see that you are in danger, leave the space and tell the attendant.
- List necessary equipment or devices such as rescue equipment, whistles, phones and radios. Rescue equipment that may be required should be on the job site. Make sure it is in working order before entry begins.
- It is a safe practice to ensure that all affected employees review the company's written Emergency Response Plan before entry.
- Positive-pressure, self-contained breathing apparatus must be available on the site for rescuers if a respiratory hazard is potentially present.
- It is a safe practice to wear an emergency escape breathing system, sometimes called an egress bottle, into a permit space whenever supplied air is required for entry. Should the supplied air fail, your emergency breathing apparatus must provide enough air to allow you to escape to breathable air.

Those of you working in or around confined spaces are aware of the danger. Yet, if you are familiar with pre-entry planning and with simple safety measures, most dangers can be avoided.

DUTIES OF AUTHORIZED ENTRANTS

Authorized entrants must maintain contact with their attendant to improve their chances of safe exit. Such systems as two-way radios, television or other continuous electronic monitoring equipment in combination with alarms and voice contact are considered effective methods of communication between attendant and entrant.

Entrants must communicate with the attendant to enable the attendant to:

- Monitor entrant status, especially subtle behavioral changes in entrant speech or deviation from set communication procedures
- Alert entrants of the need to evacuate the space.

In addition to an entrant's responsibility for self-rescue, the assigned attendant likewise may make an independent decision to terminate entry, based on:

- The entrant's failure to maintain contact
- Changes in the entrant's communications behavior
- Other changes in or outside the space, which endanger the entrant.

Authorized entrants must be trained to alert the attendant whenever:

- The entrant recognizes any warning sign or symptom of exposure to a dangerous situation
- The entrant detects a prohibited condition. A prohibited condition is any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

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Authorized entrants must exit the permit space as quickly as possible when:

- An order to evacuate is given by the attendant or the entry supervisor
- The entrant recognizes any warning sign or symptom of exposure to a dangerous situation
- The entrant detects a prohibited condition
- An evacuation alarm is activated

PRE-ENTRY PLANNING

Preparing for entry

- Check for completion of permit.
- Erect barriers around the space.
- Cap, blind or disconnect all input lines.
- Clear and ventilate the space of harmful vapors and residue.
- Make sure all participants understand the Emergency Action Plan.

VERIFYING AIR QUALITY

- Person testing or monitoring must use respiratory protection or test from outside.
- Periodic testing must be continued as long as space is occupied.
- Oxygen level must be between 19.5 and 23.5%.
- Flammable gasses must not exceed 10 percent of LFL/LEL.
- Toxic concentrations must not be over PEL/TLV.
- Test for heat stress with Wet Bulb Globe Thermometer.
- All tests must be complete, accurate and documented before entry.

SAFETY MEASURES

Equipment

- All personal protective equipment and emergency escape breathing systems must be available on site.

Emergency Situation

- Emergency services must be notified well in advance of time, date and place of entrance.
- The attendant may enter only if trained in rescue and if a second attendant is present.

URS SAFETY MANAGEMENT STANDARD

Electrical Safety

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies for those projects where electricity is used, electrical systems are installed or maintained, or live electrical circuits are accessed. For work in close proximity to overhead or underground utilities, see SMS 034 – Utility Clearances and Isolation.

2. Purpose and Scope

The purpose of this standard is to describe requirements for working on electrical circuits and to reduce worker risk from electrical hazards. The primary hazards related to electricity are shock, burns, arc-blast, fire, and explosions.

Work on live electrical circuits presents hazards of injury due to electrocution and arc flash exposure. Electrocution is a function of voltage (the energy potential) and amps (the amount of energy absorbed through the circuit). The human body can absorb 3 amps with survivable damage to the tissue. At 5 amps, tissue death is nearly immediate. Electrocution may occur with voltage of less than 50 volts. Below that level, electrocution may not cause death. However, even 0.1 amp across the heart (or across the chest or arms, which correlates to current across the heart) can interfere with the heart's function. Individuals who are electrocuted across the chest may be injured in such a way as to stop the heart's function, or stop respiration. If not immediately treated; the heart of an electrocution victim can fail. Electrocution at higher voltages may cause tissue damage or burns. In either mode of electrocution, injury is nearly instantaneous, and death is a frequent outcome.

Arc-flash injury is a result of exposure to the radiation emitted from an electrical spark. An arc flash is typically a very short-duration event (on the order of microseconds), but the heat generated may be four times as hot as the surface of the sun. The radiation emitted by arc flash will cause instant tissue damage. If the eyes are unprotected, the radiation will cause instant blindness.

3. Implementation

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

URS SAFETY MANAGEMENT STANDARD

Electrical Safety

4. Requirements

- A. Any work performed on live electrical systems of 50 volts or more must be done by a qualified licensed or journeyman electrician or HVAC mechanics. Other personnel who may be exposed to electrical hazards must be trained in and be familiar with safe working practices.
- B. Arc-flash protection protocols (see Section L) must be in place any time electricians are working on or near live circuits of 50 volts or more.
- C. Personnel must follow established lockout/tagout procedures when performing work on electrical equipment or machinery unless power must be applied for the purpose of adjustment or electrical trouble-shooting. Refer to SMS 023 – Lockout and Tagout Safety.
 - 1. Consider all electrical systems as live until verified as de-energized and grounded.
 - 2. Do not work on or in close proximity to electrical circuits unless the circuit is de-energized, grounded, or guarded.
- D. General Safe Work Practices
 - 1. Use rated-load switches or circuit breakers to disconnect electric power and lighting circuits. Non-electrical workers may reset a tripped single-pole convenience outlet or lighting circuit breaker *one time*, provided it is not located in a designated emergency panel, and when, based on their knowledge, it is safe to do so. If the circuit breaker trips again, contact a supervisor to authorize and initiate the next appropriate course of action. Other types of circuit breakers may only be reset by personnel with training and knowledge of the affected systems.
 - 2. Strictly prohibit use of pocket knives and standard box cutters – use wire strippers and cable strippers to strip wire and cable, including high-voltage cable.
 - 3. Equipment must meet the requirements of the National Fire Protection Association (NFPA) and/or National Electric Code (NEC) for these locations, if electrical equipment is used near sources of flammable vapors, such as those identified in Class 1, Division 1 or Class 1, Division 2.
 - 4. Guard and secure lamps and fixtures to preclude injury. Open fluorescent fixtures must have wire guards, lenses, tube guards and

URS SAFETY MANAGEMENT STANDARD

Electrical Safety

locks, or safety sockets that require force in the horizontal axis to remove the lamp.

5. Protect lamps for general illumination from inadvertent contact or breakage either with a suitable guard or by separation of at least 7 feet from normal working surfaces.
6. Double-insulated portable electric hand tools shall be inspected prior to use for any damage or defects and tagged out of service if the protection is compromised by damage or excessive wear. Double-insulated tools must be marked (usually with standard double-insulated mark on casing).
7. Use low voltage battery powered tools when feasible and practical.
8. Unplug portable electrical hand tools when not in use.
9. Do not use electrical cords to raise or lower equipment.
10. Do not use equipment with frayed cords or three-wire cord ends that have had the grounding prong removed.
11. Use the proper power receptacle for each application. Do not manipulate the cord-end prongs to fit the wrong receptacle.
12. Avoid the use of temporary wiring. Employ appropriate ground-fault circuit interrupters with any temporary wiring, including extension cords used for portable electrical equipment and tools.
13. Do not use extension cords in place of permanent wiring (affixed to structure, run-around poles, under doors, through holes in walls or structure, etc.).
14. Always plug high-current-draw items such as coffee pots, refrigerators, microwaves, toaster ovens, and toasters directly into an approved outlet, never into extension cords or power strips.
15. Plug power strips (surge protectors) directly into an approved outlet, not into other power strips or into extension cords. Only use surge protectors listed by a nationally or internationally recognized testing laboratory. Do not plug loads into these devices that exceed the maximum recommended by the manufacturer.

URS SAFETY MANAGEMENT STANDARD

Electrical Safety

16. Inspect extension cords and cords on electrical equipment before each use. Take equipment or extension cords with damaged wiring or missing plug prongs out of service until the damage is repaired.
17. Electrical safety interlocks may be defeated only by trained and qualified personnel, and then only temporarily, when directed to do so by an approved procedure or work practice, while working on the equipment. Return the interlock to its operable condition as soon as possible.
18. De-energize circuits immediately if an electrical shock victim is still in contact with electrical energy. If not possible to de-energize the circuit, only trained and qualified employees may attempt to remove the victim. Note: Electrical shocks are medically serious regardless of the voltage. Even if the victim shows no apparent signs of injury, they must be seen by a qualified health care professional.
19. Avoid installing conductors in or removing conductors from raceways containing energized or potentially energized conductors, as a general rule, because of the possibility of conductor damage. If this type of work is unavoidable, identify and lock out/tag circuits, or the task will be considered energized work, and an Energized Work Permit (Attachment 012-1) must be secured.
20. Personnel must remain alert at all times when working near exposed electrical parts or in situations where electrical hazards may exist. Personnel must never reach blindly into areas that may contain live circuits. Personnel must not be permitted to work in areas containing electrical hazards if alertness is recognizably impaired due to illness, fatigue, or other reasons.
21. Employees must not enter an area containing exposed electrical circuits unless adequate illumination is provided. When the illumination or obstructions affect visibility and the employee might contact the exposed circuits or equipment, employee will not perform the task.
22. Do not perform tasks within the Limited Approach Boundary of energized electrical components if lack of illumination or obstructions precludes observation of the work to be performed.
23. Handle conductive materials and equipment in contact with an employee's body carefully so they do not come into contact with

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exposed conductors. Conductive material and equipment include, but are not limited to ducts, pipes, tubes, conductive hoses or ropes, metal-lined rules and scales, and steel tapes or chains.

24. Use protective shields, barriers, or insulating materials to protect workers from exposed energized parts that might be inadvertently contacted, or where dangerous electric heating or arcing is likely to occur.
25. Take precautions when work is performed in a confined or enclosed space, such as a manhole or vault, to avoid contact with the energized part. Special training in confined spaces and a confined space entry permit must be obtained before entry.
26. Housekeeping and custodial duties will not be performed adjacent to energized parts where such parts present an electrical contact hazard. Cleaning materials such as water, steam, conductive cleaning fluid, steel wool, metalized cloth, or silicon carbide will not be used in the proximity of energized parts.
27. Workers will not wear conductive apparel (e.g., watches, rings, bracelets, key chains, necklaces, metalized aprons, cloth with conductive thread, metal head gear, wire/metal-rimmed glasses, etc.).
28. Report to supervisor potential electrical hazards or unexpected occurrences during electrical renovation or construction.
29. Do not use equipment that does not meet the requirements of this standard.

E. Hazardous Locations

1. Determine whether electrical equipment and wiring will be installed in locations where any of the following may be present: flammable vapors, liquids, or gases; combustible dusts or fibers; or a concentration or quantity of flammable or combustible material. See Supplemental Information A – Hazardous Locations, for definitions of hazardous locations.
2. Use protective barriers or insulating materials if electrical systems in a confined space cannot be de-energized.
3. If an employee must handle long dimensional conductive objects (e.g., ducts and pipes) in areas with exposed energized systems,

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attempts will be made to de-energize the systems. If the systems cannot be de-energized, site procedures will be developed (e.g., use of insulation, guarding, and material handling techniques) which will minimize the hazard.

F. Circuit Interrupters and Grounding

1. Ground-Fault Circuit Interrupters (GFCI)

- a. Provide GFCI protection in wet or extremely damp areas.
- b. Employ GFCI to protect personnel when using portable electric tools and portable electric equipment, including portable lights.
- c. Locate GFCI protection between extension cords and the electrical outlets into which they are plugged.
- d. Provide GFCI for all 120-volt, single-phase, 15- and 20-ampere receptacle outlets on construction sites.
- e. Provide GFCI for all 120-volt, single-phase, 15- and 20-ampere receptacle outlets within garages, bathrooms, kitchens, and shops.
- f. Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5 kilowatts, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with GFCI.
- g. Test portable GFCI devices by pushing the test button on the device before each use. Permanently mounted GFCI will be tested monthly by pressing the test button.

2. Grounding

Effectively ground all wiring, electrical circuits, and equipment, except portable tools and appliances protected by an Underwriter's Laboratory (UL)-approved system of double insulation. Note that an equipment conductor grounding program that meets regulatory requirements can be used in lieu of GFCIs. Examples of equipment requiring grounding include:

- a. Portable and vehicle- or trailer-mounted generators.

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- b. Electrically powered arc welders.
- c. Switches.
- d. Motor-controller cases.
- e. Fuse boxes.
- f. Distribution cabinets.
- g. Frames.
- h. Non-current-carrying rails used for travel, and motors of electrically operated cranes.
- i. Electric elevators.
- j. Metal frames of non-electric elevators to which electric conductors are attached.

3. Assured Grounding

Whenever possible, use GFCI instead of assured grounding. Assured grounding programs must be approved by the Regional HSE Manager or HSE Director. Develop a site-specific assured grounding program. Supplemental Information C – Assured Grounding Guidelines, may be used to develop a site-specific program.

G. Circuits

- 1. Require that there are no missing blanks.
- 2. Close doors to circuit and fuse boxes when not in use.
- 3. Label every circuit located on a circuit breaker/fuse box, and/or motor-control center (MCC).

H. Temporary Wiring, Electrical Tools, and Extension Cords

- 1. Require that temporary wiring is installed and used in accordance with regulatory requirements; specifically:
 - a. Guard, bury, or isolate temporary wiring by elevation to prevent accidental contact by workers and equipment.

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- b. Require that vertical clearance above walkways is not less than 10 feet (3 meters) from circuits carrying 600 volts or less.
 - c. Support all exposed temporary wiring on insulators.
 - d. Protect temporary wiring from accidental damage.
 - e. Guard live parts of wiring.
 - f. Mark temporary power lines, switch boxes, receptacle boxes, metal cabinets, and enclosures around equipment to indicate the maximum operating voltage.
- 2. Require that lighting strings are installed and used in accordance with regulatory requirements; specifically:
 - a. Provide adequate light throughout the building and in all work areas throughout the project, particularly passageways and stairways, and wherever necessary to avoid a hazard due to lack of light. Consideration should be given to the selection and placement of lights that will provide minimum glare, eliminate harsh shadows, and provide adequate illumination to work efficiently and safely. Ensure lighting is available at all times when employees are in the work area.
 - b. Use nonconductive lamp sockets and connections permanently molded to the conductor insulation.
 - c. Require that lighting strings have lamp guards, except where the construction of the reflector is such that the bulb is deeply recessed.
 - d. Promptly replace all broken or defective bulbs. Exposed empty light sockets are prohibited.
 - e. Protect all lights used for illumination from accidental contact or breakage.
 - f. Ground metal-case sockets.
- 3. Require that extension cords are installed and used in accordance with regulatory requirements, specifically:

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- a. Use only 3-wire grounded-type extension cords designated for hard service or extra hard service and listed by UL.
 - b. Check cords for damage before use and daily thereafter.
 - c. Do not exceed the rated load.
 - d. Use extension cords of adequate length. "Daisy chaining" of cords is prohibited unless specifically allowed by the cord manufacturer.
 - e. Do not use spliced cords.
 - f. Destroy and discard worn, damaged or frayed cords and cords with the ground prong removed or rendered ineffective shall be removed from service for repair and retesting.
 - g. Cord set repairs shall be performed by a qualified electrician using only UL-listed attachment plugs and receptacle ends of equal service rating. The repaired cord set shall be tested using a three prong circuit tester, a tension tester and an ohm meter prior to being returned to service.
 - h. Do not fasten extension cords with staples, hang them using non-metallic insulating hangers such as zip-ties.
 - i. Do not wrap cords or cables around any conductive materials.
 - j. Protect electrical cords and trailing cables from damage that could create a hazard to employees or other persons in the area.
4. Inspect portable electric tools brought onto the site to ensure that they are in good condition. Inspect portable cord- and plug-connected equipment for external defects and evidence of possible internal damage before use on any shift.
- I. Work On or Near Energized Hazards
- 1. Two qualified personnel and an Energized Work Permit (Attachment 012-1) must be present for work on or near energized hazards, except for authorized troubleshooting with approved testing equipment or verifying de-energization during lockout/tagout.

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- a. Work is considered to be “on or near” whenever any of the following conditions occur:
 - i. Any part of the body, regardless of the level of PPE protection, enters or is inadvertently placed within the Restricted Approach Boundary, based on the maximum potential voltage involved.
 - ii. Any tool or piece of equipment (insulated or not) enters or is inadvertently placed within the Restricted Approach Boundary, based on the maximum potential voltage involved.
 - b. If URS retains a subcontractor to perform work on live electrical systems, the subcontractor will advise URS (or URS’ client) of:
 - i. Any unique hazards presented by the contract employer’s work.
 - ii. Any unanticipated hazards found during the contract employer’s work that the host employer did not mention.
 - iii. The measures the contractor took to correct any hazards reported by URS to prevent such violation from recurring in the future.
2. Obtain an Energized Work Permit (Attachment 012-1) for all work, even non-electrical work, within the restricted approach boundary.
- a. Work “on or near” live equipment as defined above is permitted only when it is impossible to shut off the equipment or circuits; or when de-energizing the equipment would introduce additional or increased hazards; or is infeasible due to equipment design or operational limitations. Examples of situations that would meet the requirements of “increased or additional hazards” include interruption of life safety equipment, deactivation of emergency alarm systems, shutdown of hazardous location ventilation equipment, or removal of illumination from a large area.
 - b. Retain a copy of the Energized Work Permit both at the work site until work is completed in the office/project file. The Energized Work Permit provides documentation of the

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justification for working the circuit or equipment energized; identifies the specific personnel who are to perform the work and the specific PPE requirements for the task; defines the scope of the task; and details additional special protective and work practices required to protect both the workers and other personnel in the area. The permit must be authorized by a member of management.

- c. ANSI-approved voltage-rated tools must be used any time the plane of the cabinet, vault, box, or opening is breached if *all* exposed live components of 50 volts or greater in a cabinet, vault, box, or other piece of electrical equipment are not completely de-energized through lockout/tagout.
- d. Full PPE must be worn, based on maximum potential voltages as defined in Section 3 below, as well as the use of ANSI-approved and voltage-rated tools, which are rated for maximum voltages, that may be encountered during metering, even though metering during authorized troubleshooting is not considered “working on or near.”

3. Approach Boundaries for Live Parts

The approach boundaries listed below will be used to define Energized Work Permit requirements, tool and equipment requirements, and PPE requirements by employees:

- a. Flash Protection Boundary: Workers within this boundary must use arc-flash protection for all parts of the body when work is being performed that could lead to an arc flash. Arc-flash protection boundaries are presented in the table below. Flash-protection boundaries at voltages above 600 volts will be calculated following NFPA 70E on a case-by-case basis using the formula found in NFPA 70E, paragraph 130.3 (A), or applying the maximum level of protection recommended in Table 130.7(C)(9)(a), based on the work being performed.
- b. Limited Approach Boundary: The limited approach boundary establishes an area around exposed energized hazards of 50 volts or greater where unqualified employees must be escorted and directly supervised by a qualified employee. Use insulated, voltage-rated, ANSI-approved tools based on the maximum voltage within this boundary. Limited

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approach boundaries are presented in the table below (refer to NFPA 70E for higher voltages).

- c. **Restricted Approach Boundary:** The restricted approach boundary establishes an area around exposed energized hazards of 50 volts or greater where unqualified employees are prohibited, and insulated tools and full PPE are required, based on the maximum voltage. A worker is considered to be working “near” energized systems when any part of the body or tool could approach an energized component closer than the distances discussed below. An Energized Work Permit is always required in these cases, except during troubleshooting with approved testing equipment. Restricted approach boundaries are presented in the table below (refer to NFPA 70E for higher voltages).
- d. **Prohibited Approach Boundary:** The prohibited approach boundary establishes an area around exposed energized hazards of 50 volts or greater where approach within the boundary is considered “working on” an energized system. A worker is considered to be “working on” energized systems when any part of the body or tool could approach an energized component closer than the distances discussed below. Unqualified workers are prohibited, and full PPE is required, based on the maximum voltage. An Energized Work Permit is always required in these cases, except during troubleshooting with approved testing equipment. Prohibited approach boundaries are presented in the table below (refer to NFPA 70E for higher voltages).

Nominal System Voltage Range, Phase to Phase ¹	Flash Protection Boundary	Limited Approach Boundary	Restricted Approach Boundary	Prohibited Approach Boundary
Less than 50 volts	Not Specified	Not Specified	Not Specified	Not Specified
50 volts – 240 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	Avoid Contact	Avoid Contact
240 volts – 300 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	Avoid Contact	Avoid Contact
301 volts – 500 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	1 ft / 0.3 m	1 in / .03 m
501 volts – 599 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	1 ft / 0.3 m	1 in / .03 m

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Nominal System Voltage Range, Phase to Phase ¹	Flash Protection Boundary	Limited Approach Boundary	Restricted Approach Boundary	Prohibited Approach Boundary
600 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	1 ft / 0.3 m	1 in / .03 m
601 volts – 750 volts	CN	3 ft, 6 in / 1.1 m	1 ft / 0.3 m	1 in / .03 m
751 volts – 1 kV	CN	5 ft / 1.5 m	2 ft, 2 in / 0.67 m	7 in / 0.12 m
1.1 kV – 7.5 kV	CN	5 ft / 1.5 m	2 ft, 2 in / 0.67 m	7 in / 0.12 m
7.51 kV – 15 kV	CN	5 ft / 1.5 m	2 ft, 2 in / 0.67 m	7 in / 0.12 m
15.1 kV – 17 kV	CN	6 ft / 1.83 m	2 ft, 7 in / 0.82 m	10 in / 0.25 m
17.1 kV – 26.5 kV	CN	6 ft / 1.83 m	2 ft, 7 in / 0.82 m	10 in / 0.25 m
26.51 kV – 36 kV	CN	6 ft / 1.83 m	2 ft, 7 in / 0.82 m	10 in / 0.25 m
36.1 kV – 46 kV	CN	6 ft / 1.83 m	2 ft, 9 in / 0.88 m	1 ft, 5 in / 0.46 m

¹ For single-phase systems, select the range that is equal to the system's maximum phase-to-ground voltage multiplied by 1.732.

CN = Calculation Needed. See NFPA 70E, Annex D – Incident Energy and Flash Protection Boundary Calculation Methods; and choose the appropriate method out of the 5 listed. These calculations must be used only under qualified engineering supervision.

4. Establishing an Electrically Safe Work Condition

- a. Establish an electrically safe work condition before performing work (other than authorized metering as a part of troubleshooting) within the Limited Approach Boundary of exposed electrical hazards.
- b. Performing complete lockout/tagout of all electrical potentials of 50 volts or greater within the cabinet, vault, box, or work area is considered establishing an electrically safe work condition, as long as the lockout/tagout process accomplishes all of the following:
 - i. Provides a documented hazard evaluation at the site, including the identification of the person in charge of the lockout/tagout.
 - ii. Identifies every source of electrical energy of 50 volts or greater remaining inside the cabinet, vault, and

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box, and completely eliminates them through lockout/tagout.

- iii. Tests every phase conductor or circuit part with an approved meter (phase-to-phase and phase-to-ground) to verify they are de-energized (meter will be checked before and after each test to confirm it is operating properly).
 - iv. Applies ground-connecting devices to any part or circuit where there is a possibility of induced voltages or stored electrical energy, including grounding-out of capacitors or similar devices that may hold stored energy.
- c. If both locks and tags cannot be installed, employ a second alternative method such as removal of a fuse in addition to a tag. Consider all circuits and equipment energized until an electrically safe work condition has been established and verified.
- d. Follow these work practices if an electrically safe work condition as described above has not been established:
- i. If the Restricted and/or Prohibited Approach Boundary may be breached, an Energized Work Permit will be secured, and work practices will comply with those required for “working on or near” energized hazards
 - ii. If the Limited Approach Boundary may be breached, a qualified person must be present and directly supervise the work.
 - iii. If the Arc-Flash Boundary may be breached and any work is performed that has the possibility of causing an arc flash, all personnel within the flash boundary will be protected with appropriate levels of arc-flash protection.

5. Insulated Tools and Equipment

- a. Use ANSI-approved insulated tools and/or handling equipment when working near exposed energized conductors or circuit parts. Protect the insulating materials

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on these items during storage or transportation. Use fuse-handling equipment capable of withstanding the circuit voltage when removing or installing fuses from an energized fuse terminal. Allow *only* nonconductive ropes and hand lines near exposed parts.

- b. Inspect insulated tools and equipment prior to each use. Include an examination for damage to the insulation or damage that may limit the tool from performing its intended function, or which could increase the potential for an incident. Immediately remove any defective tools and equipment from service.
- c. Use insulated tools and insulated equipment when:
 - i. Breaking the plane (or opening) of an electrical fixture (cabinet, vault, panel, etc.) where any live voltage of 50 volts or greater remains (including metering for troubleshooting). Cabinet will be considered as containing live voltage until all sources of 50 volts or greater have been completely de-energized through lockout/tagout, and confirmed to be de-energized through metering.
 - ii. Any part of the body or a tool or piece of equipment may cross the Limited Approach Boundary for the maximum voltage present.
 - iii. All tools used in either case above will be voltage-rated, ANSI-approved tools rated to the maximum voltage hazard present.
- d. Insulated tools and equipment will also comply with the following:
 - i. Grounding and testing devices will be stored in a clean, dry area and properly inspected and tested before each use.
 - ii. Use fuse or fuse-holding equipment to remove or install a fuse if the fuse terminals are energized. Fuse or fuse holder will be rated and insulated for the circuit voltage.

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- iii. Ropes or hand lines used near exposed live parts operating at 50 volts or greater will be non-conductive.
- iv. Fiberglass-reinforced plastic rod and tube tools used for live line work will meet the requirements of ASTM F 711.
- v. Portable ladders will have non-conductive side rails. Metal ladders are prohibited in areas where electrical hazards exist.

6. Personal Protective Equipment Requirements

- a. Protective equipment requirements outlined in the table below are mandatory when any part of the body or a tool or piece of equipment may be placed within the Restricted-Approach Boundary (Section 1):
 - i. All personnel must wear the required PPE as outlined in this section until all energy sources of 50 volts or greater within the Restricted Approach Boundary have been completely eliminated through lockout/tagout, and de-energization has been confirmed through metering. The ratings in this section of cal/cm² represent arc-flash protection ratings. If protective equipment is not marked with these ratings, it does not meet the requirements of NFPA 70E, and will not be used. Exceptions to these requirements are limited to those specifically addressed under each type of protective equipment.
 - ii. Maintain protective equipment in a safe, reliable condition, and visually inspect before each use. Gloves shall be leak tested before use. Store protective equipment in a manner to prevent physical damage, and damage from moisture, dust, or other deteriorating agents.
 - iii. Do not use arc-flash clothing that is contaminated with grease, oil, or flammable liquids or combustible materials or is damaged to an extent where the protective qualities are impaired. Store arc-flash clothing to avoid physical damage; damage from

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moisture, dust, or other deteriorating agents; and contamination from flammable or combustible material. Clean following the manufacturer's instructions to avoid loss of protection. If necessary, make repairs using the same flame-retardant materials used in the original garment.

- iv. When body protection is required, use all-cotton underclothing (never nylon, polyester or rayon) that contains no metal.
- v. Trim, name tags, or logos affixed to flame-retardant clothing must also be flame-retardant rated.
- vi. Hairnets and/or beard nets must be of non-melting, flame-resistant design.
- vii. Wear Class E hardhats rated for electrical protection when inside any substation or other power transmission and distribution equipment area. Inspect hardhats before use.

Voltage	Required PPE
Less than 50	<u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles <u>Body</u>: Long sleeve cotton shirt and cotton pants <u>Hand</u>: Leather gloves <u>Foot</u>: Leather, EH rated footwear <u>Head/Ears</u>: Hard hat, hearing protection (ear canal inserts)
50 to 240 volts	<u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles and Arc-Flash Face Shield or Arc-Flash Suit Hood (4 cal/cm²) <u>Body</u>: Flame Retardant long sleeve shirt/pants or coverall (4 cal/cm²) <u>Hand</u>: EH gloves (Class 00 with leather protectors) <u>Foot</u>: EH rated footwear <u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts)

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Voltage	Required PPE
Above 240 to 480 volts	<u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles and Arc-Flash Face Shield and Sock Hood (8 cal/cm²) or Arc-Flash Suit Hood (8 cal/cm²) <u>Body</u>: Flame Retardant long sleeve shirt pants or coverall (8 cal/cm²) <u>Hand</u>: EH gloves (Class 00 with leather protectors) <u>Foot</u>: EH rated footwear <u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts)
480 to 600 volts	<u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles and Arc-Flash Suit Hood (8 cal/cm²) <u>Body</u>: Flame-Retardant long sleeve shirt pants or coverall (8 cal/cm²) <u>Hand</u>: EH gloves (Class 0 or higher with leather protectors) <u>Foot</u>: EH rated footwear (carbon fiber recommended) <u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts)
600 volts or above	<u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles and Arc-Flash Suit Hood (25 cal/cm²) <u>Body</u>: 2 Layer Flame-Retardant long sleeve shirt pants or coverall (25 cal/cm²) <u>Hand</u>: EH gloves (Class 0 or higher with leather protectors) <u>Foot</u>: EH rated footwear (carbon fiber recommended) <u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts)

7. Hazard Alerting/Control Requirements

- a. Employ special precautions to warn employees of unusual electrical hazards until they are corrected or eliminated. For example, if breakers or breaker blanks are found missing inside a breaker panel, a warning sign will be placed on the panel door that limits access to qualified electricians only until the electrical hazard is returned to compliance with the electrical code.
- b. Use barricades in conjunction with safety signs where it is necessary to prevent or limit employee access to work areas containing live parts. Make barricades of non-conductive design and place so as to prevent access to the Limited Approach Boundary by non-qualified personnel (10 feet for

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exposed movable conductors, and 3½ feet for non-movable conductors up to 750 volts).

- c. Do not leave exposed energized components unattended and/or unprotected. If signs or barricades cannot assure warning and protection from electrical hazards, station an attendant to warn and protect personnel. Attendants will remain in the area as long as there is the potential for personnel to be exposed to the electrical hazards. Their primary duty is to keep unqualified personnel outside a work area where the unqualified employee might be exposed to the electrical hazard; which at an absolute minimum, is outside the Limited Approach Boundary.
- d. Employ additional alerting methods such as signs, barricades, or attendants where work is performed on equipment that is de-energized and placed in an electrically safe condition in a work area with *other* energized equipment that is similar in size, shape, and construction, to prevent employees from entering look-alike equipment.

B. Electrical Protective Equipment Requirements

1. Insulating blankets, matting, covers, line hose, gloves, and sleeves made of rubber must meet the following requirements:
 - a. Produce blankets, gloves, and sleeves by a seamless process.
 - b. Mark each item clearly with its Class number.
 - c. Markings must be non-conductive and not impair the insulating qualities of the equipment.
 - d. Confine markings on gloves to the cuff-portion of the glove.
2. Equipment must also meet the specifications contained in the governing ASTM standard outlined in the following table.

Item	Standard
Insulating matting	ASTM D 178-93 (or D 178-88)
Insulating blankets	ASTM D 1048-93 (or D 1048-88a)
Insulating covers	ASTM D 1049-93 (or D 1049-88)

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Insulating line hose	ASTM D 105-90
Insulating sleeves	ASTM D 1051-87

3. Do not use insulating equipment with any of the following defects:
 - a. Holes, tears, punctures, or cuts.
 - b. Embedded foreign objects.
 - c. Texture changes, swelling, softening, hardening, or becoming sticky or inelastic.
 - d. Any other defect that may damage insulating properties.
4. Clean insulating equipment as needed to remove foreign substances, and store in a location and manner that protects it from light, temperature extremes, excessive humidity, ozone, and other injurious substances and conditions. A thorough visual examination by the worker is always required immediately before each use.
5. Inspect and test rubber insulating equipment as outlined in the following table.

Item	Inspection	Testing by Qualified Agency	Governing Standard for Test Voltage
Rubber insulating line hose	Before each use	Upon indication that the insulating value is suspect	ASTM F 478
Rubber insulating covers	Before each use	Upon indication that the insulating value is suspect	ASTM F 478
Rubber insulating blankets	Before each use	Before first issue and every 12 months thereafter	ASTM F 479
Rubber insulating gloves	Before each use	Before first issue and every 6 months thereafter	ASTM F 496
Rubber insulating sleeves	Before each use	Before first issue and every 12 months thereafter	ASTM F 496

NOTE: In the case of blankets, gloves, and sleeves, if the equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the past 12 months. In all cases, a process or procedure will be deployed that assures identification and confirmation of inspection currentness for individual pieces of equipment by both the worker and an inspecting/auditing agency.

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C. Warning Sign and Marking Requirements

1. A summary of the warning signs and marking requirements for electrical systems and areas contained in industry standards is provided in the table below. Projects must comply with these requirements or provide alternate and equally effective warnings for the Company personnel.

Warning Signs and Markings	
Condition	Requirements
Entrance to rooms or other guarded locations containing exposed live parts (600 volts nominal or less).	Post conspicuous warning sign forbidding unqualified persons from entering.
Entrance to buildings, rooms, or enclosures containing exposed live parts (over 600 volts nominal).	Post warning sign reading <i>Danger-High Voltage – Keep Out</i> or similar language. Entrance must remain locked.
All electrical equipment.	Mark equipment with the manufacturer's name, trademark, or other marking indicating the organization responsible for the product. Additional requirements for marking voltage, current, wattage, or other ratings maybe specified by the NEC.
Disconnection of power sources (including circuit breakers).	Mark each disconnection required for motors, appliances, and each service feeder or branch circuit at the point where it originates to indicate its purpose, unless located and arranged so that the purpose is evident.
Circuit breakers or fuses applied in compliance with Series Combination Ratings.	Mark equipment enclosure to indicate the equipment has been applied with Series Combination Rating. Markings must state <i>Caution-Series Rated System Amps Available: Identified Replacement Component Required.</i>
Exposed live parts of transformers.	Mark with operating voltage.
Fused cutouts not interlocked with the switch to prevent opening of the cutouts under load.	Post conspicuous sign at the cutouts reading <i>Warning – Do Not Open Under Load.</i>
More than one switch is installed with interconnected load terminals to provide for alternate connection to different supply conductors.	Post conspicuous sign reading <i>Warning – Switch May be Energized by Backfeed at each switch.</i>
Fuses potentially energized by backfeed.	Post sign on enclosure door reading <i>Warning – Fuses May Be Energized By Backfeed.</i>

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D. Power Transmission/Distribution Requirements

1. Develop additional location-specific written procedures that cover site-specific systems and define work practices that meet the spirit and intent of 29 Code of Federal Regulation (CFR) 1910.269 for locations that perform work on power transmission and distributions systems. This Safety Management Standard does not cover all of the work practices necessary to protect personnel in these highly unique and hazardous work conditions.

E. Training

1. Train affected personnel, both those qualified to perform electrical work and those not qualified who may still work on or near energized systems, in the safe work practices outlined in this section on an annual basis. Training may be at different levels for qualified and unqualified, but must be sufficient to afford the electrical safe work practices and hazard recognition knowledge required to safely perform their respective tasks. Training will also cover how a GFCI operates, hazards associated with portable electric power extension cord use, and when GFCI use is required. Affected personnel will also be instructed on how to inspect the specialized PPE required for electrical work prior to being placed in a position where this PPE is required. All personnel will receive training on electrical hazards as part of the job orientation which shall qualify as documentation for unqualified workers. Qualified workers will receive additional training specific to the job and hazards as required.
2. Document all training. Train affected personnel either as “qualified” or “unqualified,” with qualified being at a level sufficient to afford protection during actual electrical work.
3. Qualified personnel are personnel who have also been trained, at a minimum, in the following:
 - a. The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment.
 - b. The skills and techniques necessary to determine the nominal voltage of exposed live parts.
 - c. Clearance distances for working near live circuits or equipment.

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- d. The decision-making process necessary to determine the degree and extent of the hazard, and the PPE and job planning necessary to perform the task safely.
- 4. Personnel who perform work on electrical circuits must also meet the following minimum requirements:
 - a. Have experience servicing the electrical components of the equipment they are assigned to service.
 - b. Have experience working on energized electric circuit parts or equipment.
 - c. Meet any governing statute or regulatory requirement, host nation, or customer requirement for special certifications or licenses.
- 5. Personnel who work on power transmission/distribution systems must have additional training and experience that meets or exceeds the spirit and intent outlined in 29 CFR 1910.269. This includes the requirement to identify hazardous tasks not routinely performed, and establish procedures to ensure personnel have performed these tasks within the past 12 months, or that they are re-trained or supervised before performing them. These additional requirements are mandatory before exposure to the hazards. This additional training must be documented.
- 6. Additional training (retaining) will be performed when personnel are not complying with safety-related procedures or when workplace changes necessitate the use of safety-related procedures that are different than those that the employee would normally perform.

F. Job Briefings

- 1. Before starting each job, the employee in charge will conduct a job briefing with other personnel involved. The briefing will cover such subjects as a pre-job hazard review associated with the job, work procedures involved, special precautions, energy source controls, and PPE requirements. Use Supplemental Information B – PPE, Tools, and Equipment, as a guide for proper PPE, as applicable. Use SMS 086 NA procedures and appropriate forms in Supplemental Information for conducting Job Safety Analysis or Job Hazard Analysis for each job.

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2. If the work or operations to be performed during the work day or shift are repetitive and similar, at least one job briefing will be conducted before the start of the first job of the day or shift. Conduct additional job briefings if significant changes might affect the safety of employees during the course of the work. A brief discussion will be satisfactory if the work involved is routine, and if the employee, by virtue of training and experience, can reasonably be expected to recognize and avoid the hazards involved in the job. A more extensive discussion must be conducted if:
 - a. The work is complicated or particularly hazardous; or
 - b. The employee cannot be expected to recognize and avoid the hazards involved in the job.

- G. Inspect the job site periodically using Attachment 012-2 NA – Electrical Hazard Checklist, to evaluate compliance with this standard.

5. Documentation Summary

The following information will be maintained in the project file:

- A. A copy of license for licensed/journeyman electrician for project (as necessary).
- B. Completed audits of electrical hazards.
- C. Documented communications between URS, contractors, licensed/journeyman electricians, or others.
- D. Records of all pertinent electrical work performed on a project, including as-built design updates.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [General Industry Electrical Safety](#) – 29 CFR 1910, Subpart S
- B. U.S. OSHA Standard – [Construction Electrical Safety](#) – 29 CFR 1926, Subpart K
- C. U.S. OSHA Standard – [Design Safety Standards for Electrical Systems](#) – 29 CFR 1910, Subpart S

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- D. American National Standards Institute/Institute of Electrical and Electronics Engineers – [National Electrical Safety Code](#) (NESC), ANSI/IEEE C2-2002
- E. [National Fire Protection Association](#), National Electric Code, NFPA-70
- F. [SMS 023](#) – Lockout and Tagout Safety
- G. [SMS 034](#) – Utility Clearances and Isolation
- H. [SMS 086](#) – Managing Health, Safety and Environment Related Risks
- I. [Attachment 012-1 NA](#) – Energized Work Permit
- J. [Attachment 012-2 NA](#) – Electrical Hazard Checklist

7. Supplemental Information

- A. [Hazardous Locations](#)
- B. [PPE, Tools, and Equipment Needed During Electrical Work](#)
- C. [Assured Grounding Guidelines](#)

	Health, Safety, and Environment	Attachment 012-1 NA
	ENERGIZED WORK PERMIT	Issue Date: June 1999 Revision 6: September 2012

INSTRUCTIONS: An Energized Work Permit is required for any work within the Restricted Approach Boundary (1 foot for 50 to 750 volts; 2 feet, 2 inches for 751 to 15kV; see NFPA 70E for higher voltages). An energized electrical work permit is not required under the following two conditions:

- 1) Work is limited to metering as a part of troubleshooting and the maximum voltage is less than 600 volts; or
- 2) All potential sources of electrical energy of 50 volts or greater are completely eliminated within the cabinet, vault, or panel through lockout/tagout.

TO BE COMPLETED BY THE PERMIT REQUESTER			
Project/Site Name:		Work Location:	
Description of circuit/equipment:			
Description of work to be done:			
Justification of why circuit/equipment cannot be de-energized, or the work be deferred until scheduled outage:			
Requestor Name:		Requestor Title:	
Requestor Signature:		Date:	
TO BE COMPLETED BY THE ELECTRICAL QUALIFIED PERSONS DOING THE WORK			
1 – Maximum voltage of energized components:			
2 – Required PPE (check range based on maximum voltage)			
☐ 50 to 240 volts	• <u>Eye/Face</u>: Safety glasses with side shields or goggles and Arc-Flash Face Shield or Arc-Flash Suit Hood (4 cal/cm²) • <u>Body</u>: Flame-Retardant long-sleeved shirt/pants or coverall (4 cal/cm²) • <u>Hand</u>: EH gloves (Class 00 with leather protectors) • <u>Foot</u>: EH-rated footwear • <u>Head/Ears</u>: Class E hard hat, hearing protection (ear canal inserts) • <u>Tools</u>: ANSI-approved, voltage-rated		
☐ Above 240 to 480 volts	• <u>Eye/Face</u>: Safety glasses with side shields or goggles and Arc-Flash Face Shield and Sock Hood (8 cal/cm²) or Arc-Flash Suit Hood (8 cal/cm²) • <u>Body</u>: Flame-Retardant long-sleeved shirt/pants or coverall (8 cal/cm²) • <u>Hand</u>: EH gloves (Class 00 with leather protectors) • <u>Foot</u>: EH-rated footwear • <u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts) • <u>Tools</u>: ANSI-approved, voltage-rated		
☐ 480 to 600 volts	• <u>Eye/Face</u>: Safety glasses with side shields or goggles and Arc-Flash Suit Hood (8 cal/cm²) • <u>Body</u>: Flame-Retardant long-sleeved shirt/pants or coverall (8 cal/cm²) • <u>Hand</u>: EH gloves (Class 0 or higher with leather protectors) • <u>Foot</u>: EH-rated footwear (carbon fiber recommended) • <u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts) • <u>Tools</u>: ANSI-approved, voltage-rated		

	Health, Safety, and Environment	Attachment 012-1 NA
	ENERGIZED WORK PERMIT	Issue Date: June 1999 Revision 6: September 2012

☐ 600 volts and above	• <u>Eye/Face</u>: Safety glasses with side shields or goggles and Arc-Flash Suit Hood (25 cal/cm²) • <u>Body</u>: 2-Layer Flame-Retardant long-sleeved shirt/pants or coverall (25 cal/cm²) • <u>Hand</u>: EH gloves (Class 0 with leather protectors) • <u>Foot</u>: EH-rated footwear (carbon fiber recommended) • <u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts) • <u>Tools</u>: ANSI-approved, voltage-rated

3 – Description of job procedure to be used in performing the work:

4 – Description of safe work practices to be employed:

5 – Method to be employed to restrict access of unqualified persons from the work area:

ELECTRICAL QUALIFIED PERSONS CERTIFICATION

I/we agree to, and certify the following: • Work on energized circuits and components will be limited to conditions outlined on this permit. • Required ANSI-certified tools and equipment are available and will be used. • Required PPE is available and will be used/worn. • A pre-task briefing has been held that included all personnel involved with this work. • An on-site hazard assessment has been/will be conducted before work is started. • Work described on this permit can be done safely. • If conditions or work requirements change, or hazards not previously identified are encountered, work will stop until a new permit is issued or the new hazards have been eliminated.

Electrically Qualified Persons:		
Print Name	Signature	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

APPROVAL TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED

Project/Site Manager:	Date:
HSE Manager/Representative:	Date:
Date & Time Permit Valid:	Date & Time Permit Expires:

	Health, Safety and Environment	Attachment 012-2 NA
	ELECTRICAL HAZARD CHECKLIST	Issue Date: June 1999 Revision 6: September 2012

Location Inspected: _____ **Job No.:** _____

Date Inspected: _____ **Name of Inspector:** _____

Check Yes, No, or NA for Not Applicable. If a comment is required, circle the number, and see Page 3.

Electrical Equipment Markings

1.	Disconnecting switches and circuit breakers are labeled to indicate their use or equipment served.	☐ Yes	☐ No	☐ NA
2.	The necessary voltage, wattage, or current ratings are labeled.	☐ Yes	☐ No	☐ NA
3.	Circuit breakers clearly indicate whether they are in the "on" or "off" position.	☐ Yes	☐ No	☐ NA
4.	Markings for arc flash hazards per NFPA 70E are on each panel or distribution box.	☐ Yes	☐ No	☐ NA

Electrical Grounding

5.	Extension cords used have a grounding conductor (third plug).	☐ Yes	☐ No	☐ NA
6.	Ground-fault circuit interrupters are installed as required.	☐ Yes	☐ No	☐ NA
7.	Portable electrical tools and equipment are of the double-insulated type.	☐ Yes	☐ No	☐ NA
8.	Ground-fault circuit interrupters open the circuit on a ground current of 5 milliamperes or greater, and are equipped with an integral push-button test circuit.	☐ Yes	☐ No	☐ NA
9.	Ground-fault circuit interrupters are installed in accordance with the manufacturer's instructions.	☐ Yes	☐ No	☐ NA
10.	Ground-fault circuit interrupters are tested prior to initial use, and periodically thereafter.	☐ Yes	☐ No	☐ NA
11.	Grounding rods are at least 5/8-inch- (0.625-centimeter)-diameter steel or iron rods, 1/2-inch- (1.27-centimeter)-diameter copper-clad steel, or 3/4-inch-(1.9-centimeter)-diameter galvanized pipe.	☐ Yes	☐ No	☐ NA
12.	Grounding rods are in 8-foot (2.5-meter) lengths and driven to full depth.	☐ Yes	☐ No	☐ NA
13.	The paths from circuits, equipment, structures, and conduits or enclosures to ground are:			
	• Permanent and continuous.	☐ Yes	☐ No	☐ NA
	• Have ample carrying capacity for the current likely to be imposed on them.	☐ Yes	☐ No	☐ NA
	• Have resistance sufficiently low to permit current flow to operate circuit breakers and similar overcurrent devices on the circuit.	☐ Yes	☐ No	☐ NA
14.	Driven ground-rod electrodes have a resistance to ground not exceeding 25 ohms.	☐ Yes	☐ No	☐ NA
15.	Upon installation of the driven ground-rod electrode, the resistance was tested and recorded.	☐ Yes	☐ No	☐ NA
16.	Conductors, used for bonding and grounding circuits, are of sufficient size to carry the anticipated current.	☐ Yes	☐ No	☐ NA
17.	Grounds are not removed until all work is complete.	☐ Yes	☐ No	☐ NA

	Health, Safety and Environment ELECTRICAL HAZARD CHECKLIST	Attachment 012-2 NA Issue Date: June 1999 Revision 6: September 2012

Electrical Guarding

18. Switches, receptacles, etc., are provided with tight-fitting covers or plates.	☐ Yes	☐ No	☐ NA
19. All energized parts of electrical circuits and equipment are guarded against accidental contact by approved cabinets or enclosure.	☐ Yes	☐ No	☐ NA
20. All unused openings (including conduit knockouts) in electrical enclosures and fittings are enclosed with appropriate covers, plugs, or plates.	☐ Yes	☐ No	☐ NA
21. Ground-fault circuit interrupters are installed on each temporary 15- or 20-ampere, 120-volt AC circuit at locations where construction, demolition, modifications, alterations, or excavations are being performed.	☐ Yes	☐ No	☐ NA
22. Electrical switches and breakers (rated 440 volts or greater) are provided with a means for locking them out in the OFF position.	☐ Yes	☐ No	☐ NA

Electrical Systems

23. Circuit breakers accessible to personnel are protected from physical damage, and located away from ignitable material.	☐ Yes	☐ No	☐ NA
24. Weatherproof cabinets or enclosures are used when switches, circuit breakers, fuse panels, and motor controllers are in a wet or outside location.	☐ Yes	☐ No	☐ NA
25. A readily accessible, manually operated switch is provided for each incoming service or supply circuit rated less than 5 kilovolts.	☐ Yes	☐ No	☐ NA
26. Electrical raceways and enclosures are securely fastened in place.	☐ Yes	☐ No	☐ NA
27. Overcurrent protection is provided for fuses or circuit breakers for each feeder and branch circuit.	☐ Yes	☐ No	☐ NA
28. Insulating fuse tongs or extractors are used when removing fuses from circuits rated 50 to 600 volts.	☐ Yes	☐ No	☐ NA
29. Fuse cabinets have close-fitting doors that can be locked.	☐ Yes	☐ No	☐ NA

Extension Cords

30. Clamps or other securing means are provided on flexible cords or cables at plug receptacles, tools, equipment, etc., and the cord jackets are securely held in place.	☐ Yes	☐ No	☐ NA
31. Flexible cords and cables are free of splices and taps.	☐ Yes	☐ No	☐ NA
32. Only 3-wire grounded-type extension cords, designated for hard or extra-hard service, are used.	☐ Yes	☐ No	☐ NA
33. Extension cords are listed by Underwriters Laboratories, Inc.	☐ Yes	☐ No	☐ NA
34. Extension cords are checked for damage before use.	☐ Yes	☐ No	☐ NA
35. The rated load on extension cords is not exceeded.	☐ Yes	☐ No	☐ NA
36. Extension cords are not fastened with staples, hung by nails, or suspended by wire.	☐ Yes	☐ No	☐ NA

Temporary Wiring

37. Temporary wiring is guarded, buried, or isolated by elevation to prevent accidental contact by workers and equipment.	☐ Yes	☐ No	☐ NA
38. A vertical clearance above walkways for temporary wiring is not less than 10 feet (3 meters) from circuits carrying 600 volts or less.	☐ Yes	☐ No	☐ NA
39. All exposed temporary wiring is supported on insulators.	☐ Yes	☐ No	☐ NA
40. Temporary wiring is protected from accidental damage.	☐ Yes	☐ No	☐ NA

	Health, Safety and Environment	Attachment 012-2 NA
	ELECTRICAL HAZARD CHECKLIST	Issue Date: June 1999 Revision 6: September 2012

41.	Nonconductive lamp sockets and connections are permanently molded to the conductor insulation on lighting strings.	☐ Yes	☐ No	☐ NA
42.	Lighting strings have lamp guards.	☐ Yes	☐ No	☐ NA
43.	Broken or defective bulbs are replaced promptly.	☐ Yes	☐ No	☐ NA
44.	Lights are protected from accidental contact or breakage.	☐ Yes	☐ No	☐ NA
45.	Wiring installed in conduit is equipped with bushings at outlets and terminals.	☐ Yes	☐ No	☐ NA
46.	Receptacles are of the grounding type, and electrically connected to the equipment-grounding conductor.	☐ Yes	☐ No	☐ NA

Worker Practices

47.	Personnel performing electrical repairs are properly trained and qualified.	☐ Yes	☐ No	☐ NA
48.	Workers de-energize, ground, or guard electrical circuits before working in close proximity to them.	☐ Yes	☐ No	☐ NA
49.	Workers consider all electrical systems as live until verified de-energized and grounded.	☐ Yes	☐ No	☐ NA
50.	Proper lockout/tag-out procedures are used for de-energizing electric circuits.	☐ Yes	☐ No	☐ NA
51.	Arc flash protection protocols are in place for work on circuits of 50 volts or higher.	☐ Yes	☐ No	☐ NA

Equipment

52.	Only fiberglass or wood ladders are used when working near electrical hazards.	☐ Yes	☐ No	☐ NA
53.	Insulation mats are placed on floors and on frames of equipment when working on energized equipment.	☐ Yes	☐ No	☐ NA
54.	Only voltage-rated tools are used on or near live circuits. Voltage rating is appropriate for the work being performed.	☐ Yes	☐ No	☐ NA

Personal Protective Equipment

55.	Rubber matting, blankets, insulated sleeves, and rubber gloves are inspected before use.	☐ Yes	☐ No	☐ NA
56.	Workers use safety glasses and face shields during work activities where there is a reasonable probability of eye injury (and on systems with 50 or more volts).	☐ Yes	☐ No	☐ NA
57.	Workers wear arc flash protective clothing, hoods, face shields, and gloves when working on live circuits greater than 50 volts (per NFPA 70E).	☐ Yes	☐ No	☐ NA

COMMENTS:

	Health, Safety and Environment HAZARDOUS LOCATIONS	SMS 012 NA Supplemental Information A Issue Date: February 2009 Revision 2: January 2011

“Class I Locations”

Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures. Class I locations include the following:

- A. Class I, Division 1 location is a location:
 - 1. In which ignitable concentrations of flammable gases or vapors may exist under normal operating conditions; or
 - 2. In which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or
 - 3. In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also cause simultaneous failure of electric equipment.
- B. Class I, Division 2 location is a location:
 - 1. In which volatile flammable liquids or flammable gases are handled, processed, or used, but in which the hazardous liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems, or in case of abnormal operation of equipment; or
 - 2. In which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operations of the ventilating equipment; or
 - 3. That is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

“Class II Locations”

Class II locations are those that are hazardous because of the presence of combustible dust. Class II locations include the following:

- A. Class II, Division 1 location is a location:

	Health, Safety and Environment HAZARDOUS LOCATIONS	SMS 012 NA Supplemental Information A Issue Date: February 2009 Revision 2: January 2011

1. In which combustible dust is or may be in suspension in the air under normal operating conditions, in quantities sufficient to produce explosive or ignitable mixtures; or
2. Where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes, or
3. In which combustible dusts of an electrically conductive nature may be present.

B. Class II, Division 2 location is a location in which:

1. Combustible dust will not normally be in suspension in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus; or
2. Dust may be in suspension in the air as a result of infrequent malfunction of handling or processing equipment, and dust accumulations resulting therefrom may be ignitable by abnormal operation or failure of electrical equipment or other apparatus.

“Class III Locations”

Class III locations are those that are hazardous because of the presence of easily ignitable fibers or flyings but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures. Class III locations include the following:

- A. Class III, Division 1 location is a location in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.
- B. Class III, Division 2 location is a location in which easily ignitable fibers are stored or handled, except in process of manufacture.

	Health, Safety and Environment PPE, TOOLS AND EQUIPMENT NEEDED DURING ELECTRICAL WORK	SMS 012 NA Supplemental Information B Issue Date: February 2009 Revision 2: January 2011

If there is a danger of:	Then use the following:
• Head injury from electric shock, or • Burns due to contact with exposed energized parts	• Nonconductive head protection – Type II, E nonconductive hard hat
Injury to the eyes or face from: • Electric arcs or flashes; or • Flying objectives resulting from electrical explosion	• Protective equipment for the eyes and face – face shield and safety glasses
• Shock to hands while handling energized wires	• Lineman's rubber insulated gloves rated for the voltage exposed to. Leather overgloves may be needed if exposure to abrasive surfaces is possible.
• Shock while working in areas where high voltage electrical systems are present, or • Shock when performing electrical repairs	• Non-conductive protective foot wear
Exposure to electric arcing or flashing from: • Circuits of more than 50 volts; • Opening or closing 2400 volt oil cutout switching devices; • Removing or installing links in high voltage able tap boxes; or • Removing or installing fuses in high voltage circuits.	• Protective arc flash clothing (levels 0-40 to address energy potential as specified in NFPA 70E).
IF	THEN
• Energized parts are exposed.	• Use nonconductive ropes and handlines near the exposed energized part.
• Working near exposed energized conductors or circuit parts.	• Use insulated tools or handling equipment if the tools or handling equipment might make contact with such conducts or parts.
• The insulating capability of insulated tools or handling equipment is subject to damage.	• Protect the insulating material.
• Removing or installing fuses when the fuse terminals are energized.	• Use fuse-handling equipment insulated for the circuit voltage.
• Working near exposed energized parts that might be accidentally contacted or where dangerous electric heating or arcing might occur.	• Use protective shields, protective barriers, or insulating materials to protect from shock, burns, or other electrically related injuries.
• Normally enclosed live parts are exposed for maintenance or repair.	• Guard the parts to protect unqualified persons from contact with the live parts.

	Health, Safety and Environment ASSURED GROUNDING GUIDELINES	SMS 012 NA Supplemental Information C Issue Date: January 2011

OSHA (29 CFR 1926.404) requires that employers use either ground-fault circuit interrupters (GFCIs) or an Assured Equipment Grounding Conductor Program to protect employees on construction sites. This Plan consists of the two elements described below.

1. Ground-Fault Circuit Interrupters

All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites that are not part of the permanent wiring of the building or structure, and that are in use by employees will have approved GFCIs for personnel protection. *Temporary electrical service GFCIs will be tested weekly by depressing the "Test" button and ensuring receptacle functionality.*

Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5 kilovolts, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with GFCIs.

2. Assured Equipment Grounding Conductor Program

URS has established and implemented this Assured Equipment Grounding Conductor Program on construction sites covering all cord sets, receptacles that are not a part of the building or structure, and equipment connected by cord and plug that are available for use, or used by employees and volunteer construction workers.

Each cord set, attachment cap, plug, and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles that are fixed and not exposed to damage, ***must be visually inspected before each day's use*** for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage. Equipment found damaged or defective will not be used until repaired.

URS will designate one or more competent person at each construction site to implement this program. *"Competent person" means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.*

Tests

The following two tests will be performed on all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and cord- and plug-connected equipment required to be grounded.

Continuity Test

The continuity test ensures that the equipment-grounding conductor is electrically continuous. Perform this test on all cord sets, receptacles that are not part of a building or structure's permanent wiring, and cord- and plug-connected equipment required to be grounded. Use a simple continuity tester, such as a lamp and battery, bell and battery, an ohmmeter, or a receptacle tester.

	Health, Safety and Environment ASSURED GROUNDING GUIDELINES	SMS 012 NA Supplemental Information C Issue Date: January 2011

Terminal Connection Test

The terminal connection test ensures that the equipment-grounding conductor is connected to its proper terminal. Perform this test with the same equipment used in the first test.

Each receptacle and attachment cap or plug will be tested for correct attachment of the equipment-grounding conductor. The equipment-grounding conductor will be connected to its proper terminal.

All required tests will be performed:

1. Before first use and visually inspected daily thereafter.
2. Before equipment is returned to service following any repairs.
3. Before equipment is used after any incident that can be reasonably suspected to have caused damage; such as when a cord set is run over, "pinched" in a doorway, or "crushed" in a window.
4. Perform monthly continuity tests.

The employer will neither make available nor permit any employees to use equipment that has not met the four requirements listed above.

Records will be kept of the tests performed, as required. These test records will identify each receptacle, cord set, and cord- and plug-connected equipment piece that passed the test, and will indicate the last date it was tested or the interval for which it was tested. This record will be kept by means of logs, color coding, or other effective means, and will be maintained until replaced by a more current record. The record will be made available on the job site for inspection by OSHA and any affected employee.

Part of the URS recordkeeping task, and the method preferable to OSHA, color coding is used for marking cord sets and cord- and plug-connected equipment. The table below lists a color code that is widely used. Colored plastic or vinyl electrical tape is placed on one or both ends of cords and cord- and plug-connected equipment to denote the month that the tests were performed.

Assured Equipment Grounding Conductor Program Color Code			
Month #	Month Tested	Color of tape(s) to apply to cord	
1	January	White	
2	February	White +	Yellow
3	March	White +	Blue
4	April	Green	
5	May	Green +	Yellow
6	June	Green +	Blue

	Health, Safety and Environment ASSURED GROUNDING GUIDELINES	SMS 012 NA Supplemental Information C Issue Date: January 2011

Assured Equipment Grounding Conductor Program Color Code			
Month #	Month Tested	Color of tape(s) to apply to cord	
7	July	Red	
8	August	Red +	Yellow
9	September	Red +	Blue
10	October	Orange	
11	November	Orange +	Yellow
12	December	Orange +	Blue

To remember the color of tape to place on the newly tested cord, keep in mind the color for the start of each calendar quarter by season:

White → January → Winter

Green → April → Spring

Red → July → Summer, or the 4th of July

Orange → October → Fall, or pumpkin

Then add:

Yellow for the second month in each quarter

Blue for the third month of each quarter

URS SAFETY MANAGEMENT STANDARD

Fire Protection and Prevention

1. Applicability

This standard applies to URS Corporation and its subsidiary companies.

2. Purpose and Scope

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

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location. At project sites controlled by contractors or building owners, some of these responsibilities may be covered by building/facility owners or owner agents.

4. Requirements

A. Fire Protection

1. A fire protection program will be developed and followed throughout all phases of work.
 - a. Access to available firefighting equipment will be maintained at all times.
 - b. Firefighting equipment will be inspected monthly and maintained in operating condition. Defective equipment will be immediately replaced.
 - c. Fire extinguishers that out of service or discharged will be immediately tagged, removed from service, and replaced.
 - d. Firefighting equipment will be conspicuously located and not obstructed from view in the workplace.
 - e. Where and when required or necessary, the project manager will provide a trained and equipped firefighting organization (fire brigade) to assure adequate protection.
2. A temporary or permanent water supply (sufficient volume, duration, and pressure) required to properly operate the firefighting equipment will be made available as soon as combustible materials accumulate.

URS SAFETY MANAGEMENT STANDARD

Fire Protection and Prevention

- a. Where underground water mains are to be provided, they will be installed, completed, and made available for use as soon as practicable.
- b. Fire Hose and Connections
 - i. One hundred feet, or less, of 1.5-inch (3.75-cm) hose, with a nozzle capable of discharging water at 25 gallons (95 liters) or more per minute, may be substituted for a fire extinguisher rated not more than 2A 20BC in the designated area, provided the hose line can reach all points in the area.
 - ii. If fire hose connections are not compatible with local firefighting equipment, the project manager will provide adapters or equivalent to permit connections.
 - iii. During demolition involving combustible materials, charged hose lines supplied by hydrants, water trucks with pumps, or equivalent will be made available.
- c. Fixed Firefighting Equipment
 - i. Sprinkler Protection
 - Where URS is involved in the construction of a facility in which automatic sprinkler protection is required, the installation of the sprinklers will closely follow the construction, and sprinklers will be placed into service as soon as practicable.
 - Where URS is involved in the demolition or alteration of a facility, existing automatic sprinkler installations should be retained in service as long as reasonable. Only authorized persons will permit the operation of sprinkler control valves. Modification of sprinkler systems to permit alterations or additional demolition should be expedited so that the automatic protection may be returned to service as quickly as possible. Sprinkler control valves will be checked daily, at the close of work/business, to ascertain that the protection is in service.

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ii. Standpipes

In all structures requiring standpipes or where standpipes exist in structures being altered, they will be maintained to always be ready for fire protection use. Conspicuously marked standpipes will be provided with connections on the outside of the structure (at the street level). Each floor will be equipped with at least one standard hose outlet.

iii. Fire Alarm Devices

- An alarm system (e.g., telephone system, siren) will be established to alert both the employees on the site and the local fire department of an emergency.
- The alarm code and reporting instructions will be conspicuously posted at phones and at all employee entrances.

iv. Fire Cutoffs

- In new construction, firewalls and exit stairways required for the completed buildings will be given construction priority. Fire doors, with automatic closing devices, will be hung on openings as soon as practicable.
- Fire cutoffs will be retained in buildings undergoing alterations or demolition until operations necessitate their removal.

d. Jobsite Requirements

- i. Material storage areas will be equipped with fire extinguishers adequate for their size, construction, and the material stored therein.
- ii. Welding, cutting, grinding, and burning will not be done within 25 feet (7.6 meters) of any material fuel storage area. Fire extinguishers will be provided at the site of welding operations.

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- iii. Flammable materials will be stored as far as possible from the working area, at least 25 feet (7.6 meters). Safety cans will be used when handling and transporting fuel, gas, and other flammables.
- iv. Extinguishers are to be adequately maintained.
- v. The telephone number of the nearest organized firefighting group is to be displayed at jobsite telephones.

3. Fire Extinguishing Equipment

a. Extinguisher Requirements

Use only UL-listed extinguishers. Mark extinguishers and extinguisher locations, indicating the suitability of each extinguisher for a particular classification of fire.

b. Building and Occupancy Hazard Protection

Requirements for fire extinguisher protection are divided into two categories: building protection and occupancy hazard protection. Provide for extinguishing equipment to protect both the building structure (if it is combustible) and the occupancy hazards inside it.

- i. For building protection, provide fire extinguishers rated for Class A fires or greater, as required by applicable building codes.
- ii. For protection against occupancy hazards, provide fire extinguishers rated for Class A, B, C, or other fire potential as appropriate. Requirements may vary from section to section within a single building. Determine the occupancy hazards, as well as the proper ratings of necessary fire extinguishers, of each room or section. Classify rooms or sections as light hazard, ordinary hazard, or extra hazard. See Supplemental Information B for additional details and assistance in determining extinguisher requirements.

c. Extinguisher Placement

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- i. Place extinguishers in conspicuous locations, along normal paths of travel, and near exits. If the extinguishers are not readily visible, use wall markings, signs, or lights to identify their locations.
- ii. Ensure that extinguishers are readily accessible. Keep the space in front of and below extinguishers clear at all times. The floor area beneath extinguishers may be marked as a reminder to keep the area clear.
- iii. Hang extinguishers on hangers, brackets, or other equipment furnished by the manufacturer, or place them on shelves. If an extinguisher weighs less than 40 pounds (18.1 kg), the top of the extinguisher will not be more than 5 feet (1.5 meters) above the floor. If an extinguisher weighs equal to or more than 40 pounds (18.1 kg), it will not be more than 3.5 feet (1.1 meters) above the floor. The clearance between the bottom of the extinguisher and the floor will never be less than 4 inches (10.2 cm).
- iv. Provide the appropriate number and types of fire extinguishers for operations being performed. Refer to Supplemental Information A for guidance.

d. Inspection

Properly trained personnel will inspect extinguishers at least monthly. The monthly inspection will include the following items at a minimum:

- i. Location.
- ii. Rating.
- iii. Access.
- iv. Visibility.
- v. Operating instructions.
- vi. Seals.
- vii. Tamper indicators.

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viii. Fullness.

ix. Physical condition.

Attach inspection tags to each extinguisher indicating the dates of purchase, inspection, testing, and recharging, and the initials of the inspector. In addition to the tag, a colored tape may be used to indicate that an extinguisher has been inspected.

Fire extinguishers must be inspected annually by a qualified fire services contactor.

e. Testing and Maintenance

- i. Establish periodic testing programs to ensure that extinguishers are in proper operating condition. Only properly trained personnel (preferably fire extinguisher vendors) should maintain extinguishers.
- ii. At the conclusion of testing or maintenance work, attach a tag to the extinguisher showing the date and the signature of the person who performed the service.

f. Testing Intervals

- i. Each year, recharge soda acid and foam extinguishers, and weigh others according to the manufacturer's instructions. Inspect the body, hose, and nozzle of the extinguisher, and examine the dry powder. Note: Testing is not necessary for stored pressure units unless a loss of pressure or other conditions indicates a need; however, units mounted in vehicles or otherwise subject to mechanical packing should have their powder examined.
- ii. Every five years, test the pressure parts of all extinguishers except Halon 1301 extinguishers; dry chemical extinguishers with braised-brass, mild steel, or aluminum shells; and dry-powder extinguishers for metal fires.

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- iii. Every six years, empty dry-chemical, stored-pressure extinguishers and examine working parts for operability.
- iv. Every 12 years, test the pressure parts of Halon 1301 extinguishers; dry-chemical extinguishers with braised-brass, mild steel, and aluminum shells; and dry-powder extinguishers for metal fires.

g. Employee Training

- i. Where fire extinguishers are provided for employee use, training will be provided on general principles of portable fire extinguishers, including stages of fires and classes of fire extinguisher. The emphasis should be on hazards of fighting a fire during the initial phases of a fire.
- ii. Personnel designated to use firefighting as part of a site Emergency Action Plan must have training in the use of appropriate equipment. Training must be conducted prior to initial assignment and annually thereafter or whenever there is a change in the Emergency Action Plan or new equipment is introduced.

B. Fire Prevention

1. General

- a. Develop an Emergency Preparedness Plan as outlined in SMS 003 – Emergency Preparedness Plan.
- b. Conduct evacuation drills at least annually.
- c. Maintain good housekeeping to reduce fire hazards and to provide safe routes of egress should a fire occur.
- d. Conduct periodic workplace inspections to identify fire hazards such as unnecessary accumulation of combustibles (including paper and boxes), unnecessary storage of flammables, and sources of ignition.

2. Ignition Hazards

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- a. Electrical wiring and equipment for light, heat, or power purposes will be properly installed.
- b. Equipment powered by internal combustion will be located with the exhausts positioned away from combustible materials. When the exhausts are piped outside the building under construction, a clearance of at least 6 inches (15 cm) will be maintained between piping and combustible material.
- c. Smoking is prohibited at or in the vicinity of operations that constitute a fire hazard. Such areas will be conspicuously posted as follows: "NO SMOKING OR OPEN FLAME."
- d. Portable, battery-powered lighting equipment, used in connection with the storage, handling, or use of flammable gases or liquids, will be approved for the hazardous locations. For more information, see SMS 015 – Flammable and Combustible Liquids and Gases.
- e. The nozzles of air, inert gas, and steam lines or holes used in the cleaning or ventilation of tanks and vessels containing hazardous concentrations of flammable gases or vapors will be bonded to the tank or vessel shell. Bonding devices will not be attached or detached while hazardous concentrations of flammable gases or vapors exist.

3. Temporary Buildings

- a. Temporary buildings will not be erected where the location adversely affects any means of employee exit.
- b. Temporary buildings, located within another building or structure, will be of noncombustible construction or combustible construction having a fire resistance rating of not less than 1 hour.
- c. Temporary buildings, located other than inside another building and not used for handling and storage of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous occupancies, will be located at a distance of not less than 10 feet (3 meters) from another building or structure. Groups of temporary buildings, not exceeding 2,000 square feet (186 square meters) in total, will be considered a single temporary building.

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4. Open Yard Storage

- a. Combustible materials will be stored with regard to the stability of piles and in no case higher than 10 feet (3 meters).
- b. Driveways between and around combustible storage piles will be at least 15 feet (4.6 meters) wide and maintained free of accumulations of rubbish, equipment, or other articles or materials. Driveways will be spaced to produce a maximum grid system unit of 50 feet (15.2 meters) by 150 feet (45.7 meters).
- c. The entire storage site will be kept free from accumulations of unnecessary combustible materials. Weeds and grass will be maintained, and procedures will be established for periodic cleanup of the entire area.
- d. The method of piling combustible materials will be solid and in orderly regular piles. No combustible material will be stored outdoors within 10 feet (3 meters) of a building or structure.
- e. Portable fire extinguishing equipment, suitable for the fire hazard involved, will be provided at convenient, conspicuously accessible locations in the yard area. Portable fire extinguishers, rated not less than 2A:20BC, will be placed to assure that the maximum travel distance to the nearest unit will not exceed 100 feet (30.5 meters).

5. Indoor Storage

- a. Storage will not obstruct, or adversely affect, means of exit.
- b. Materials will be stored, handled, and piled with regard to their fire characteristics.
- c. Noncompatible materials, which may create a fire hazard, will be segregated by a barrier having a fire resistance of at least 1 hour.
- d. Materials will be piled to minimize the spread of fire internally and to permit convenient access for firefighting. Stable piling will be maintained at all times. Aisle space will be

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maintained to safely accommodate the widest vehicle used within the building for firefighting purposes.

- e. A clearance of at least 36 inches (90 cm) will be maintained between the top level of the stored material and the sprinkler deflectors.
- f. Clearance will be maintained around lights and heating units to prevent ignition of combustible materials.
- g. A clearance of 24 inches (60 cm) will be maintained around the fire door's path of travel, unless a barricade is provided, in which case no clearance is needed. Material will not be stored within 36 inches (90 cm) of a fire door.

C. Temporary Heating Devices

1. Ventilation

- a. Fresh air will be supplied in sufficient quantities to maintain the health and safety of employees. Where natural means of fresh air supply are inadequate, mechanical ventilation will be provided.
- b. Heaters used in confined spaces necessitate that special care be taken to provide sufficient ventilation to ensure proper combustion, maintain the health and safety of workmen, and limit temperature increase in the area.

2. Clearance and Mounting

- a. Temporary heating devices will be installed to provide clearance to combustible materials not less than the amount shown in the following table:

Minimum Clearance in inches (cm)			
Heating Appliance	Sides	Rear	Chimney Connector
Room heater, circulating type	12 (30)	12 (30)	18 (45)
Room heater, radiant type	36 (90)	36 (90)	18 (45)

- b. Temporary heating devices that are listed for installation with lesser clearance than specified in the previous table must be

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installed in accordance with the manufacturer's specifications.

- c. Heaters not suitable for use on wood floors will not be set directly upon them or other combustible materials. When such heaters are used, they will rest on suitable heat-insulating material or concrete at least 1 inch (2.5 cm) thick or equivalent. The insulating material will extend beyond the heater 2 feet (60 cm) or more in all directions.
- d. Heaters used near combustible tarpaulins, canvas, or similar coverings will be located at least 10 feet (3 meters) from the coverings. The coverings will be securely fastened to prevent ignition or upsetting of the heater due to wind action on the covering or other material.

3. Stability

When in use, heaters will be set horizontally level, unless otherwise permitted by the manufacturer's instructions.

4. Solid Fuel Heaters

Solid fuel heaters are prohibited in buildings and on scaffolds.

5. Oil Fired Heaters

- a. Flammable liquid-fired heaters will be equipped with a primary safety control to stop the flow of fuel in the event of flame failure. Barometric or gravity oil feed will not be considered a primary safety control.
- b. Heaters designed for barometric or gravity oil feed will be used only with integral tanks.
- c. Heaters specifically designed and approved for use with separate supply tanks may be directly connected for gravity feed, or an automatic pump, from a supply tank.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Emergency Action Plans.

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- B. Fire extinguisher inspection logs.
- C. Employee training documentation.
- D. Site audits.
- E. Evacuation drills.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [Means of Egress](#) – 29 Code of Federal Regulations (CFR) 1910, Subpart E
- B. U.S. OSHA Standard – [Exit Routes, Emergency Action Plans, and Fire Prevention Plans](#) – 29 CFR 1910.38
- C. U.S. OSHA Standard – [Fire Protection](#) – 29 CFR 1910, Subpart L
- D. U.S. OSHA Software – [Fire Safety Advisor](#)
- E. U.S. OSHA Construction Standard – [Fire Protection and Prevention](#) – 29 CFR 1926.150, Subpart F
- F. National Fire Protection Association – Standard for Portable Fire Extinguishers – [NFPA 10](#)
- G. International Code Council – [International Fire Code](#)
- H. [SMS 003](#) – Emergency Preparedness Plan
- I. [SMS 015](#) – Flammable and Combustible Liquids and Gases

7. Supplemental Information

- A. [Fire Classifications](#)
- B. [General Fire Extinguisher Requirements](#)

	Health, Safety and Environment FIRE CLASSIFICATIONS	SMS 014 NA Supplemental Information A Issue Date: February 2009

A. Fire Classifications

Fires are classified as Class A, B, C, D, or Special, depending upon the types of materials involved. These classifications are defined as follows:

1. Class A – Fires in ordinary combustible materials such as wood, cloth, paper, trash, rubber, and plastic.
2. Class B – Fires in flammable liquid, oil, grease, tar, oil-base paint, lacquer, and flammable gas.
3. Class C – Fires involving energized electrical equipment or systems, resulting in the extinguishing media conducting electricity. When electrical equipment or systems are de-energized, extinguishers for Class A or B fires can be used safely.
4. Class D - Fires involving combustible metals such as magnesium, titanium, zirconium, lithium, potassium, and sodium. Specialized techniques, extinguishing agents, and extinguishing equipment have been developed to control and extinguish fires of this type. Generally, do not use normal extinguishing agents on metal fires. In such fires, there is the danger of increasing the intensity of the fire because of a chemical reaction between some extinguishing agents and the burning metal.
5. Special - Fires that involve certain combustible metals or reactive chemicals require, in some cases, special extinguishing agents or techniques.

B. Extinguisher Classifications and Ratings

All types of extinguishers are not equally effective against all classifications of fires. Therefore, extinguishers are rated according to the classification and size of the fires against which they are effective. Extinguisher ratings are found on the extinguisher label. A rating consists of a letter indicating the classification of fire on which the extinguisher is effective and a rating number indicating the relative extinguishing effectiveness. The significance of the rating number varies with the classification of fire for which the extinguisher is rated. The following rating criteria are used:

1. For extinguishers rated for Class A fires, the rating number indicates relative effectiveness, the higher the number, the more effective the extinguisher. The minimum recommended rating for extinguishers rated for Class A fires is 2A.

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2. For extinguishers rated for Class B fires, the rating number represents the average size (in square feet) of the fire the extinguisher could put out.
3. No number is used for extinguishers rated for Class C fires, because Class C fires are essentially either Class A or B fires involving energized electrical wiring and equipment.

C. Hazard Classifications

The materials in a building or area present hazards of varying potential. These hazards are classified. As follows:

1. Light or Low Hazard – A room or area where, considering the amount of combustible material or flammable liquids present, fires of small size should be anticipated (e.g., change trailers, toilet trailers, and general storage).
2. Ordinary or Moderate Hazard – A location where, considering the amount of combustibles or flammable liquids present, fires of moderate size should be anticipated (e.g., temporary construction offices and most shops).
3. Extra or High Hazard – A location where, considering the amount of combustibles or flammable liquids present, fires of severe magnitude should be anticipated (e.g., carpenter shops and storage areas for flammable liquids and lumber).

	Health, Safety and Environment GENERAL FIRE EXTINGUISHER REQUIREMENTS	SMS 014 NA Supplemental Information B Issue Date: February 2009

1. Fire Extinguishers – General

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

Extinguisher Requirements for Class A Hazards

Rating Shown on Extinguisher	Maximum Travel Distance to Extinguishers in Feet (m)	Maximum Area to be Protected per Extinguisher		
		Light Hazard sq. ft. (m ²)	Ordinary Hazard sq. ft. (m ²)	Extra Hazard sq. ft. (m ²)
1-A	-	-	-	-
2-A	75 (23)	6,000 (557)	3,000 (279)	-
3-A	75 (22.9)	9,000 (836)	4,500 (418)	3,000 (279)
4-A	75 (22.9)	11,250 (1,045)	6,000 (557)	4,000 (372)
6-A	75 (22.9)	11,250 (1,045)	9,000 (836)	6,000 (557)
10-A	75 (22.9)	11,250 (1,045)	11,250 (1,045)	10,000 (929)
20-A	75 (22.9)	11,250 (1,045)	11,250 (1,045)	11,250 (1,045)
40-A	75 (22.9)	11,250 (1,045)	11,250 (1,045)	11,250 (1,045)

Extinguisher Requirements for Class B Hazards

Type of Hazard	Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers in Feet (m)
Light	5-B	30 (9.1)
	10-B	50 (15.2)
Ordinary	10-B	30 (9.1)
	20-B	50 (15.2)
Extra	40-B	30 (9.1)
	80-B	50 (15.2)

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Extinguisher Requirements for Class C Hazards

Class C extinguishers are required wherever energized electrical equipment is located. Since a Class C fire itself is either Class A or Class B (involving ordinary combustible material, flammable liquids, or flammable gases), the extinguishers are sized and located as for a Class A or B hazard.

Types of Extinguishers Approved for Types of Hazards

Class A Hazards	Class B Hazards	Class C Hazards
Cartridge-operated water or antifreeze	Carbon dioxide*	Carbon dioxide
Stored pressure water or antifreeze	Dry chemical	Dry chemical
Wetting Agent Foam	Multipurpose dry chemical (ABC)	Multipurpose dry chemical (ABC)
Loaded stream	Halon 1301	Halon 1301
Multipurpose dry chemical (ABC)	Halon 1211	Halon 1211
Pump tank water or antifreeze (Halon 1211)		

*Certain sizes are not classified or acceptable to meet requirements.

2. Hot Work

A minimum of one fire extinguisher, rated at least 20BC, must be provided for each hot work location. The extinguisher should be conspicuously positioned no more than 10 feet (3.04 meters) from the hot work. Refer to SMS 020- Hot Work”.

3. Motorized Construction Equipment

At least one portable fire extinguisher, rated at least 20BC, must be provided on each piece of motorized construction equipment.

4. Temporary Construction/Work Trailer

A minimum of one fire extinguisher, rated at a minimum of 2A, must be provided for each temporary construction/work trailer.

URS SAFETY MANAGEMENT STANDARD

Hazardous Waste Operations

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies involving the investigation or remediation of sites impacted with hazardous wastes or hazardous materials, including those associated with underground storage tanks.

Normally, investigation projects for real estate transactions conducted to confirm that a site is "clean" are not covered under this standard. If the Project Manager reasonably expects that there is the potential for a "clean" site to actually have some level of contamination, it should initially be treated as contaminated, and be subject to this standard.

2. Purpose and Scope

The purpose of this standard is to minimize the risks to URS personnel and subcontractors while conducting hazardous waste field operations.

Investigation techniques discussed in this standard include, but are not limited to, hand augering, soil gas evaluation, groundwater monitoring, test pits, and all types of power drilling, including direct-push. Remediation techniques discussed under this standard include, but are not limited to, excavation, groundwater treatment, soil gas treatment, containment, and landfarming.

The applicability of the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard to URS activities is primarily in the areas of site investigation and remediation. URS relies on outside vendors or clients to provide emergency response teams (HazMat Teams) at our project sites and locations. On a project-specific basis, if the need arises for URS to provide an emergency response team, then the HAZWOPER requirements specific to that activity will be developed and incorporated into the project health and safety plan (HASP). This includes specific chemical protective clothing, equipment, and post-emergency response operations.

3. Implementation

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

4. Requirements

The URS Health, Safety and Environment Management System and Safety Management Standards were designed to help employees to identify, evaluate, and control safety and health hazards and to provide for emergency response.

URS SAFETY MANAGEMENT STANDARD

Hazardous Waste Operations

Site/project hazards and scope of work dictate the specifics, which are covered in Facility Emergency Action Plans and Project HASPs.

A. Project Evaluation

Assess the technical and field aspects of every hazardous waste site project to evaluate:

1. Risk of exposure to hazardous chemicals, with particular attention to suspected or known human carcinogens.
2. Personal protective equipment requirements.
3. Air monitoring requirements.
4. Emergency services requirements.
5. Hazards addressed by other URS Safety Management Standards (e.g., SMS 010 – Confined Space Entry).
6. Hazardous materials shipping and disposal responsibilities.
7. Other safety and health hazards associated with site operations.

B. Client/Contract Evaluation

1. Review contract documents to determine whether the client has any special internal or regulatory requirements for hazardous waste site operations.
2. Implement client requirements in addition to those of this standard. Those requirements that are the most protective (e.g., most stringent) will be used.

C. Site-Specific Health and Safety Plan

1. Prepare a site-specific HASP for every project under this standard.
2. HASPs must be written or approved by the appropriate Health, Safety, and Environment (HSE) Manager, or a safety professional specifically approved by the HSE Manager, and by the project manager. Modifications and addendums to the HASP require approval by the HSE Manager and project manager.

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Hazardous Waste Operations

3. Evaluate client and agency requirements prior to preparing the HASP, particularly if the client or an agency will approve the HASP prior to implementation.
4. On a site-/project-specific basis, conduct a hazard assessment and identify appropriate engineering controls, work practices, and personal protective equipment (PPE) requirements. This assessment and the mitigations and controls must be documented in site-/project-specific HASP(s) and Job Safety Analysis (or equivalent).
5. On a site-/project-specific basis, conduct a hazard assessment for potential physical and chemical exposures and identify monitoring equipment, frequency, action levels, and actions. These must be incorporated into project-/site-specific HASP(s). Guidance on monitoring is provided in SMS 043 – Personal Monitoring/Industrial Hygiene.
6. On a site-/project-specific basis and based on the potential chemical exposures and work activities, develop specific decontamination procedures that include instructions on materials, decontamination steps, and location of decontamination. The purpose of these procedures will be to ensure personnel leaving contaminated areas are appropriately decontaminated, and all equipment is disposed or decontaminated.
7. PPE selection, use, and maintenance are presented in SMS 029 – Personal Protective Equipment. This information is documented on a site/project specific basis in the site/project HASP. The HASP may include PPE requirements that vary by task and project conditions. The Site Safety Officer (SSO) will implement these PPE changes included in the HASP, but may not modify the HASP PPE requirements. Work may not proceed unless the PPE required by the HASP is available and properly used.

The HASP shall include the following minimum PPE: hard hat, safety glasses, high visibility vest, and safety-toe shoes/boots.

8. Remove any non-impermeable PPE clothing that becomes contaminated with hazardous substances in accordance with the decontamination procedures noted above.

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Hazardous Waste Operations

9. Provide regular showers, change rooms, and sanitation facilities for employees, as necessary. Unauthorized personnel shall not remove protective clothing or equipment from change rooms.

D. Training – Remediation and Investigation Activities

Verify that each assigned URS employee has completed the following required training.

1. 40-hour initial training from an approved training provider, (24 hours of initial training for operations outside of North America).
2. 3 days of on-the-job training (1 day is required for operations outside of North America).
3. 8-hour refresher training completed within 12 months of the initial or subsequent refresher training. If the time lapse since the 40 hour training or 8 hour refresher (whichever is later) is greater than two years, contact a Division, Regional, or Business Unit HSE Manager or Director. The HSE Manager/Director may require additional training (e.g., on-line modules) including the 40 hour class to be re-taken.
4. 8-hour Site Safety Officer (Supervisor) training for directing the activities of any other URS employee or subcontractor.
5. Additional training for the Site Safety Officer as described below.

E. Training – Emergency Response

The HAZWOPER standard is primarily applicable to URS operations involving remediation and investigations at hazardous waste sites or sampling at Treatment, Storage, and/or Disposal Facilities (TSDFs). URS typically contracts emergency response or relies on client or local emergency response teams. On an as-needed basis, if a project requires URS to provide a HAZMAT emergency response team, the following training requirements must be met.

1. Operations Level – a minimum of 8 hours of initial and refresher training for those responsible for acting defensively in the case of a release, attempting to contain the release from a safe distance.
2. HAZMAT Technician – at least 24 hours of initial training and 8 hours of refresher training. They will participate in operations-level

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Hazardous Waste Operations

training and know how to implement the emergency response plan for the facility/site/project location.

3. HAZMAT Specialist – at least 24 hours of initial training and 8 hours of refresher training. They will be trained in the same content as the HAZMAT Technician, as well as in how to develop a site safety and control plan.
4. Incident Commander – will have at least 40 hours of training covering the Operations Level training and techniques for implementing the emergency response plan and directing the incident. They will be knowledgeable in relevant regulations.

F. Site Safety Officer

1. Appoint a Site Safety Officer (SSO) with appropriate qualifications for the specific hazardous waste project.
2. Assure that the SSO for complex projects, such as those with complicated remediation activities, has no duties other than site safety and health.
3. Verify that the SSO has completed basic supervisor training, and has additional required training and experience as applicable:
 - a. Additional respiratory protection training is required for projects where supplied air respirators may be used.
 - b. Heavy equipment/construction safety.
 - c. Personal air monitoring.
4. The SSO will monitor decontamination and other site activities for effectiveness.

G. Exposure Monitoring

Require that exposure monitoring is conducted in accordance with the HASP on all hazardous waste projects.

H. Project Equipment

1. Provide all health and safety equipment as described by the project HASP.

URS SAFETY MANAGEMENT STANDARD

Hazardous Waste Operations

2. Provide all personal protective equipment as described by the project HASP.

- I. Medical Surveillance

Verify that each URS employee assigned to the project meets the minimum requirements of the URS Medical Surveillance Program (refer to SMS 024 – Medical Screening and Surveillance). This typically includes:

1. Baseline examination
2. Annual examination
3. Appropriate clearance for respirator use.

- J. Compliance Assurance

SMS 068 – Compliance Assurance is a tool for use in determining the effectiveness and compliance of a hazardous waste site operation.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Completed Health and Safety Plan
- B. Completed and signed HASP approval form
- C. Signed HASP acceptance form (or equivalent)
- D. Completed health and safety field forms that are included in each HASP
- E. Training and Medical Surveillance Clearance documentation for project personnel

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) – [Hazardous Waste Operations](#)
- B. European Agency for Safety and Health at Work, Dangerous Substances http://europe.osha.eu.int/good_practice/risks/dangerous_substances/
- C. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities – [National Institute for Occupational Safety and Health \(NIOSH\) 85-115](#)

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- D. [SMS 010](#) – Confined Space Entry
- E. [SMS 024](#) – Medical Screening & Surveillance
- F. [SMS 043](#) – Personal Monitoring
- G. [SMS 029](#) – Personal Protective Equipment
- H. [SMS 068](#) – Compliance Assurance

URS SAFETY MANAGEMENT STANDARD

Housekeeping

1. Applicability

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

2. Purpose and Scope

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

3. Implementation

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

4. Requirements

A. General

1. Require tools, materials, extension cords, hoses, and other equipment to be stowed at the end of the day. These materials must not be strewn about the site in a manner that may cause tripping or other hazards while in use.
2. Clear general waste, scraps, debris, and rubbish from work areas, passageways, and stairs in and around the facility on a daily basis. Do not throw or drop materials from upper levels to lower levels or to the ground unless disposal areas are provided and the area below is barricaded or secured.
3. Provide metal or other approved containers in adequate numbers to handle waste and rubbish disposal.
4. Garbage (including solid or liquid wastes), refuse, and hazardous waste such as caustics, acids, and toxic materials must be stored in approved and covered containers. Containers must be appropriately labeled as to contents. SMS 009 – Corrosive and Reactive Materials and SMS 017 – Hazardous Waste Operations, provide additional information on hazardous materials.
5. Store supplies and generated wastes or scrap in locations away from walkways and in a manner that will not trip workers. Maintain

URS SAFETY MANAGEMENT STANDARD

Housekeeping

stored materials in safe, neat stockpiles for ease of access and to prevent collapse or falling.

6. Keep weeds and vegetation away from stockpiled materials and walkways.
7. Maintain flooring, stairways, gangways, access ways, and walkways in a clean, dry, and smooth condition.
8. Ensure that oil, grease, water, ice, or other hazardous materials that may cause slipping or fire hazards are removed promptly.
9. Ensure employees are trained in appropriate waste disposal procedures.
10. Identify a member of line management (typically a site supervisor or foreman) with the responsibility of ensuring proper waste disposal and storage requirements are followed.

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

1. Office and trailer locations – Inspect work areas at least quarterly. Use the inspection sheet provided as Attachment 021-1 NA.
2. Field sites – Inspect sites at least biweekly. Use the inspection sheet provided as Attachment 021-1 NA.
3. Field sites performing aircraft and vehicle maintenance – Inspect the sites weekly if sanding, drilling, grinding, and/or painting operations are conducted. Use the inspection sheet provided as Attachment 021-2 NA.
4. For European operations, the Workplace Inspection Checklist - Attachment 021-3 NA must be completed monthly.

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

D. Project management personnel shall address the following issues in project pre-planning:

1. Estimate the types and quantities of waste or scrap generated during site-specific project activities.

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Housekeeping

2. Identify any needs for specialized containers or waste disposal services.
 3. Coordinate waste disposal options with the client.
 4. Identify any hazards associated with handling or storage of waste or scrap and determine if control measures, including engineering, administrative controls, or personal protective equipment, are required.
 5. Identify waste or scrap handling and storage procedures that will minimize impacts to site personnel, client operations, and the environment.
 6. Identify waste segregation criteria, as well as opportunities for recycling.
- E. For operations involving work with hazardous materials (including metals associated with aviation maintenance activities), the manager directing activities of the facility or site will assure that:
1. Eating, drinking, and smoking areas are removed from the work areas. Hand washing stations shall be available nearby for employees entering the eating and smoking areas.
 2. Resting, eating and smoking areas will be kept clean.
 3. Work areas will be cleaned to remove accumulated contaminants. Working surfaces, including workbenches, desks, and other lateral working surfaces, will be wiped down daily with an appropriate cleaner (soap, solvent, or oxidizing agent). Walking surfaces will be cleaned to remove accumulated contaminants weekly or more often.
 4. Chemicals shall be properly stored to minimize the potential for spills. Chemicals shall be stored in proper containers, organized, labeled and in secondary containment, when required.
 5. Spill cleanup materials must be accessible and appropriate for the materials that may be spilled.
 6. Proper communication measures shall be in place and initiated upon a spill event. Procedures should be based on type and quantity of materials spilled. Spills will be reported to regulatory agencies when required by regulations.

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7. Employees shall be trained on the proper response procedures for spilled materials. Training shall address proper communication procedures in the event of a spill.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Completed Inspection Sheets.
- B. Spill Response Training

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [Sanitation – 29 Code of Federal Regulations \(CFR\) 1910.141](#)
- B. U.S. OSHA Standard – [Walking and Working Surfaces – 29 CFR 1910.22.](#)
- E. [SMS 009](#) – Corrosive and Reactive Materials
- F. [SMS 017](#) – Hazardous Waste Operations
- G. [Attachment 021-1 NA](#) – Housekeeping Inspection Sheet
- H. [Attachment 021-2 NA](#) – Special Housekeeping Inspection Sheet - Sanding, Drilling, Grinding, and Painting
- I. [Attachment 021-3 NA](#) – Workplace Inspection Checklist

	Health, Safety and Environment	Attachment 021-1 NA
	HOUSEKEEPING INSPECTION SHEET	Issue Date: June 1999 Revision 7: September 2012

Building or Location: _____

Inspection Conducted by: _____ **Date:** _____

Check Yes, No, or NA for Not Applicable.

General Site Housekeeping

1.	Do not block exits or emergency equipment.	☐ Yes	☐ No	☐ NA
2.	Do not leave equipment or materials lying on the ground.	☐ Yes	☐ No	☐ NA
3.	Keep storage areas free from the accumulation of materials that constitute trip hazards.	☐ Yes	☐ No	☐ NA
4.	Remove scrap materials and other debris from work area.	☐ Yes	☐ No	☐ NA
5.	Remove combustible scrap and debris by safe means at regular intervals.	☐ Yes	☐ No	☐ NA
6.	Store oily rags in metal cans with tight fitting lids. Remove oily rags at the end of the day.	☐ Yes	☐ No	☐ NA

Visibility

7.	Ensure that halls, stairways and walkways are well lit.	☐ Yes	☐ No	☐ NA
8.	Ensure that well designed light switches are present in areas where walkways are not always lighted.	☐ Yes	☐ No	☐ NA
9.	Ensure that dust, smoke or steam does not create poor visibility.	☐ Yes	☐ No	☐ NA
10.	Ensure that glare from floodlights or windows does not create poor visibility in work areas.	☐ Yes	☐ No	☐ NA

Stairs

11.	Ensure that handrails are tight and at the proper level.	☐ Yes	☐ No	☐ NA
12.	Ensure that handrails extend past the top and bottom step.	☐ Yes	☐ No	☐ NA
13.	Ensure that white or yellow strips are painted on the first and last step for better visibility. (Not an OSHA requirement – recommendation only).	☐ Yes	☐ No	☐ NA
14.	Ensure that steps are not rough or defective.	☐ Yes	☐ No	☐ NA
15.	Ensure that stair treads are wide enough and risers consistently spaced.	☐ Yes	☐ No	☐ NA
16.	Ensure that stairs are free of obstructions.	☐ Yes	☐ No	☐ NA

Floor Conditions

17.	Ensure that floors of every workroom are clean, and so far as possible, in a dry condition.	☐ Yes	☐ No	☐ NA
18.	Ensure that floors are not oily, overly waxed, or polished.	☐ Yes	☐ No	☐ NA
19.	Where wet floors or processes are present, provide proper drainage and false floors, mats, or other dry standing places.	☐ Yes	☐ No	☐ NA
20.	Finish floor surfaces with non-slip coatings where spills are likely.	☐ Yes	☐ No	☐ NA
21.	Ensure that floors and passageways are free from protruding nails, splinters, holes, or loose boards.	☐ Yes	☐ No	☐ NA
22.	Ensure that floors are free of holes and depressions.	☐ Yes	☐ No	☐ NA
23.	Ensure that aisles or pathways are wide enough for easy passage and for carrying objects (48 inches is recommended).	☐ Yes	☐ No	☐ NA

	Health, Safety and Environment	Attachment 021-1 NA
	HOUSEKEEPING INSPECTION SHEET	Issue Date: June 1999 Revision 7: September 2012

24.	Ensure that ramps are covered with non-slip surfaces or matting.	☐ Yes	☐ No	☐ NA
25.	Keep carpets or rugs free from loose or frayed edges that may catch boots or shoes.	☐ Yes	☐ No	☐ NA
26.	Keep walkways free from extension cords, air hoses and cables.	☐ Yes	☐ No	☐ NA
27.	Keep pathways free from boxes, containers, machine parts, or other tripping hazards.	☐ Yes	☐ No	☐ NA

Ground Conditions

28.	Ensure that trip hazards are not present.	☐ Yes	☐ No	☐ NA
29.	Ensure that fall hazards are not present.	☐ Yes	☐ No	☐ NA
30.	Ensure that holes or changes in ground elevation are either filled or guarded.	☐ Yes	☐ No	☐ NA
31.	Ensure that muddy walkways are filled with gravel to reduce slipping.	☐ Yes	☐ No	☐ NA
32.	Ensure that all employees who work in wet or greasy conditions wear slip resistant footwear.	☐ Yes	☐ No	☐ NA

Equipment

33.	Ensure that vehicle steps are of adequate size, surface placement for safe dismounting.	☐ Yes	☐ No	☐ NA
34.	Ensure that hand grips or ladders are adequate for getting into and out of equipment.	☐ Yes	☐ No	☐ NA
35.	Ensure that ladders have been checked for damage and removed from service if found unsafe.	☐ Yes	☐ No	☐ NA

Chemicals

36.	Ensure that chemicals are properly stored to minimize a potential spill.	☐ Yes	☐ No	☐ NA
37.	Ensure that spill cleanup materials are available and appropriate for the type of potential spill.	☐ Yes	☐ No	☐ NA

Identify areas that need attention and describe the corrective actions to be implemented:

I certify that the above inspection was performed to the best of my knowledge and ability, based on the conditions present.

Signature

Date

	Health, Safety and Environment	Attachment 021-3 NA
	WORKPLACE INSPECTION CHECKLIST	Issue Date: June 1999 Revision 7: September 2012

- Where no problems have been identified, place a check in the appropriate box under the date of the inspection.
- Where a problem has been identified, ensure that a correction action is assigned and completed.

Office:	Inspected By:								Year:			
Month:	J	F	M	A	M	J	J	A	S	O	N	D
Date of Inspection:												
1. Emergency Preparedness Plan (or equivalent)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2. Fire	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3. Entrances and doors	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4. Workstations & equipment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5. Restricted areas	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6. Steps/staircases/ladders	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7. Floors	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8. Electrical Equipment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9. Lighting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10. Temperature	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
11. Building Services	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
12. Ventilation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
13. Toilet Facilities	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
14. Kitchens	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
15. General Cleanliness	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
16. Chemical Substances	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
17. Refuse Facilities	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
18. First Aid	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
19. Access roads and car parks	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
20. Elevators	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
21. Display Screen Equipment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
22. Systems of Work	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
23. Water	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
24. Electrical Installation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
25. H&S Meetings/Notices	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

	Health, Safety and Environment WORKPLACE INSPECTION CHECKLIST	Attachment 021-3 NA Issue Date: June 1999 Revision 7: September 2012

GUIDANCE NOTES/CHECKLISTS

To help in the completion of the "Workplace Inspection Checklist" the following brief notes summarize some of the most important aspects. Individual offices may need to modify them to deal with their particular arrangements.

The aspects are listed below in the same order as on the Form.

1. Emergency Preparedness Plan (or equivalent)	
Location	During the walk-around inspection of the office, investigate the cause of any entries made during the previous month.
Reporting	All accidents/injuries dangerous occurrences known to have occurred in the property during the past month to be adequately reported.
Check Site	Employees to have easy access to the plan whenever necessary.
2. Fire	
Fire Doors Fire Exits	All fire doors and exits to be closed, unobstructed and easy to open.
Fire Extinguishers	On hooks/brackets provided.
Records	Check that fire alarm test is being carried out and that fire alarm system is being maintained
3. Entrances and Doors	
Entrances	Doors and doorways not obstructed by any article or substance. Doormats/doorsteps securely fixed and not constituting a tripping hazard.
Doors	Doors and gates secure on their hinges or sliding runners. Glazing panels on 2-way doors not covered over. Fire doors not fastened or wedged open. Fire doors able to completely close from fully open, automatically.
4. Workstations and Equipment	
Workstations (NB: Includes maintenance tools, equipment, printing equipment, etc.)	Workstation furniture and work equipment safe, clean and in a good state of repair. Workstation furniture and work equipment suitable for the person using it and for the work they are doing.
5. Restricted Areas	
Access Secured	Doors securely locked. Unauthorized access impossible by normal (unforced) means.
Keys	Keys not accessible to unauthorized persons.
6. Steps, Staircases and Ladders	
Structure	Treads and handrails secure and in good repair.
Tripping	Carpets/coverings untorn and secure. Edge strips well fixed. Steps and staircases free from litter. Stairs and landings clear of any unnecessary obstructions.
Slipping	Surfaces of steps not slippery. Spillages have been properly cleaned up.
Lighting	All stairs adequately lit so that the edges of each step can be clearly seen.
Cleanliness	All steps/staircases clean and free from dust dirt and litter.
Ladders	<u>No part of ladder damaged or weakened.</u> Securely positioned/fixed at base and top to prevent slipping, moving or falling of ladder when in use, or held by another person stationed at the foot of the ladder, at a slope of approximately 75°. Inspection Record available

	Health, Safety and Environment WORKPLACE INSPECTION CHECKLIST	Attachment 021-3 NA Issue Date: June 1999 Revision 7: September 2012

7. Floors	
Tripping	All floor coverings even, level and securely fixed down.
	No obstructions in thoroughfares, which could cause people to trip or fall.
Slipping	Where floor surfaces are being polished, suitable signs warning of the slipping hazard are being displayed.
	Spillages have been properly cleaned up.
Cleanliness	All floors are clean and free from dust, dirt and litter.
8. Electrical Equipment	
Electrical Equipment	Working satisfactorily
	Undamaged in any way.
	All used in a proper and safe manner.
Wiring	No exposed wires or circuitry.
Portable Electric Equipment	Checked in accordance with SMS 012.
9. Lighting	
Lamps, Light Fittings and Switches	All lamps working satisfactorily and providing suitable light intensity.
	Light fittings are suitably orientated for task/ activity.
	Not damaged in any way, securely fixed and clean.
10. Temperature	
Services Functioning	Air conditioning and heating systems operating as and when required.
Air Temperature	No complaints of low or high temperatures from the building occupants (offices should be > 61°F (16°C) after first hour).
Drafts	No unacceptable drafts around doors, windows or grilles or through fixed or broken openings.
Thermometers	One thermometer to be provided for each floor.
11. Building Services Equipment	
Indications of Malfunctioning Building Services Equipment:	Leaks of water, oil or gas.
	Presence of unfamiliar noises.
	Presence of unfamiliar smells.
	Non-operation of important components.
	Gauges showing abnormal readings.
12. Ventilation	
Indications of Inadequate Ventilation Rates:	Presence of strong odors.
	Very high temperatures in summer.
	Condensation problems.
	Drafts.
13. Toilet Facilities	
Hygienic	Bathroom stalls, urinals, floors, hand basins, taps and door handles kept clean.
Tidy	Bathroom areas not used for storage or food/drink preparation.
	Litter-free and bins (including sanitary) regularly emptied.
Well Stocked	Sufficient and suitable provision of toilet paper and soap.
Well Maintained	Mechanical hand drying facilities fully operational, if provided.
	Towels clean, if provided.
	Bathroom stalls, urinals, hand basins and taps in good order and functioning properly.
Ventilation	Mechanical ventilation is operational, e.g., providing and/or extracting air.
	Problems evidenced by strong odors and/or lack of air movement.
	Windows and/or grilles open satisfactorily.

	Health, Safety and Environment WORKPLACE INSPECTION CHECKLIST	Attachment 021-3 NA Issue Date: June 1999 Revision 7: September 2012

14. Kitchens	
Housekeeping	Kitchen area not being used for any other purpose than the preparation and consumption of food and drink, e.g. storage of cleaning materials.
	Kept clean and tidy.
Hygiene	No signs of infestation by insects or rodents.
	No signs of stale or rotten foodstuffs.
Appliances	Sharp kitchen implements suitably stored.
	All appliances in good working order.
15. General Cleanliness	
Building Materials	Walls, floors, etc. clean and free from dust.
	Paint or plaster not flaking off walls or ceilings.
Furniture	Furniture clean and free from dust.
Windows	Windows not excessively dirty.
Tidiness	Corridors, fire escapes, electrical switch closets, etc. kept free of litter and are not used for storage.
Cleaning Materials	Suitable provision of cleaning chemicals and personal protective equipment, e.g. gloves; cleaning chemicals are suitable stored.
16. Chemical Substances	
Storage and Labelling of Chemicals	Chemicals in secure, undamaged and clearly labelled containers.
	Chemicals stored so that they are not liable to fall or damage either themselves or other materials.
	Chemicals kept within locked closet if required.
17. Refuse Facilities	
Well Maintained	Bins and other refuse facilities in good state of repair.
Clean and Tidy	Waste facilities not overflowing.
	All refuse is being regularly collected.
	Area around waste facilities kept clean and tidy.
	Refuse bags/bins not presenting an obstruction or tripping hazard to the public or employees.
18. First Aid (See also SMS 065 NA and Attachment 065-8NA)	
First Aid Kit	First aid kit fully stocked with listed items.
	First aid box contains guidance on the treatment of injured people.
	First aid box situated in the correct appointed location.
	Drugs, creams or ointments should not be available for use by employees, visitors or tenants (e.g. Aspirin).
First Aider/Appointed Person	At least one "appointed person" to be available during the designated working day times when people are at work, to administer first aid assistance and/or call an ambulance.
First Aid Notices	Check that first aid notices giving location of first aid kit and name and location of appointed persons are up-to-date.
19. Access Roads and Car Parks	
Access and Egress	No obstructions to the safe and easy passage of vehicles throughout the property's traffic routes.
	All vehicle parking bays free from obstructions.
	In areas where vehicles and pedestrians circulate, the lines of sight available to both are not obscured.
	Gates/barriers in full working order and not presenting a risk to health and safety.
	Any fire escape route through a garage or car park not blocked by vehicles.
Signage	Signs directing traffic or pedestrians in place, visible, and, where possible to assess, being adhered to.
Cleanliness	Car-parking areas clean and tidy.

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20. Elevators	
Elevators	Doors fully operational.
	No obvious signs of damage.
	Emergency phone operational.
	No unusual sounds when operating.
	Maintained in a clean condition and free from litter.
	Inspection Certificates
21. Display Screen Equipment (See also SMS 054 NA and Attachment 054-1 NA)	
Lighting	Visual conditions for the task satisfactory, no glare from lights/sunlight, no shadowing and the screen easy to read.
Noise	Minimal nuisance from printers and heating/ventilation units
Posture	Operator able to adjust equipment in order to maintain good posture.
Furniture	Furniture and work equipment clean and in good repair.
Training and Information Packages	Information to be provided close to the workstation on the use of computer package(s), adjustment of display screen equipment and furniture, maintaining a good working posture.
Risk assessment	Completed by the main user and Office Safety Supervisor and satisfactory.
22. Systems of Work and Work Equipment	
Working Methods and Work Equipment	Safe working procedures established and being adhered to.
	Manufacturer's instructions for the equipment used are being followed. Equipment working efficiently and in good repair.
	Appropriate protective clothing is being used, if necessary.
	Tools are properly stored when not in use, and safety carried especially when used at a height.
Permits to Work	In hazardous places/situations (e.g. roof work), permit to work system in place and being adhered to.
23. Water	
Little-used Outlets	Flush (run) any little-used hot and cold outlets for minimum of 3 minutes each month (5 minutes if very distant from storage).
Hot Water Supplies	Producing hot (>122°F; >50°C) and not scalding (<149°F; <65°C) water.
24. Electrical Installation	
Electrical Equipment	Working satisfactorily
	Undamaged in any way.
	All used in a proper and safe manner.
Wiring	No exposed wires or circuitry.
Installation	Tested every 5 years and certified by Competent Person
25. H&S Meetings/Notices	
Management Meetings	Attend Management Meetings at which H&S is discussed. The Meeting should discuss as a minimum: Updates to Safety Management System, Accidents/Incidents, Results of Audits, Corrective actions, Project-related H&S and any issues raised by the Office Safety Representative.
H&S Committee Meetings	Attend H&S Committee Meetings and ensure record of meeting is made available to employees.
Notices	Legally required notices such as OSHA Poster (OSHA Job Safety and Health: It's the Law), and URS material (4sight, Lessons Learned, etc.) on display.

URS SAFETY MANAGEMENT STANDARD

Lockout and Tagout Safety

1. Applicability

This standard applies to operations of URS Corporation and its subsidiary companies in field and office locations that are engaged in the lockout and tagout of energized sources.

2. Purpose and Scope

This standard outlines the minimum requirements for the lockout/tagout of energy isolating devices. It will be used to ensure that a machine or piece of equipment is isolated from all potentially hazardous energy before employees perform servicing or maintenance activities where the unexpected energization, start-up, or release of stored energy could cause injury.

Types of energy sources that will be protected against include, but are not limited to, the following:

- A. Electrical circuits.
- B. Fluid systems (water and liquid product).
- C. Pneumatic systems.
- D. Flammable systems (including liquid and gaseous fuels).
- E. Thermal systems (steam).
- F. Gravity systems.
- G. Hazardous material systems.

3. Implementation

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

4. Requirements

A. General

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

URS SAFETY MANAGEMENT STANDARD

Lockout and Tagout Safety

2. "Affected employee" is an employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout and tagout (LOTO), or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.
3. "Qualified person" is person who is familiar with the construction and operation of the equipment and the hazards involved, and who
 - a. Requests de-energizing of an energy source.
 - b. Inspects de-energizing with the authorized employee.
 - c. Assures that an authorized employee has locked and tagged the source.
 - d. Requires that all applicable authorized employees affix lock/tags at the same locations(s).
 - e. Operates the equipment controls or otherwise verifies that the equipment cannot be restarted after being locked out.
 - f. Coordinates the continuation of LOTO protection through shift or personnel changes.
 - g. Controls accountability of locks and tags.
 - h. Makes appropriate entries on the Lock and Tag Log – Attachment 023-1 NA. Where the number of energy control activities is extensive or the scope of energy controls is complex, the qualified person may choose to use the Lockout/Tagout Permit – Attachment 023-2 NA as an aid.
 - i. Conducts tests and visual inspections prior to reenergizing to check that circuits and equipment can be safely energized.
4. Employees will not work on or in equipment, vessels, etc. that are *not* in a "zero energy state."
5. Coordinate all energy control activities with client, owner, contractor, and subcontractor practices and programs.
6. Require that all locks used in a LOTO program are marked in such a way so as to distinguish the locks from locks used for any other purpose.

URS SAFETY MANAGEMENT STANDARD

Lockout and Tagout Safety

7. Require that all locks are keyed differently and that only one key exists for each lock and remains in the possession of the authorized employee to whom it has been assigned.
8. Require that any employee who fails to follow these procedures, or who tampers with or removes a LOTO device without authorization, will be subject to disciplinary action.

B. Procedure

Follow this LOTO procedure whenever the unexpected operation of equipment, switch, valve, or other energy sources could injure someone. Only authorized employees may perform jobs requiring LOTO procedures. Common jobs for which LOTO is used include repairing electrical circuits, cleaning or oiling machinery with moving parts, clearing jammed mechanisms, replacing control units or valves, and performing preventative maintenance.

1. Step 1 – Achieving Zero Energy

- a. Before turning off a machine or equipment, you must know the type and magnitude of the energy, the hazards of the energy to be controlled, and the way the energy will be controlled. Identify and locate all sources of energy that could affect individuals involved. Note that more than one source of energy may be involved at each machine or piece of equipment.
- b. Determine whether more than one employee or crew will be working on the machine or equipment. Also, evaluate the potential for personnel on multiple shifts to be working on the equipment.
- c. Notify all affected personnel that equipment is going to be de-energized and accessed. This can be done verbally or visually, or by hanging a warning tag on the control panel.
- d. Disconnect the main sources of power by breaking the primary power circuit, valve, pipe, etc. Locking out a low voltage control circuit is not considered breaking a main power source.
- e. Disconnect each separate power source of multiple power systems (e.g., air over hydraulic, electric over hydraulic).

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Lockout and Tagout Safety

- f. Release all residual energy remaining behind the power source (e.g., hydraulic or air pressure). If there is a possibility of re-accumulation of stored energy level, verify isolation until the task is complete or the possibility no longer exists. Use the following methods to guard against energy left in equipment after it has been isolated:
 - i. Inspect the system to ensure that all parts have stopped moving.
 - ii. Install grounding wires.
 - iii. Relieve trapped pressure.
 - iv. Release the tension of springs or block the movement of spring-driven parts.
 - v. Block or brace parts that could fall because of gravity.
 - vi. Bleed pneumatic and hydraulic systems and leave vent valves open. Block parts in hydraulic and pneumatic systems that could move from loss of pressure.
 - vii. Drain process piping systems and close valves to prevent the flow of hazardous materials.
 - viii. Use blank flanges on lines without valves that must be blocked.
 - ix. Purge reactor tanks and process lines.
 - x. Dissipate extreme heat or cold, or wear protective clothing.
 - xi. Remove fuses from electrical circuits.
 - xii. Monitor situations where there is a potential for stored energy to re-accumulate.
- g. Lockout devices and tags must be applied as follows:
 - i. In a manner that will hold the energy-isolating device in a safe or off position.

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Lockout and Tagout Safety

- ii. Tags (when used) will clearly show the operation or movement from the safe or off position. Examples of sample tags are provided in Supplemental Information A.
 - iii. When both tags and locks are used, the tag should be placed at the same point as the lock.
 - iv. When locks cannot be used and tags cannot be placed directly on the energy-isolating device, the locks/tags need to be highly visible and placed as close as possible.
 - v. Note that locks and tags by themselves do not de-energize equipment. Attach them only after the machinery has been isolated from its energy sources.
- h. Secure all power sources in the de-energized position with a lockout device. Note that in many situations the equipment requiring lockout may belong to the facility owner/manager (our clients). These facilities typically require their procedures to be followed and their equipment to be used. Use multiple lock devices when more than one lock is required. The authorized person will identify and notify all persons protected by the lockout. Each person who is protected by the lockout:
- i. Places a signed lock and tag on source location(s).
 - ii. Keeps the key to his/her own lock.
 - iii. Removes his/her own lock (only exception: person not on site and person is contacted).
 - iv. Works *only* on protected source(s).
 - v. Removes lock and tag at completion of work shift or transfer.
 - vi. If more than one employee is required to lockout and tag a piece of equipment, a LOTO device capable of accepting multiple locks will be used. Under no circumstances is an employee allowed to work on a lock and tag belonging to another employee.
- i. If the energy source can be locked, this is the preferred method of tagging. (Lockout devices require a key or

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combination to hold it in a safe position). If tagout must be used, the tag must be weather and chemical resistant, be standard in size and color, and have a text warning such as DO NOT START, DO NOT OPEN, etc.

- j. Block or blank any machinery, device, or piping system that can move on its own or deliver energy with or without the power source.
- k. Test equipment prior to working on it to ensure that all sources of energy have been isolated. This may include verifying that the main disconnect switch or circuit breaker can't be moved to the "on" position, depressing all start buttons and activating controls, or using a voltmeter to check for potential energization sources.

2. Step 2 - Preparing to Re-energize

- a. Once the task has been completed, ensure that tools are picked up and safety chains, guards, guard rails, warning signs, etc. are replaced. Notify affected personnel that the lockout device is going to be removed.
- b. Position controls correctly for start-up; ensure that the machine is ready for operation.
- c. Remove locks and tags. This can be done only by the person applying the lock and/or tag, except as noted elsewhere in this standard.
- d. Once all lockout devices have been removed, the equipment or process may be restarted.

3. Temporary operation of locked-out source

- a. Make sure everyone is clear of the system.
- b. Make sure tools are clear.
- c. Remove lock(s).
- d. Energize the system and conduct check.
- e. Immediately de-energize the system and replace locks.

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Lockout and Tagout Safety

4. Unauthorized removal of locks and tags is prohibited. Use the following procedure for the supervisor or qualified person to remove the lock/tag when the employee is not available:
 - a. Verify that the authorized employee is not on site and available to remove his or her own tag.
 - b. Check that employees are not exposed to hazards.
 - c. Verify that the equipment is safe to operate, tools have been removed, and guards have been replaced.
 - d. Remain with affected equipment so that no one returns while equipment or process is being restarted.
 - e. Remove lock/tag and energize equipment.
 - f. Require that the affected employee knows the lockout device has been removed before he/she resumes work.

C. Training

1. Authorized employees must receive training prior to conducting LOTO activities.
2. Training must include the following:
 - a. Purpose of lockout/tagout procedure.
 - b. Hazards associated with different energy sources.
 - c. Recognition of when to use LOTO procedures.
 - d. Electrical lockout procedures.
 - e. Valve lockout procedures.
 - f. Compliance with lockout procedures.
 - g. Discussion of specific procedures.
3. Awareness training of affected employees will be conducted to ensure that they understand the purpose of the LOTO procedures, the hazards associated with different energy sources, and their responsibilities under the LOTO program.

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Lockout and Tagout Safety

4. Retraining of authorized employees will be conducted and documented:
 - a. When there is a change in
 - i. Assignments.
 - ii. Machines.
 - iii. Equipment.
 - iv. Processes.
 - b. When there are new hazards or changes in the energy control procedure.
 - c. When evaluation of lockout/tagout procedures reveals a need for additional training
5. The manager or safety supervisor should maintain a list of the names of all employees who are authorized to perform LOTO operations on specified machines or equipment.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Training records for authorized employees.
- B. Lock and Tag Log (Attachment 023-1 NA).
- C. Lockout/Tagout Permit (Attachment 023-2 NA).

6. Resources

- A. American National Standards Institute ([ANSI](#)) Z244.1- 2003 – Control of Hazardous Energy – Lockout/Tagout and Alternative Methods
- B. U.S. Occupational Safety and Health Administration (OSHA) Standard–[Accident Prevention Signs and Tags](#) – 29 Code of Federal Regulations (CFR) 1926.200
- C. U.S. OSHA Standard – [The Control of Hazardous Energy](#) – 29 CFR 1910.147

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- D. U.S. OSHA Standard – [Lockout and Tagging of Circuits](#) – 29 CFR 1926.417
- E. U.S. OSHA Technical Links – [Lockout/Tagout](#)
- F. United Kingdom – ['Management of Health and Safety Work'](#) Regulations
- G. [Attachment 023-1 NA](#) – Lock and Tag Log
- H. [Attachment 023-2 NA](#) – Lockout/Tagout Permit

7. Supplemental Information

- A. [Sample Tags](#)



	Health, Safety and Environment LOCK AND TAG LOG	Attachment 023-1 NA Issue Date: June 1999 Revision 5: February 2009

	Health, Safety and Environment LOCK AND TAG LOG	Attachment 023-1 NA Issue Date: June 1999 Revision 5: February 2009

	Health, Safety and Environment LOCK AND TAG LOG	Attachment 023-1 NA Issue Date: June 1999 Revision 5: February 2009

Name of Qualified Person: _____ Date: _____

Job Name: _____ Job Location: _____

[illegible]

	Health, Safety and Environment	Attachment 023-2 NA
	LOCKOUT / TAGOUT PERMIT	Issue Date: June 1999 Revision 5: February 2009

Equipment/System to be Isolated: _____

Building: _____ Floor: _____ Column: _____

Other Location: _____

Purpose of Isolation: _____

Type of Isolation: _____

Authorized Employee: _____ Date: _____

Special Instructions: _____

Lockout/Tagout Performed: _____

Tag No.	Device ID	Bldg/Floor/Col.	Installed By	Removed By

Verification System Is Safe for Specified Work to Start

Authorized Employee: _____ Date: _____ Time: _____

Accountability

Accepts Protection

Requesting Authority: _____ Date: _____ Time: _____

Accountability

Release Protection

Requesting Authority: _____ Date: _____ Time: _____

Lockout/Tagout Removal Authorization

Authorized Employee: _____ Date: _____ Time: _____

	Health, Safety and Environment LOCKOUT / TAGOUT PERMIT	Attachment 023-2 NA Issue Date: June 1999 Revision 5: February 2009

	Health, Safety and Environment SAMPLE TAGS	SMS 023 NA Supplemental Information A Issue Date: February 2009



This energy source has
been LOCKED OUT

Only the individual who
signed the reverse side
may remove this lock/tag
Remarks: _____



**LOCKED
OUT**
DO NOT OPERATE

This lock/tag may
only be removed by:

Name _____

Dept _____

Expected Completion _____

URS SAFETY MANAGEMENT STANDARD

Medical Screening and Surveillance

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies for employees assigned to work environments where there is a potential for exposure to chemical, biological, and/or physical hazards.

Individuals will be selected for medical screening based on regulatory standards, project health and safety plan (HASP), assessments, the expected use of personal protective equipment (PPE), and client contract requirements.

2. Purpose and Scope

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

3. Implementation

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

The Occupational Health Manager (OHM) is responsible for development and administration of this program in coordination with the URS Medical Service Provider (MSP). The OHM will maintain current injury and illness data, and participate with corporate, division, regional, country, or strategic business unit Health, Safety, and Environment (HSE) Managers in evaluation of this program. The MSP will provide occupational medicine oversight for the program and will approve medical surveillance protocols.

Locations in the United States and Canada will follow all requirements of this program.

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

URS SAFETY MANAGEMENT STANDARD

Medical Screening and Surveillance

4. Requirements

A. Selection of program participants

1. The Medical Surveillance Evaluation (MSE) form – Attachment 024-2 NA provides the primary guidance for determining whether medical screening is required for an employee and the frequency of periodic exams. The MSE is to be completed by the employee and his or her supervisor at the time of hire for any employee who may work outside an office environment. At each annual performance review, the MSE is to be reviewed for accuracy. Other reviews are required whenever there is a change in job tasks.
2. Additional site- or project-specific biological monitoring or toxicological screening may be required in addition to this program's scheduled core exams. These medical tests will be specified by the project-specific HASP and will be authorized by the MSP on the exam appointment protocol. Note: See Section D.2 if the employee will have an initial assignment at a HAZWOPER site.

B. Types of medical screening and surveillance exams

1. A baseline or preassignment baseline exam will be conducted prior to the start of work assignments requiring medical surveillance.
2. Periodic exam schedules are established by the MSP using the following criteria:
 - a. Employees performing the following types of work will receive annual exams: construction activities in the exclusion zone of HAZWOPER sites; field work activities in the exclusion zone of HAZWOPER sites for 30 or more days per year; or projects involving exposure to materials regulated by the Occupational Safety and Health Administration (OSHA) or Mine Safety and Health Administration (MSHA) at or above established action levels.
 - b. Employees performing the following types of work will receive biennial exams: field work activities at HAZWOPER sites less than 30 days per year; waste disposal activities; non-HAZWOPER environmental sampling; or chemistry laboratory, pilot plant projects, or bench-scale operations for 30 or more days per year.

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Medical Screening and Surveillance

3. Employees currently participating in an examination program will receive exit exams when they leave their work assignment as identified in the Exit Exam Determination – Attachment 024-6 NA. In the event an employee declines the exit exam, the employee will be requested to sign a Waiver of Exit Medical Surveillance Exam – Attachment 024-7 NA.
4. Department of Transportation (DOT) exams will be conducted biennially when an employee is assigned to drive a vehicle with a gross weight rating of more than 10,000 pounds or a placarded vehicle of any size used to transport hazardous chemicals. DOT exam certification can be added to a routine baseline or periodic exam protocol when scheduling with the MSP.
5. When noise levels in the employee's work environment equal or exceed an 8-hour time-weighted average of 85 decibels as measured on the A-scale (dBA), annual audiograms will be performed. For employees involved in construction activities or construction management, enrollment in this program will be required if more than 50% of their time is spent in an active construction area and working in an area with posted noise hazards.
6. Individual radiation dose monitoring will be conducted as required by the site-specific HASP with approval by a Radiation Safety Officer. Personal dosimetry (film badges) is typically required; however, depending on the specific radiation hazard, additional monitoring or scans may be required.
7. To determine an employee's ability to wear a respirator, a medical evaluation will be performed before an employee is fit tested or assigned to wear a respirator.
8. Employees assigned to work in environments with airborne concentrations of asbestos fibers at or above the established action level (OSHA, MSHA, state, or other applicable regulations) will receive asbestos-specific baseline and annual exams. Exit exams will be performed if an exam has not been performed within the previous 6 months or if an employee has medical complaints related to potential asbestos exposure.
9. Blood sampling and monitoring for lead and other heavy metals will be conducted every 6 months until two consecutive blood

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Medical Screening and Surveillance

samples/analyses are acceptable. An employee with elevated heavy metal blood levels should be temporarily assigned to a task with minimal exposure, pending medical clearance. Sampling and monitoring will be performed every 2 weeks during the reassignment period. Employees will be notified of results within 5 days when levels are not acceptable. Medical Removal Protection benefits may apply in this situation.

10. Urine samples may be collected for some heavy metal exposures such as cadmium and mercury. Samples must be collected within 30 days of assignment to any task with potential for exposure to cadmium or other heavy metals. Medical monitoring results will be used to assess worker exposure and exposure control methods.
11. Medical monitoring will also be required to assess potential worker health risk to other chemical hazards, including polyaromatic hydrocarbons (PAHs), pesticides, benzene, chlorinated solvents, crystalline silica, and other chemical hazards as identified in prejob hazard analysis. The MSP will be consulted to determine necessary testing protocols and acceptance levels. The physician's opinion letter will be used to determine the worker's ability to perform the specified task and to wear PPE necessary to accomplish the task in a safe manner.
12. Skin exposures to hazardous chemicals with "Skin" notation will be evaluated case by case in consultation with the MSP. Allergic and hyper-sensitivity symptoms will be evaluated by the MSP as required.

C. Exam protocols

1. The Medical Screening and Surveillance Exam Protocol – Attachment 024-3 NA identifies the medical exam components of this program.
2. Evaluation will be confidential and provided during normal hours. Employees will be offered the opportunity to discuss the results of the evaluation with the MSP. All exam results are considered personal and confidential information, and will not be stored in any unsecured records not transmitted without the employee's permission.

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Medical Screening and Surveillance

D. Scheduling of exams

1. The Office or Project Manager, usually with assistance from the local HSE Representative, is responsible for contacting the MSP when baseline, exit, and project-specific exams are required. The MSP maintains an employee scheduling database for tracking periodic exams and will contact the employee for scheduling during the month the exam is due. These steps are detailed in the Medical Surveillance Exam Process – Attachment 024-4 NA.
2. Employees hired with an initial assignment to work at a HAZWOPER site whose work duties require passing a physical exam or who have an essential job function of wearing a respirator will receive a job offer contingent upon passing a preassignment baseline exam. See HAZWOPER and Respirator Preassignment Baseline Exam Protocol – Attachment 024-5 NA.
3. In the event of an urgent business need, a temporary clearance to begin work the day of the exam may be requested at the time a baseline exam is scheduled through the MSP. The temporary clearance will be issued by the local physician and will be good for up to 14 days or until the MSP physician's final clearance is received, whichever comes first.
4. If an exam becomes due during an employee's pregnancy, it is advised to defer the exam until after delivery and the employee returns to work from family/medical leave status.

E. Exam Follow-Up

1. Following each exam, the MSP will issue a physician's written opinion (Health Status Medical Report), which will include any medical restrictions and address the employee's ability to use personal protective equipment, to the HSE Representative. See Exam Follow-Up Procedures – Attachment 024-8 NA.
2. The MSP will mail the exam invoice to the Local Office HSE Representative, who will either approve the charge and forward the invoice to the accounts payable department for payment or forward the charge to the manager responsible for the employee for charge assignment and payment. (Medical exams that are part of this program are provided to URS employees at no cost to the employee.)

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3. The MSP will mail a confidential letter detailing the results of the exam to the employee at his or her home address within 30 days of the exam date.

F. Medical Records

1. Medical records include records concerning an employee's health status that is made or maintained by a physician, nurse or other health care professional. Medical records are maintained and preserved in confidential, locked files in the custody of the MSP for at least the duration of employment plus 30 years. Only information regarding the employee's ability to perform the job assignment will be provided to company representatives.
2. Employees in medical monitoring programs are notified initially, and annually thereafter, of the existence, location and ability to access medical records maintained by the MSP. Upon request, each employee (or designated representative) will have access to the employee's medical record. Prior to the release of health information to the employee (or designated representative), a specific written consent must be signed by the employee. Records will be provided in a reasonable time and manner at no cost to the employee.
3. International records (excluding the United States and Canada) will be maintained in-country at the local clinic.
4. Projects that use local clinics or employer/client clinics may store records at that site, but at the termination of the project, all employee medical records must be transferred to long-term records retention or forwarded to WorkCare™.
5. Subcontractors and vendors are expected to maintain their own employee records and reports, but the employee physician's opinion letters will be available for inspection and verification of compliance.
6. If in the event, URS ceases operations, medical records will be transferred to the successor employer. If no successor employer is available, records will be transferred to the National Institute for Occupational Safety and Health.

URS SAFETY MANAGEMENT STANDARD

Medical Screening and Surveillance

G. Program Evaluation

1. The OHM and corporate, regional, country, or SBU HSE Managers will evaluate this program annually and as needed. Issues to review include program efficacy and efficiency, employee satisfaction, and cost-effectiveness.
2. The MSP will prepare an Annual Medical Trending Report specifying the number and types of exams performed and anonymous statistical exam results in group data format.
3. Each employee is mailed a Post-Exam Evaluation by the MSP. Employee feedback regarding the clinic, medical staff, and exam procedures are reviewed, and corrective actions are identified and taken as needed.

5. Documentation Summary

The following documentation will be maintained in the office / project file:

- A. Medical Surveillance Evaluation.
- B. Health Status Medical Report.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Technical Links – [Medical Screening/Surveillance](#)
- B. [U.S. OSHA Publication 3162](#) – Screening and Surveillance: A Guide to OSHA Standards, 1999
- C. [SMS 065](#) – Injury Management
- D. [Attachment 024-1 NA](#) – WorkCare™ Medical History Questionnaire
- E. [Attachment 024-2 NA](#) – Medical Surveillance Evaluation
- F. [Attachment 024-3 NA](#) – Medical Screening and Surveillance Exam Protocol
- G. [Attachment 024-4 NA](#) – Medical Surveillance Exam Process

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Medical Screening and Surveillance

- H. [Attachment 024-5 NA](#) – HAZWOPER and Respirator Preassignment Baseline Exam Protocol
- I. [Attachment 024-6 NA](#) – Exit Exam Determination
- J. [Attachment 024-7 NA](#) – Waiver of Exit Medical Surveillance Exam
- K. [Attachment 024-8 NA](#) – Exam Follow-Up Procedures

Medical History Questionnaire

☐ Baseline ☐ Annual/Biennial
☐ Exit ☐ Other

Employee Name: _____
Company Name: _____
Office: _____
Date: _____



Medical History Questionnaire

Your Instructions

- Location of your exam will be listed on your Appointment Protocol.
- Please have your Supervisor or Health & Safety Professional complete the Job Profile on the inside flap of this page if you do not know the responses.
- See your Supervisor or Health & Safety Professional for directions to the clinic. Please bring the completed exam packet and your Appointment Protocol.
- If lab work is ordered, do not eat for 8 hours prior to exam. (Water and unsweetened juice or black decaffeinated coffee is allowed. Dry toast if you have an afternoon appointment.)
- Avoid all alcohol consumption for 24 hours prior to the exam.
- Avoid loud noise exposure for 14 to 16 hours before the exam.
- If you wear contact lenses, please do not insert them on the day of the exam. Bring a pair of glasses.
- If you use hearing aids, please bring them to the clinic.
- Your employer is responsible for the cost of this exam. It is important to be on time for your appointment.
- If you cannot attend your appointment, please call (800) 455-6155 to cancel, or your employer may be charged.

**Please answer all the questions in this booklet.
If you have any questions, please call 1-800-455-6155.**

Making Health Count

I.**Instructions**

Your supervisor must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the healthcare professional who will review it.

Has your employer told you how to contact the healthcare professional who will review this questionnaire? Yes ☐ No ☐

This questionnaire is used to gather information about your health and physical condition, both now and in the past. This information will be used to determine if you can safely perform the duties of your job. This exam is not intended to substitute for care provided by your personal physician. Results of the exam will be sent to your home address. The results of the examination are kept confidential.

Print the following information:

Last Name: _____ First Name: _____

Home Mailing Address: _____

City: _____ State: _____ Zip: _____

Email Address: _____ Social Security # : _____

Sex: ☐ Male ☐ Female Date of Birth: _____ Age: _____
Race: ☐ Hispanic or Latino ☐ White ☐ Asian ☐ Black or African American
☐ American Indian or Alaska Native ☐ Native Hawaiian or Other Pacific Islander
☐ Two or More Races (Not Hispanic or Latino)

Position: _____ Site Location: _____ Date Employed: _____

What is the phone number (including area code) at which you can be reached by the healthcare professional who reviews this questionnaire? _____

What is the best time to reach you? From: _____ ☐ AM ☐ PM To: _____ ☐ AM ☐ PM

Read and sign this Consent for Release of Medical Records:

I hereby authorize **WorkCare** to release in confidence to _____ (company) and/or its subsidiaries medical information, including but not limited to the results of medical evaluations, physical examinations or medical testing, as it specifically pertains to my medical qualification to perform the stated Job Duty consistent with the applicable requirements of OSHA, MSHA. I further authorize the examining physician and/or clinic to release to WorkCare any medical information related to my medical or physical condition. You have a right to receive a copy of this authorization.

Signature: _____ Date: _____

II.**Complete This Entire Section****Job Profile**

If you have questions regarding this Job Profile, please discuss with your supervisor in order to complete this section.

Job Duty/Title:

Indicate your job title: _____

(Example: Driller, Engineer, Environmental Scientist, etc.)

Indicate your job duty: _____

Indicate the time you spend in each area:

Field _____ % Office _____ % Travel _____ %

Physical Requirements:**Yes No**

Are there any specific physical demands of the job that are important? (Examples: Lifting, carrying)

☐☐

If yes, please describe: _____

Protective Equipment:**Yes No**

Is clearance for the use of respiratory equipment needed?

☐☐☐ Escape only (no rescue) ☐ Emergency rescue only

Is there specific safety equipment (beyond hard hat, gloves, boots, and appropriate clothing) that is used in the safe performance of this job?

☐☐

If yes, please describe: _____

1. **Please Check the Following Types of Respiratory Protective Equipment Used**

✓		Duration	Frequency	Temperature Extremes	Humidity
☐	Half Face Piece Air Purifying Respirator				
☐	Full Face Piece Air Purifying Respirator				
☐	Powered Air Purifying Respirator				
☐	Self-Contained Breathing Apparatus				
☐	Air Line Respirator				

Yes No

2. Is it possible that you will be required to wear Level A protection at any time? (SCBA, fully encapsulated suit, chemical resistant gloves & boots.)

☐☐

3. Is it possible that you will be required to wear Level B protection at any time? (SCBA, chemical resistant clothing, chemical resistant gloves & boots.)

☐☐

4. Describe significant potential chemical exposures: _____

5. Will you be working under hot conditions (temperatures exceeding 77°F)?

☐☐

Will you be working under humid conditions?

☐☐

Will you be working at high altitudes?

☐☐

Describe the work you'll be doing while you're using your respirator(s):

6. Describe any special or hazardous conditions you might encounter when you're using your respirator(s). (For example, confined spaces, life-threatening gases):

7. During the period in which you use the respirator(s), is your work effort:

a. Light (less than 200 kcal per hour) *Example: Sitting while mailing or filing; performing light assembly work, etc.*☐☐

Hours per shift: _____

b. Moderate (200 to 350 kcal per hour) *Example: Transferring a moderate load (about 35 lbs.) at trunk level; pushing a wheel barrel with a heavy load, etc.*☐☐

Hours per shift: _____

c. Heavy (above 350 kcal per hour) *Example: Lifting a heavy load (about 50 lbs.) from the floor to your waist; shoveling, etc.*☐☐

Hours per shift: _____

8. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (e.g. rescue, security):

9. Are there any substances that you cannot work with?

☐☐

Describe: _____

III.

Review of Systems

Answer "Yes" if you currently have any of these symptoms/conditions and/or have had them significantly in the past. List date when first occurred.

		Yes	No	Date
1.	A. Fever	☐	☐	
	B. Chills	☐	☐	
	C. Weight loss	☐	☐	
	D. Loss of energy/fatigue	☐	☐	
2.	A. Poor vision	☐	☐	
	B. Color blindness	☐	☐	
	C. Double vision	☐	☐	
	D. Eye injury	☐	☐	
	E. Cataract	☐	☐	
	F. Glaucoma	☐	☐	
	G. Do you wear glasses or contacts?	☐	☐	
3.	A. Ear infection	☐	☐	
	B. Mastoid surgery	☐	☐	
	C. Hearing loss	☐	☐	
	D. Sore throat	☐	☐	
	E. Frequent hoarseness	☐	☐	
	F. Dental problems	☐	☐	
4.	A. Allergies	☐	☐	
	B. Sinus trouble	☐	☐	
	C. Hay fever	☐	☐	
5.	A. Tuberculosis	☐	☐	
	B. Asthma & breathing difficulties	☐	☐	
	C. Lung collapse	☐	☐	
	D. Pneumonia	☐	☐	
	E. Shortness of breath	☐	☐	
	F. Persistent or severe colds	☐	☐	
	G. Persistent or severe coughs	☐	☐	
	H. Chest surgery	☐	☐	
	I. Wheezing	☐	☐	
	J. Emphysema	☐	☐	
	K. Bronchitis	☐	☐	
6.	A. High blood pressure	☐	☐	
	B. Heart murmur	☐	☐	
	C. Enlarged heart	☐	☐	
	D. Heart disease/failure	☐	☐	
	E. Rheumatic fever	☐	☐	
	F. Heart palpitations	☐	☐	
	G. Irregular heart beat	☐	☐	
	H. Heart attack	☐	☐	
	I. Chest pain	☐	☐	
7.	A. Varicose veins	☐	☐	
	B. Stroke	☐	☐	
	C. Leg ulcers	☐	☐	
	D. Swelling of ankles	☐	☐	
	E. Leg pain when walking	☐	☐	
8.	A. Anemia	☐	☐	
	B. Leukemia	☐	☐	
	C. Sickle cell disease	☐	☐	
	D. Other blood disease	☐	☐	
9.	A. Diabetes	☐	☐	
	B. Thyroid problems	☐	☐	
	C. Cancer or tumors	☐	☐	
	D. Heat related illness	☐	☐	
10.	A. Rash/dermatitis	☐	☐	
	B. Bruise easily	☐	☐	
	C. Psoriasis	☐	☐	
	D. Wart/mole change	☐	☐	
	E. Eczema/Acne	☐	☐	

		Yes	No	Date	
11.	A. Headaches	☐	☐		
	B. Head injury	☐	☐		
	C. Neck Injury	☐	☐		
	12.	A. Birth defect	☐	☐	
		B. Frequent backaches	☐	☐	
		C. Back surgery	☐	☐	
		D. Disc disease	☐	☐	
		E. Back injury or strain	☐	☐	
		F. Back x-rays	☐	☐	
		G. Chiropractic treatments	☐	☐	
H. Arthritis/Rheumatism		☐	☐		
I. Knee problems		☐	☐		
J. Swollen joints		☐	☐		
K. Amputation	☐	☐			
L. Broken Bones	☐	☐			
Type:					
M. Dislocations	☐	☐			
N. Carpal tunnel syndrome	☐	☐			
O. Repetitive strain extremities	☐	☐			
13.	A. Ulcers	☐	☐		
	B. Colitis	☐	☐		
	C. Diarrhea (frequent)	☐	☐		
	D. Stomach problems	☐	☐		
	E. Vomiting	☐	☐		
	F. Bloody bowel movements	☐	☐		
	G. Hepatitis/Abdominal liver enzymes	☐	☐		
	H. Cirrhosis	☐	☐		
	I. Yellow jaundice	☐	☐		
	J. Gallbladder trouble	☐	☐		
14.	A. Epilepsy/seizures	☐	☐		
	B. Fainting spells	☐	☐		
	C. Loss of consciousness	☐	☐		
	D. Dizziness or vertigo	☐	☐		
	E. Frequent exhaustion	☐	☐		
	F. Trouble with nerves	☐	☐		
	G. Frequent worry/depression	☐	☐		
15.	A. Kidney trouble/stones	☐	☐		
	B. Bladder trouble	☐	☐		
	C. Kidney/bladder surgery	☐	☐		
	D. Blood in urine	☐	☐		
	E. Difficulty urinating	☐	☐		
16.	A. Venereal disease	☐	☐		
	B. Infertility/difficulty conceiving	☐	☐		
	C. Children with birth defects	☐	☐		
17.	A. Irregular period/painful menstruation	☐	☐		
	B. Hysterectomy	☐	☐		
	C. Are you pregnant?	☐	☐		
	D. Difficulty becoming pregnant	☐	☐		
	E. Date of last menstrual period	Date:			
	F. Date of last pelvic/pap smear	Date:			
	G. Date of last mammogram	Date:			
	H. Breast lumps	☐	☐		
	I. Breast discharge	☐	☐		
J. Repeated miscarriages	☐	☐			
18.	A. Inability to have an erection	☐	☐		
	B. Discharge or bleeding from the penis	☐	☐		
	C. Abnormal testicular self examination	☐	☐		
	D. Prostate problems	☐	☐		

Describe any "Yes" responses by number: _____

Are you currently unable to perform any type of activity? ☐ Yes ☐ No Describe: _____

III.**Social History****Yes No**

1. Do you now or in the past month ever smoked cigarettes? ☐ Yes ☐ No
2. Have you ever smoked cigarettes in the past? ☐ Yes ☐ No
3. If you now smoke or have smoked in the past, how many years total have you smoked? _____
4. If you now smoke or have smoked in the past, how many packs/day do/did you smoke on average?

☐ Less than one-half	☐ Two	☐ Three
☐ One	☐ Two and one-half	☐ More than three
☐ One and one-half		
5. Do you use any one of the following tobacco products?

☐ Pipe tobacco	☐ Snuff	☐ None
☐ Smokeless tobacco	☐ Cigars	
6. Do you regularly drink alcoholic beverages? ☐ Yes ☐ No
7. If yes, how many drinks, beers or glasses of wines do you drink daily?

☐ Less than 1	☐ 3-4	☐ 7-8
☐ 1-2	☐ 5-6	☐ More than 8
8. Do you exercise strenuously for at least 45 min.?

☐ Daily	☐ 1 time a week	☐ Never
☐ 3 times a week	☐ Rarely	
9. Do you feel frustrated, stressed or uptight?

☐ Daily	☐ 1 time a week	☐ Never
☐ 3 times a week	☐ Rarely	
10. Do you eat greasy or fatty foods?

☐ Daily	☐ 1 time a week	☐ Never
☐ 3 times a week	☐ Rarely	

V.**Past Medical History****For Annual or Exit Exam – Indicate if There Has Been a Change Since Last Exam**

1. Are you currently being treated for illness or injury? ☐ Yes ☐ No
2. Have you been treated for persistent illness or injury? ☐ Yes ☐ No
3. Describe any "yes" responses: _____
4. Please list hospital admissions: If none, check here ☐

Year	Reason for Hospitalization
_____	_____
_____	_____
_____	_____
5. Please list allergies to any medication, food, clothing, bee stings or other substances: _____
6. How many days of work did you miss in the last 12 months due to your health? _____
7. Have you ever pursued a compensation claim or received disability payment for an occupational injury or disease?

☐ Yes	☐ No
8. Have you ever been turned down for life insurance? ☐ Yes ☐ No
9. Have you ever had injuries from an auto accident? ☐ Yes ☐ No

VI.**Current Medications**

Fill out the following questions for any exam type.

When was your last tetanus immunization booster? Month: _____ Year: _____

Do you currently have prescriptions for drugs or medications? ☐ Yes ☐ No

Have you ever been addicted to drugs? ☐ Yes ☐ No

Describe: _____

Have you ever abused prescription medication? ☐ Yes ☐ No

Describe: _____

Do you take any of the following medications regularly?

Heart medicine	☐ Yes	☐ No	Aspirin	☐ Yes	☐ No
Thyroid medicine	☐ Yes	☐ No	Blood pressure medicine	☐ Yes	☐ No
Oral medicine for diabetes	☐ Yes	☐ No	Diuretic (Water pill)	☐ Yes	☐ No
Insulin for diabetes	☐ Yes	☐ No	Medicine for seizures	☐ Yes	☐ No
Nerve or sleeping pill	☐ Yes	☐ No	Allergy/Asthma medications	☐ Yes	☐ No

VII.**Family History**

Fill out the following questions for any exam type. Indicate change since last exam.

Father: ☐ Living List Diseases: _____ If deceased, cause of death: _____

Mother: ☐ Living List Diseases: _____ If deceased, cause of death: _____

Brother: ☐ Living List Diseases: _____ If deceased, cause of death: _____

Sister: ☐ Living List Diseases: _____ If deceased, cause of death: _____

Has any member of your immediate family had any of the following?

Cancer	☐ Yes	☐ No	Diabetes	☐ Yes	☐ No	Nervousness	☐ Yes	☐ No
Mental Illness	☐ Yes	☐ No	Tuberculosis	☐ Yes	☐ No	Rheumatism	☐ Yes	☐ No
Kidney Disease	☐ Yes	☐ No	Heart Disease	☐ Yes	☐ No			

**Continue to Next Section on
Following Page ►**

This Page is to Be Completed Only As Initial or Post Offer Exams

VIII.	Past Job History				
List All Jobs Ever Held Starting With Your First – Include Part Time And Volunteer Work					
Name Of Employer	From Mo/Yr	To Mo/Yr	# Hrs Worked Per Week/Shift	Description of Work	Potential Hazards (Dust, Fumes, Chemicals, Heat, Noise, Physical Agents, Metals, Radiation)

IX.	Toxic Exposure History																																																																															
At work or at home, have you ever been significantly exposed to hazardous solvents, hazardous airborne chemicals (e.g. gases, fumes, dust) or have you had significant skin contact with hazardous chemicals? ☐ Yes ☐ No Describe: _____ Have you worked with any of the materials, or under any of the conditions, listed below: <table style="width: 100%;"> <thead> <tr> <th></th> <th style="text-align: center;">Yes</th> <th style="text-align: center;">No</th> </tr> </thead> <tbody> <tr><td>Asbestos</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Silica (e.g. sandblasting)</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Coal (e.g. mining)</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Grinding</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Welding</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Asphalt, pitch or tar</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Beryllium</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Cadmium</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Cotton Dust</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Pesticides</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Fuel</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Oils</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Lead</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Nickel/Chrome</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Paint</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Microwave/Radio Frequency</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Nuclear Radiation/X-Ray</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Fiberglass</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Plastics</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Solvents</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Compressed Gases</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Aluminum</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Iron</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Tin</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> <tr><td>Dusty Environments</td><td style="text-align: center;">☐</td><td style="text-align: center;">☐</td></tr> </tbody> </table> Have you ever worked around excessive noise? ☐ Yes ☐ No Where: _____		Yes	No	Asbestos	☐	☐	Silica (e.g. sandblasting)	☐	☐	Coal (e.g. mining)	☐	☐	Grinding	☐	☐	Welding	☐	☐	Asphalt, pitch or tar	☐	☐	Beryllium	☐	☐	Cadmium	☐	☐	Cotton Dust	☐	☐	Pesticides	☐	☐	Fuel	☐	☐	Oils	☐	☐	Lead	☐	☐	Nickel/Chrome	☐	☐	Paint	☐	☐	Microwave/Radio Frequency	☐	☐	Nuclear Radiation/X-Ray	☐	☐	Fiberglass	☐	☐	Plastics	☐	☐	Solvents	☐	☐	Compressed Gases	☐	☐	Aluminum	☐	☐	Iron	☐	☐	Tin	☐	☐	Dusty Environments	☐	☐	Have you ever worked in an excessive hot or cold environment? ☐ Yes ☐ No Where: _____ Have you ever worked around vibration or with vibrating tools? ☐ Yes ☐ No Have you ever worked in a doctor's office, clinic or hospital where you might have had exposure to biohazardous materials? ☐ Yes ☐ No Have you ever performed a site assessment on any of the potential hazards listed above in Past Job History? ☐ Yes ☐ No Describe: _____ Any other hazardous exposures? ☐ Yes ☐ No If yes, describe these exposures: _____ Have you ever lived near a large industrial plant or in areas of excessive air pollution? ☐ Yes ☐ No Have you ever been in the military service? ☐ Yes ☐ No If yes, were you exposed to biological or chemical agents (either in training or in combat)? ☐ Yes ☐ No Have you ever worked on a HAZMAT team? ☐ Yes ☐ No List any second jobs or side businesses you have: _____ _____ List your current and previous hobbies: _____ _____ _____	
	Yes	No																																																																														
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Silica (e.g. sandblasting)	☐	☐																																																																														
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Respirator Users Only

**The following two pages only need to be completed by those assigned to use respirators.
If uncertain about respirator use, please complete.**

Respirator Use			Heart, Lungs and Other Body Systems (cont.)		
	Yes	No		Yes	No
1. Have you ever worn a respirator in the past?	☐	☐	6. Have you ever had surgery of the arteries, coronary bypass or angioplasty? If yes:	☐	☐
2. If no, go to Question #4. If yes, what type of respirator did you wear:			☐ Within the past year		
☐ Disposable particulate filter mask (non-cartridge dust mask)			☐ More than one year ago		
☐ Half face air purifying respirator			7. Have you ever had or currently have any of the following pulmonary or lung problems:		
☐ Full face air purifying respirator			Asbestosis	☐	☐
☐ Powered air purifying respirator			Asthma	☐	☐
☐ Supplied air (airline) respirator			Chronic bronchitis	☐	☐
☐ Self contained breathing apparatus (SCBA)			Emphysema	☐	☐
☐ Escape only respirator			Pneumonia	☐	☐
3. If you've ever used a respirator, have you ever had any of the following problems:			Tuberculosis	☐	☐
Eye irritation	☐	☐	Silicosis	☐	☐
Skin allergies or rashes	☐	☐	Lung cancer	☐	☐
Anxiety	☐	☐	Broken ribs	☐	☐
General weakness or fatigue	☐	☐	Pneumothorax (collapsed lung)	☐	☐
Any other problem or difficulty that interfered with your use of a respirator	☐	☐	Any chest injuries or surgeries	☐	☐
Describe: _____			8. Have you <u>ever</u> had seizures (fits)?	☐	☐
Heart, Lungs and Other Body Systems			9. Have you <u>ever</u> been told you had diabetes (sugar disease)?	☐	☐
	Yes	No	10. Have you <u>ever</u> had allergic reactions that interfere with your breathing?	☐	☐
4. Have you ever had an abnormal EKG (Electrocardiogram)	☐	☐	11. Have you <u>ever</u> experienced claustrophobia (fear of closed-in spaces)?	☐	☐
Describe: _____			12. Have you <u>ever</u> had trouble smelling odors?	☐	☐
5. Have you ever had or currently have any of the following cardiovascular or heart problems:			13. Have you <u>ever</u> had or currently have any of the following pulmonary, cardiovascular, lung or heart symptoms?		
Heart attack	☐	☐	Shortness of breath	☐	☐
Stroke	☐	☐	Shortness of breath when walking on level ground or walking up a slight hill or incline	☐	☐
Angina (chest pain)	☐	☐	Shortness of breath when walking with other people at an ordinary pace on level ground	☐	☐
Heart failure	☐	☐	Have to stop for breath when walking at your own pace on level ground	☐	☐
High blood pressure	☐	☐	Shortness of breath when washing or dressing yourself	☐	☐
Heart arrhythmia	☐	☐	Shortness of breath that interferes with your job	☐	☐
Swelling in your legs or feet (not caused by standing or walking)	☐	☐			
Any other heart problem that you have been told about	☐	☐			

Heart, Lungs and Other Body Systems (cont.)

	Yes	No
14. Do you <u>currently</u> take medication for any of the following problems:		
Breathing	☐	☐
Heart trouble	☐	☐
Blood pressure	☐	☐
Seizures (fits)	☐	☐
15. Have you had or currently have any of the following symptoms of lung illness:		
Coughing that produces phlegm (thick sputum)	☐	☐
Coughing that occurs when you are lying down	☐	☐
Coughing up blood in the last month	☐	☐
Wheezing	☐	☐
Wheezing that interferes with your job	☐	☐
Chest pain when you breath deeply	☐	☐
Coughing that wakes you early in the morning	☐	☐
Any other symptoms that you think may be related to lung problems	☐	☐
16. Have you ever had any of the following cardiovascular or heart symptoms:		
Frequent pain or tightness in your chest	☐	☐
Pain or tightness in your chest during physical activity	☐	☐
Pain or tightness in your chest that interferes with your job	☐	☐
In the past two years, have you noticed your heart skipping or missing a beat?	☐	☐
Heartburn or indigestion that is not related to eating	☐	☐
Any other symptoms that you think might be related to heart or circulation problems	☐	☐

Full Face or SCBA Respirator User Only

Answer the following questions if you have been selected to use either a full-face piece respirator or Self-Contained Breathing Apparatus [SCBA].

	Yes	No
17. Have you ever lost vision in either eye (temporarily or permanently)?	☐	☐
18. Do you currently have any of the following vision problems?		
Wear contact lenses	☐	☐
Wear glasses	☐	☐
Color blind	☐	☐
Any other eye or vision problem	☐	☐

Full Face or SCBA Respirator User Only (cont.)

	Yes	No
19. Have you ever had an injury to your ears, including a broken eardrum?	☐	☐
20. Do you currently have any of the following hearing problems:		
Difficulty hearing	☐	☐
Wearing a hearing aid	☐	☐
Any other hearing or ear problem	☐	☐
Describe fully: _____		
21. Have you ever had a back injury?	☐	☐
22. Do you currently have any of the following muscle or skeletal problems:		
Weakness in any of your arms, hands, legs or feet	☐	☐
Back pain	☐	☐
Difficulty moving your arms and legs	☐	☐
Pain or stiffness when you lean forward or backward at the waist	☐	☐
Difficulty moving your head up and down	☐	☐
Difficulty moving your head side to side	☐	☐
Difficulty bending at your knees	☐	☐
Difficulty squatting to the ground	☐	☐
Difficulty climbing a flight of stairs or a ladder while carrying more than 25 lbs.	☐	☐
Any other muscle or skeletal problems that might interfere with using a respirator?	☐	☐
Describe fully: _____		

**Continue to Next Section on
Following Page ►**

X.**For Yearly/Exit Examinations Only**

- 1a. Approximately how many days of hazardous fieldwork have you performed since your last exam? _____
- 1b. Approximately how many days in Level C (using an air-purifying respirator)? _____
- 1c. Approximately how many days in Level B (self-contained breathing apparatus or air line)? _____
2. Approximately how many different hazardous material sites have you worked on since your last examination? _____
3. What were the chemical or other hazards of concern to which you had or currently have significant potential exposure since your last examination? List chemicals of concern in table below.

Chemicals of Concern	Approximate # of Days	Exposure Frequency			Exposure Duration		
		Daily	Weekly	Monthly	<1 Hr.	1-8 Hr.	> 8 Hrs.

4. Since your last exam, have you had difficulty doing your job, because of:
- a. Sensitivity to chemicals, dust, sunlight, etc.? ☐ Yes ☐ No ☐ Don't Know
- b. Inability to perform certain motions? ☐ Yes ☐ No ☐ Don't Know
- c. Inability to assume certain positions? ☐ Yes ☐ No ☐ Don't Know
- d. Heat stress? ☐ Yes ☐ No ☐ Don't Know
- e. Other medical reasons? ☐ Yes ☐ No ☐ Don't Know
5. Have you experienced any health symptoms that may be related to exposures to hazardous materials since your last examination? If so, please describe: _____
-
6. Since your last examination, have you had any type of illness that resulted in more than 3 consecutive days lost time from work? ☐ Yes ☐ No
- Describe: _____
7. Do you feel that you have and/or had exposure to ticks? ☐ Yes ☐ No When: _____
- How would you quantify the exposure: ☐ Very significant ☐ Significant ☐ Insignificant ☐ None ☐ Unknown
8. Have you ever had any symptoms or signs (e.g. rash) which you attribute to tick bites? ☐ Yes ☐ No
- If yes, please describe: _____
- 9a. How would you rate the effectiveness of the health and safety procedures used for work? (Check only one.)
- ☐ Poor ☐ Fair ☐ Good ☐ Excellent
- 9b. Comments: _____
10. Have you ever had an illness, condition or symptom which:
- Occurred only during work? ☐ Yes ☐ No
- Occurred only after work, in evening? ☐ Yes ☐ No
- Occurred when you begin work after a weekend or holiday? ☐ Yes ☐ No
- Disappeared during vacations or weekends? ☐ Yes ☐ No
11. Have you ever developed an illness or symptoms that you think were related to work? ☐ Yes ☐ No
12. Have you ever worked with a substance that made your nose, chest or sinuses congested? ☐ Yes ☐ No
13. Have you ever worked with substances that irritated your skin or caused a rash? ☐ Yes ☐ No

STOP! Physicians Complete the Remaining Sections.

Physical Examination and Supporting Studies

(Please initial on Authorization Form when completed.)

Height

_____ Inches

Weight

_____ lbs.

Temperature

_____ °

Blood Pressure

_____ / _____

Pulse (Resting)

_____ / min.

For DOT only: Pulse immediately after 2 min. exercise: _____

Vision

Visual acuity: If applicant wears glasses, test and record both with and without glasses.

Near

Left

Right

Both

Corrected

20/____

20/____

20/____

Uncorrected

20/____

20/____

20/____

Color Vision

Normal

☐

Abnormal

☐

Can recognize red & green ☐

Far

Left

Right

Both

Corrected

20/____

20/____

20/____

Uncorrected

20/____

20/____

20/____

Peripheral Vision

Normal

☐

Abnormal

☐

Urinalysis

Specified Gravity: _____

Albumin: _____

Female LMP: _____

Sugar: _____

Blood: _____

Audiogram (If marked yes on Exam Checklist.)

500

1000

2000

3000

4000

6000

8000

Right:

Left:

(Note: Testing documentation must be forwarded to WorkCare.)

Spirometry (If marked yes on Exam Checklist.)

FVC _____ Observed Vol.

FEV₁ _____ Observed Vol.

$\frac{FEV_1}{FVC}$ _____ %

FVC _____ Predicted % _____

FEV₁ _____ Predicted % _____

(Note: Testing documentation must be forwarded to WorkCare.)

EKG (If marked yes on Exam Checklist.)

☐ Normal

☐ Abnormal

(Note: All EKG strips must be forwarded to WorkCare.)

Chest X-Ray (If marked yes on Exam Checklist.)

☐ Normal

☐ Abnormal

Comments: _____

Specimen Collection Per Exam Checklist

All laboratory specimens must be shipped by the day of the exam! If this is a Friday exam, mark air bill for Saturday delivery. Exam data should be included for shipment in the box with the laboratory specimens.

Medical Examination

Checklist	Normal	Abnormal	Detailed Description of Abnormal Findings
Hands / Skin			
Hair	☐	☐	
Skin Color / Texture	☐	☐	
Nails	☐	☐	
Head / Eyes / Nose / Throat / Mouth			
Configuration	☐	☐	
Lids / Conj / Sclera	☐	☐	
Pupils / Fundi / EOM	☐	☐	
Nasal Septum / Mucosa	☐	☐	
Teeth / Gums / Tongue / Palate	☐	☐	
Nervous System			
Central	☐	☐	
Motor	☐	☐	
Sensory	☐	☐	
Cerebellar	☐	☐	
Reflexes	☐	☐	
Neck / Nodes			
Bruit	☐	☐	
ROM	☐	☐	
Muscle Strength	☐	☐	
Thyroid	☐	☐	
Cervical Nodes	☐	☐	
Inguinal / Axillary Nodes	☐	☐	
Chest / Lungs			
Shapes / Symmetry	☐	☐	
Diaphragmatic Excursion	☐	☐	
Percussion	☐	☐	
Auscultation	☐	☐	
Cardiovascular			
Carotids	☐	☐	
Neck Veins / Pulses	☐	☐	
Heart Sounds (Murmurs)	☐	☐	
Heart Size	☐	☐	
Gastro / Intestinal			
Liver	☐	☐	
Spleen	☐	☐	
Masses	☐	☐	
Tenderness	☐	☐	
Scars	☐	☐	
Hernia	☐	☐	
Musculoskeletal / Extremities			
Spinal Alignment	☐	☐	
Extremities	☐	☐	
(Edema, Varicosities)	☐	☐	
Joints	☐	☐	
ROM	☐	☐	
Comments:			
Examining Physician (Print):	Physician Signature:		Date:

Summary of Findings and Comments Relevant to Abnormal Conditions

Signature of Licensed Examining Physician: _____

Printed Name: _____ Phone: () _____

Summary of Findings and Comments Relevant to Abnormal Conditions

1. The results of the required testing should be recorded on page 11.
2. Please be sure to note EKG and chest x-ray readings on **Normal** or **Abnormal** on page 11, if required for this exam.
3. Please review any **Yes** answers **ONLY** for questions on pages 4, 5, 7, 8 and 9 of this booklet. You are not required to review the other history questions.
4. Your physical examination findings should be recorded on page 12 and 13.
5. The booklet and any specimens must be shipped to our laboratory **THE DAY OF THE EXAM.**

**Please answer all the questions in this booklet.
If you have any questions, please call 1-800-455-6155.**



	Health, Safety and Environment	Attachment 024-2 NA
	MEDICAL SURVEILLANCE EVALUATION	Issue Date: February 2001 Revision 9: March 2012

This information will be used to determine routine medical screening exams for employees who work outside of an office setting. In addition, site-specific health and safety plans may specify project-related medical surveillance for regulated substances.

Please answer each entry:

Date:	_____
Name:	_____
Phone #:	_____
Employee #:	_____
Job Title:	_____
Location:	_____
Business:	_____
Region/Business Unit:	_____
Supervisor:	_____
HSE Representative:	_____

Choose One:

- ☐ New employee
 ☐ Current employee with job change
☐ Transfer from _____ OFFICE

The following questions assess federally mandated medical screenings and surveillance requirements:

Respirator	☐ Yes ☐ No	Does your job require you to wear a respirator or to be certified for respirator use? If yes, how many days per year? ☐ 1–29 ☐ 30+
Hearing	☐ Yes ☐ No	Does your job require you to wear hearing protection because you: a) Work in an environment where noise levels equal or exceed an 8-hour time-weighted average of 85 decibels? b) Perform construction activities or construction management around heavy equipment on a construction project more than 50 percent of the time?
Asbestos	☐ Yes ☐ No	Do you perform intrusive work with asbestos (i.e., sampling, demolition, etc.)?

	Health, Safety and Environment	Attachment 024-2 NA
	MEDICAL SURVEILLANCE EVALUATION	Issue Date: February 2001 Revision 9: March 2012

Lead	☐ Yes ☐ No	Are you currently performing construction work where you may be exposed to airborne lead concentration at or above the OSHA action level or are you currently in a job that requires you to be in a medical surveillance program for lead (i.e., removal of lead-based paint or other demolition activities)?
Radiation	☐ Yes ☐ No	Are you classified as a radiation worker?
DOT Driver	☐ Yes ☐ No	Do you drive a truck with a gross vehicle weight rating of 10,000 pounds or more during company trips?
Diving	☐ Yes ☐ No	Do you perform diving activities?
Biohazard	☐ Yes ☐ No	Does your job require work with bloodborne pathogens?
Remediation	☐ Yes ☐ No	Do you perform remediation construction activities, field construction sampling, or supervision activities at hazardous waste remediation sites or hazardous waste treatment, storage, or disposal (TSD) facilities that could expose you to hazardous substances above permissible exposure levels (i.e., work in exclusion zones)? If yes, how many days per year? ☐ 1–29 ☐ 30+
Field and Lab	☐ Yes ☐ No	Answer Yes if you do ANY of the following: a) Work at HAZWOPER sites 1 to 29 days per year b) Perform waste disposal activities c) Perform non-HAZWOPER environmental sampling d) Work in a chemistry laboratory 30 or more days per year e) Work on a pilot plant project 30 or more days per year f) Conduct bench-scale operations 30 or more days per year
Other	☐ Yes ☐ No	Site- or project-specific biological monitoring or toxicological screening as specified by the project-specific health and safety plan.

Distribution:

- ☐ Supervisor
☐ HSE Representative

 Employee Signature

 Date

 Supervisor Signature

 Date



Health, Safety and Environment

Attachment 024-3 NA

MEDICAL SCREENING and SURVEILLANCE EXAM PROTOCOL

Issue Date: February 2001
Revision 9: March 2012

PROTOCOL	HAZWOPER (Baseline or Preassignment Baseline)	HAZWOPER (Annual or Biennial)	HAZWOPER (Exit)	DIVING (Baseline and Biennial)	DOT Driver Certification (Baseline and Biennial)	ASBESTOS (Baseline, Annual, and Exit)	SILICA (Baseline and Biennial)	RESPIRATOR (Baseline and Biennial)
Medical History & Respiratory Questionnaire	X	X	X	X	X	X	X	X
Medical Exam	X	X	X	X	X	X	X	If indicated by questionnaire
Physical Exam (height, weight, pulse, oral temperature, blood pressure)	X	X	X	X	X	X	X	
Vision	X	X	X	X	X	X	X	
Urinalysis	X	X	X	X	X		X	
Audiogram (hearing test)	X	X	X	X	X	If indicated by project noise levels	X	
Spirometry (pulmonary function test)	X	X	X	X		X	X	Every 2 years
Electrocardiogram (EKG)								
< Age 40				Every 2 years				
Age < or = 50	X	Every 4 years		X			Every 4 years	
Age 50+	X	Every 2 years		X			Every 2 years	
Chest x-ray (one view)								
Age < or = 50	X	Every 4 years	If symptomatic or due on periodic	X		Baseline and every 5 years per 1910.1001	Baseline and Annual if 20+ years of silica	
Age 50+	X	Every 2 years	If symptomatic or due on periodic	X		Baseline and every 2-5 years per 1910.1001	exposure or Biennial if <20 years silica exposure	
B-reader						X	X	
Complete Blood Count with White Cell Differential	X	X	X	X			X	
Blood Chemistry Panel	X	X	X	X			X	
Other				Sickle Cell (Baseline) Treadmill Stress Test (Baseline & Biennial after age 40)		OSHA Asbestos Questionnaire (Initial/Periodic)	OSHA Silica Questionnaire (Initial/ Periodic) TB Skin Test (MSHA regulated sites)	

Note: Additional entry, periodic, and exit biological monitoring or toxicological screening may be indicated in the project-specific health and safety plan. Examples include blood lead/ZPP, serum/RBC cholinesterase, urine heavy metals (arsenic, cadmium, mercury, chromium, or beryllium), urine radiation (thorium, uranium), biological vaccinations (hepatitis A/B, tetanus), blood benzene, blood beryllium LPT, etc. Substance abuse testing is not included in the medical screening and surveillance program. Please consult the business-specific substance abuse testing program for more information.



Health, Safety and Environment

Attachment 024-3 NA

MEDICAL SCREENING and SURVEILLANCE EXAM PROTOCOL

Issue Date: February 2001
Revision 9: March 2012

PROTOCOL	Hearing Conservation (Annual)	Cadmium (Annual/Exit)	Hexavalent Chromium (Annual/Exit)	Engine Run (Biennial)	Fuel Cell (Annual)	Ground Physical (Every 5 years)	Flight Deck Critical/Non- Critical (Annual)	Flight Deck Critical (Annual)
Medical History & Respiratory Questionnaire		X	X	X	X	X	X	X
Medical Exam		X	X	X	X	X	X	X
Physical Exam (height, weight, pulse, oral temperature, blood pressure)		X	X	X	X	X	X	X
Vision				X	X		X (near/far/depth)	X (Near/far/col or/depth)
Urinalysis		X		x	X			
Audiogram (hearing test)	X			X	X		X	
Spirometry (pulmonary function test)		X	X		X			
Electrocardiogram (EKG)								
< Age 40								
Age < or = 50				X				Age >40
Age 50+				X				
Chest x-ray (one view)								
Age < or = 50				X				
Age 50+				X				
B-reader								
Complete Blood Count with White Cell Differential					X			
Blood Chemistry Panel		X			X			Lipid panel if age >40
Other	Hearing Conservation Questionnaire	Cadmium Panel	Urine Chromium					Ordinance Questionnaire, Drug Screen Tonometry after 40 years of age and if indicated by exam, MD to sign Ordinance card



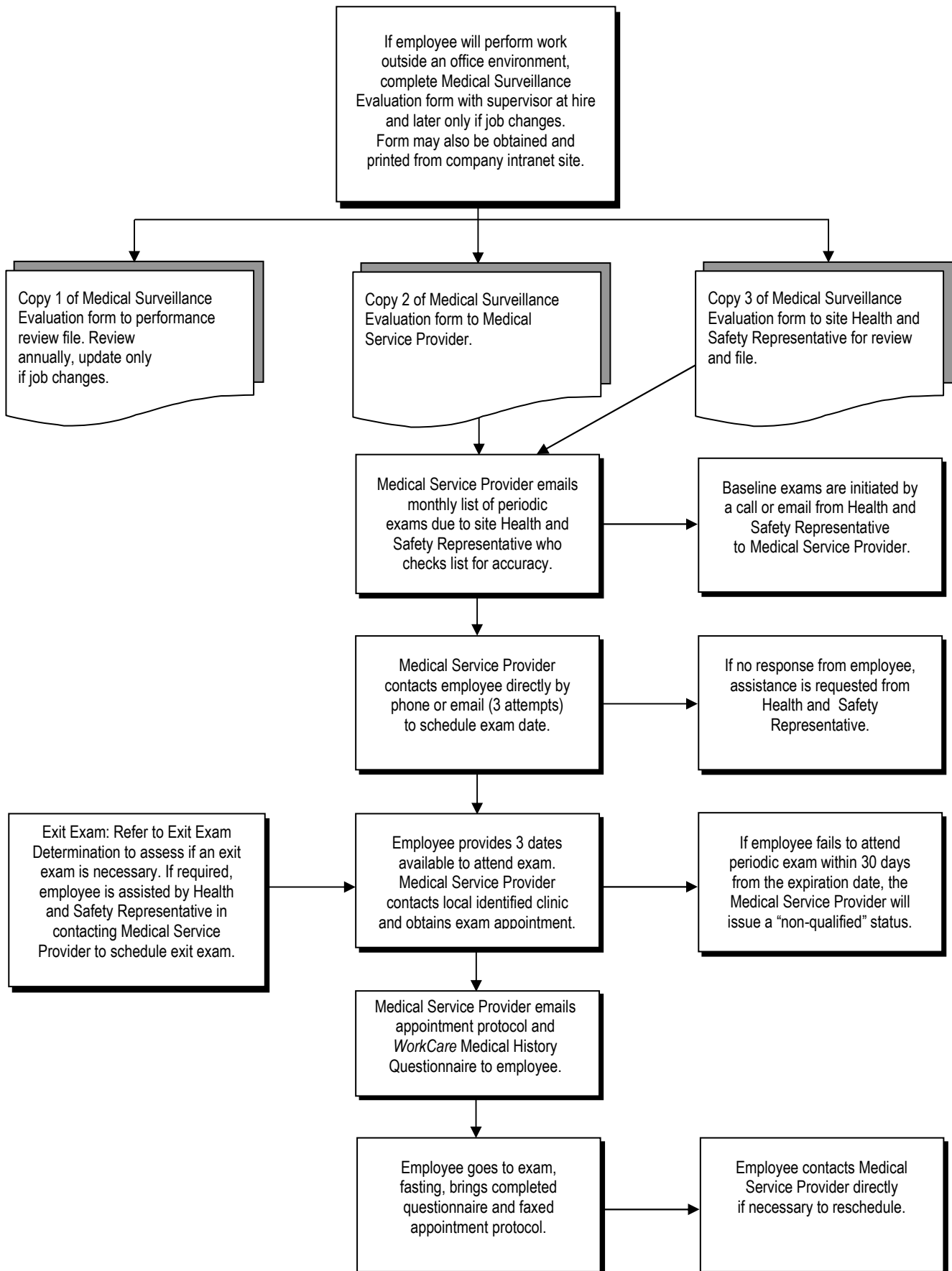
Health, Safety and Environment

Attachment 024-3 NA

MEDICAL SCREENING and SURVEILLANCE EXAM PROTOCOL

Issue Date: February 2001
Revision 9: March 2012

PROTOCOL	CRANE OPERATOR (Annual)	AIR TRAFFIC CONTROLLER (Annual)	CDF ORDINANCE Physicals (Annual)	NAVAL ORDINANCE Physicals (biennial)	LASER EYE EXAM	FORKLIFT Physicals (every 3 years)
Medical History & Respiratory Questionnaire	X	X	X	X		X
Medical Exam	X	X	X	X		X
Physical Exam (height, weight, pulse, oral temperature, blood pressure)	X	X	X	X		X
Vision	X (near/far/color/ depth)	X	x	X		X (visual acuity, color, depth, perception and peripheral fields)
Urinalysis	X					X
Audiogram (hearing test)	X	X	X			X
Spirometry (pulmonary function test)			X			X
Electrocardiogram (EKG)						
< Age 40		Baseline only	X			X
Age < or = 50			X	>40		X
Age 50+			X			X
Chest x-ray (one view)						
Age < or = 50		Baseline only	Baseline/exit			
Age 50+			X			
B-reader						
Complete Blood Count with White Cell Differential			X			
Blood Chemistry Panel			X	Lipid panel if age >40		X
Other	Hearing Conservation Questionnaire	Waist circumference Fasting blood sugar, drug screen	Ordinance PPE eval (work in heat), pupil size and reactivity	Ordinance Questionnaire, Drug Screen Tonometry after 40 years of age and if indicated by exam, MD to sign Ordinance card	Retinal Mapping	



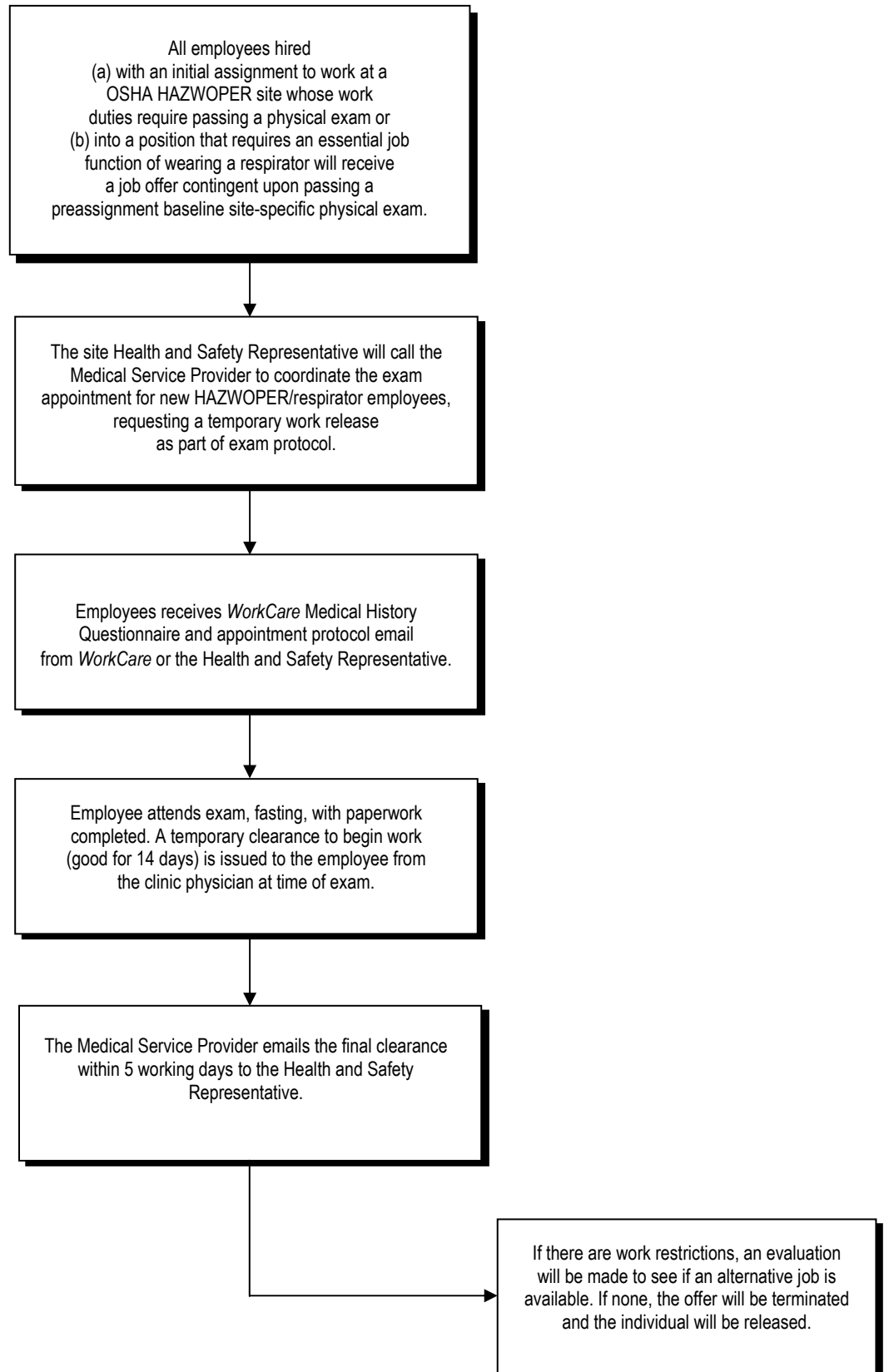


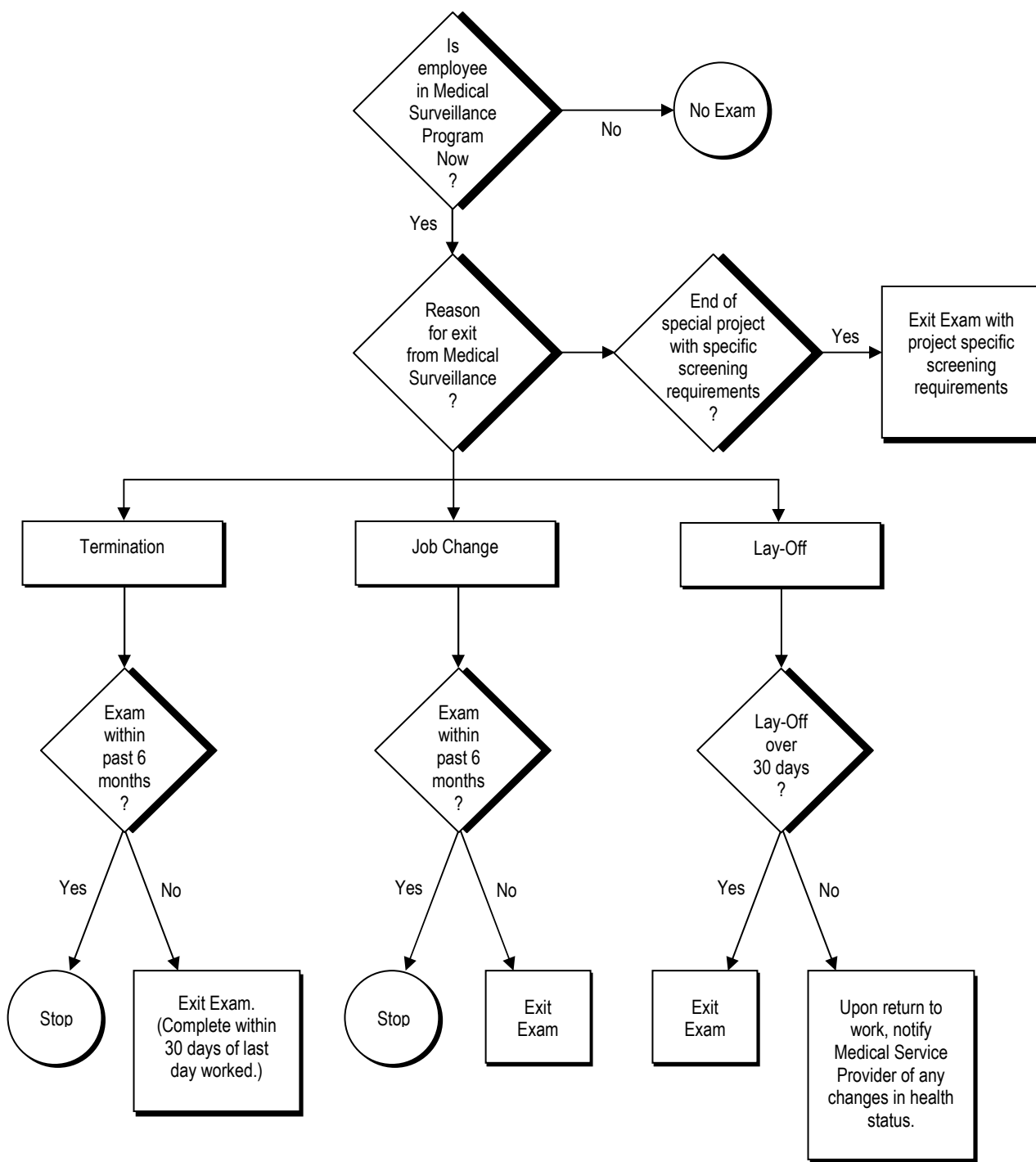
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**HAZWOPER AND RESPIRATOR
PRE-ASSIGNMENT BASELINE
EXAM PROTOCOL**

Attachment 024-5 NA

Issue Date: February 2001
Revision 9: March 2012





Note: Exit exams from Medical Service Provider or previous employer may be used for review as a URS Corporation baseline exam if completed within the past 3 months. A *WorkCare* Medical History Questionnaire is completed by the employee and submitted with a copy of the previous exam for physician review and approval.

	Health, Safety and Environment WAIVER OF EXIT MEDICAL SURVEILLANCE EXAM	Attachment 024-7 NA Issue Date: February 2001 Revision 9: March 2012

I have been a participant in URS' Medical Screening and Surveillance Program, which entitles me to an exit medical surveillance exam upon reassignment to a position that does not require medical clearance or termination of my employment. I understand that URS encourages employees to schedule and complete an exit medical exam; however, I voluntarily relinquish the opportunity to have an exit medical exam.

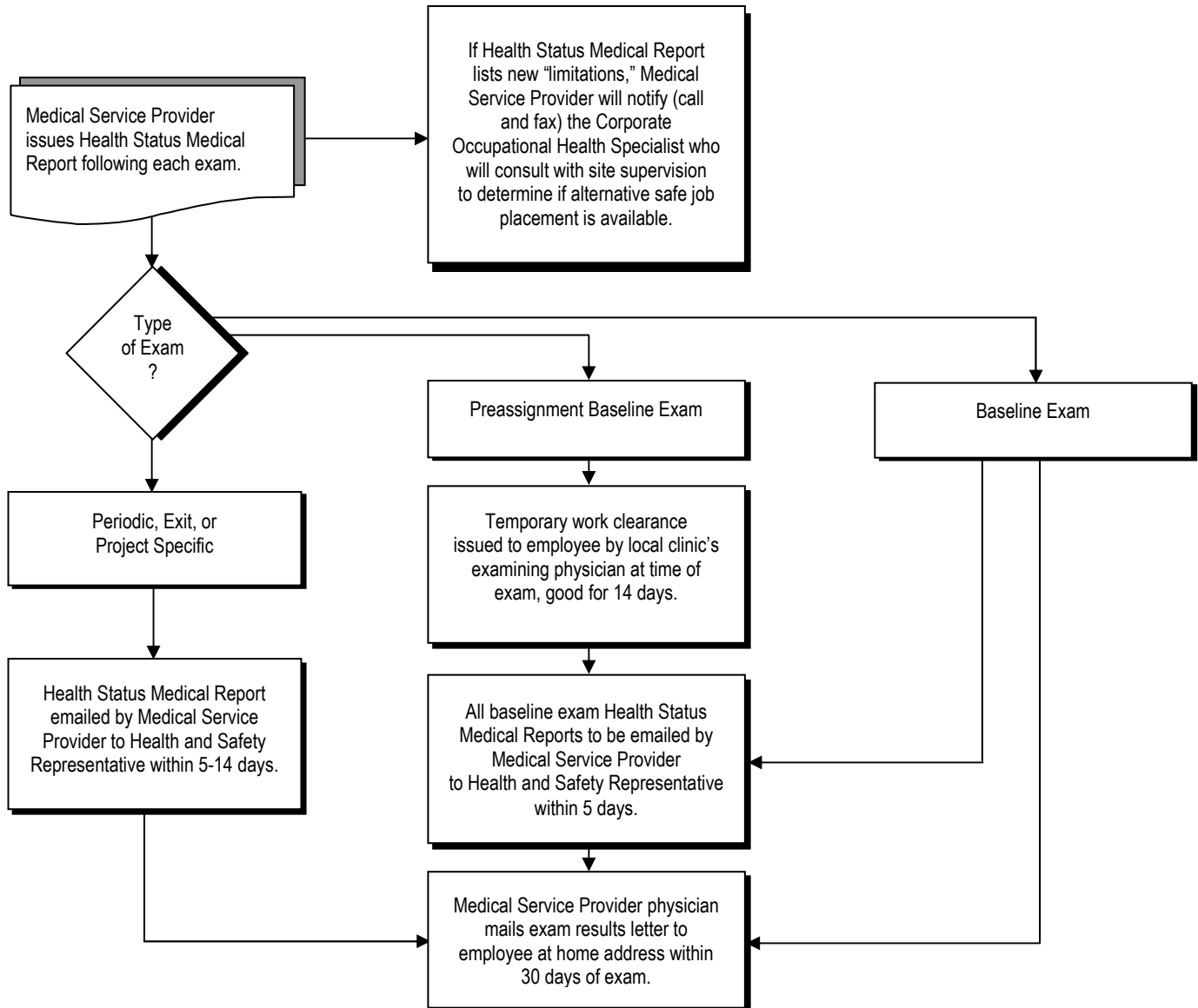
Name

Employee Number

Date

Employee Signature

Medical Surveillance Exam Clearances



URS SAFETY MANAGEMENT STANDARD

Noise and Hearing Conservation

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies where personnel may encounter noise exposures that may exceed 85 decibels, measured using an A-weighted scale (dBA), as an 8-hour time-weighted average (TWA).

2. Purpose and Scope

The purpose of this procedure is to protect employees from hazardous noise exposures and to prevent hearing loss.

3. Implementation

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

4. Requirements

A. General

1. The use of hearing protectors is required in any location where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. Whenever information indicates that any employee's exposure may equal or exceed an 8-hour TWA of 85 dBA, the project manager or location manager will be responsible for enforcing the proper use of hearing protectors.
2. Implement a hearing conservation program in accordance with 29 Code of Federal Regulations (CFR) 1910.95(c) when applicable. Work not applicable to 29 CFR 1910.95(c) will assess hazards of noise exposure on a task basis, and implement engineering or administrative controls to reduce employee noise exposure.
3. Hearing protectors will be used in the event that administrative or engineering controls are either not effective or not feasible, and the following criteria will be applicable to selection of hearing protection devices.
 - a. Require that at least two types of hearing protectors are available to employees free of charge, and that the type of hearing protector is suitable to the task.

URS SAFETY MANAGEMENT STANDARD

Noise and Hearing Conservation

- b. Require that hearing protectors are used in accordance with manufacturer's specifications to effectively protect hearing.
- c. Evaluate the effectiveness of the hearing protectors chosen. The manufacturer's assigned noise reduction rating (NRR) for hearing protection devices can seldom be achieved in workplace conditions; therefore this rating must be attenuated for real world conditions and use. To do so, subtract 7 from the NRR of the protector provided by the manufacturer. Divide this result by 2, and then subtract the remained from the observed "A" scale sound level measurement collected in the employee's work area (see Section 4.B). If this number is below 85, the hearing protectors are adequate for use in the work area.

B. Noise Surveys

1. Noise surveys must be conducted in a manner that reasonably reflects the exposure of the affected employees. Surveys must be conducted under the supervision of a URS Health, Safety, and Environment (HSE) Representative.
2. Sound-level meters and audio dosimeters used to determine employee exposure to noise sources must be Type II (accurate to within +/- 2 dBA), operated in "slow" response, on the "A" scale, and be calibrated to factory guidelines (including periodic factory recalibration).
3. Attachment 026-1NA (Sound Level Survey) and Attachment 026-2NA (Noise Dosimetry Field Sheet) may be used to record noise surveys.

C. Noise Controls

Eliminate noise sources to the extent possible. Examples of controls that must be considered include:

1. Adding or replacing mufflers on motorized equipment.
2. Adding mufflers to air exhausts on pneumatic equipment.
3. Following equipment maintenance procedures to lubricate dry bearings and replace worn or broken components.
4. Isolating loud equipment with barriers.
5. Replacing loud equipment with newer and quieter models.

URS SAFETY MANAGEMENT STANDARD

Noise and Hearing Conservation

6. Using caution signs and Hearing Protection Required signs to designate noisy work areas.
7. Installing HPD-dispensing devices at the entrance to noisy work areas.

D. Audiometric Exams

1. Tests

- a. Details on the medical surveillance program (including audiometric testing) are included in SMS 024 – Medical Screening and Surveillance.
- b. Audiometric tests will be performed by a person meeting the requirements described in 29 CFR 1910.95(g)(3). Within 6 months of an employee's first exposure at or above the action level, a valid baseline audiogram will be established, against which subsequent audiograms can be compared. Testing to establish a baseline audiogram will be preceded by 14 hours without exposure to noise. Hearing protectors may be used as a substitute for the requirement that a baseline audiogram will be preceded by 14 hours without exposure to workplace noise. The medical surveillance provider will notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination. For multi-year projects, an annual audiogram will be obtained for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.
- c. Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid, and if there is a standard threshold shift (STS). A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 hertz (Hz) in either ear. If the annual audiogram shows that an employee has suffered an STS, the employer will obtain a retest within 30 days, and consider the results in assessing an STS as the annual audiogram. The audiologist, otolaryngologist, or physician will review problem audiograms, and will determine whether there is a need for further evaluation. If an STS has occurred, the medical surveillance provider will notify the employee within 21 days of the determination.

URS SAFETY MANAGEMENT STANDARD

Noise and Hearing Conservation

E. Standard Threshold Shifts

If an employee's test results show a confirmed STS, their hearing protection will be evaluated and refitted, and a medical evaluation may be required.

F. Training

Verify that each employee who must work in a noisy environment is current on required Hearing Conservation Training. At a minimum, training shall be conducted before initial assignment and annually. Training must include the following topics:

1. The effects of noise on hearing.
2. The purpose of hearing protectors.
3. The advantages and disadvantages of various types of hearing protectors.
4. The attenuation of various types of hearing protection.
5. The selection, fitting, care, and use of hearing protectors.
6. The purpose of audiometric testing.
7. An explanation of the audiometric testing procedure.

5. Documentation Summary

The following documentation will be maintained:

- A. Noise surveys, when applicable.
- B. Training records.
- C. Audiometric tests (must be maintained by the Company's medical record retention vendor (e.g., WorkCare)).

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [Occupational Noise Exposure – 29 CFR 1910.95](#)

URS SAFETY MANAGEMENT STANDARD
Noise and Hearing Conservation

- B. U.S. OSHA Construction Standard – [Occupational Noise Exposure – 29 CFR 1926.52 and 1926.101](#)
- C. U.S. MSHA – Occupational Noise Exposure [30 CFR 62](#)
- D. U.S. FRA – Occupational Noise Exposure [49 CFR 227](#)
- E. [U.S. OSHA Technical Links – Noise and Hearing Conservation](#)
- F. American Industrial Hygiene Association: [Protect Yourself from Noise-Induced Hearing Loss](#)
- G. [National Hearing Conservation Association web site](#)
- H. [SMS 024](#) – Medical Screening and Surveillance
- I. [Attachment 026-1NA](#) – Sound Level Survey
- J. [Attachment 026-2NA](#) – Noise Dosimetry Field Sheet

**Health, Safety and Environment**

Attachment 026-1 NA

SOUND LEVEL SURVEYIssue Date: July 2000
Revision 7: March 2012

Location: _____ Date: _____

Conducted By: _____

Sound Level Meter: _____ Serial #: _____

Calibrator Model: _____ Serial # _____ Class: ☐ 1 ☐ 2Battery Check Completed: ☐ Date of Factory Calibration: _____

Test No.	Description Location/Equipment	Distance	dBA	Hearing Protection Required?		Comments
				Yes	No	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
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Health, Safety and Environment

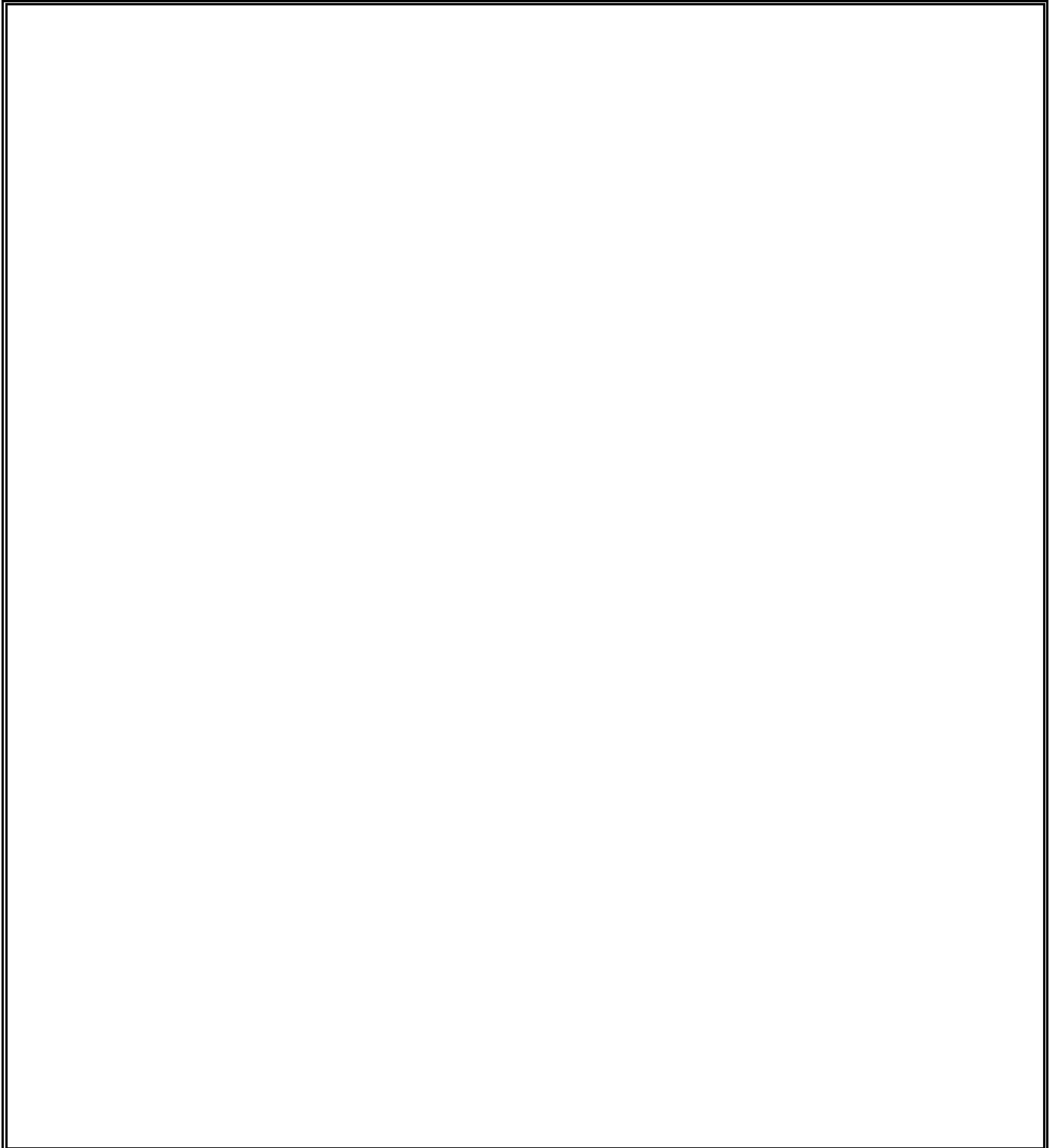
SOUND LEVEL SURVEY

Attachment 026-1 NA

Issue Date: July 2000
Revision 7: March 2012

Drawing of Equipment or Work Layout

Reference Numbers refer to the Test Numbers on Page 1



	Health, Safety and Environment	Attachment 026-2 NA
	NOISE DOSIMETRY FIELD SHEET	Issue Date: July 2000 Revision 7: March 2012

Sample Identification

Sample #: _____ Date: _____
 Employee Monitored: _____ Employee #: _____
 Job: _____ Location: _____

Dosimeter Information

Model: _____ Serial # _____
 Criterion Level (in dBA): _____ Threshold (in dBA): _____ Exchange Rate (in dBA): _____
 Calibration (in dBA): _____ Initial _____ Final _____
 Weighting: Fast ☐ Slow ☐

Calibrator Information

Model: _____ Serial #: _____ Class ☐ 1 ☐ 2
 Battery Check Completed: ☐ Date of Factory Calibration: _____

Sample Information

Time On: _____ Time Off: _____ Total Run Time (in min): _____
 Time Weighted Average (in dBA): _____ %Dose: _____ Est. %Dose: _____
 Average Sound Level (L_{avg}): _____ Peak Sound Level (L_{pk}): _____
 Maximum Sound Level (L_{max}): _____ Minimum Sound Level (L_{min}): _____

Workplace Conditions

Scheduled Hours per Shift: _____ Operations: Normal? ☐ Abnormal? ☐
 Explain: _____

Hearing Protection: Type _____ % of Time Worn _____

Work Description/Comments

Sampled By: _____

URS Safety Management Standard **Personal Protective Equipment**

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies where the use of personal protective equipment (PPE) is anticipated.

2. Purpose and Scope

The purpose of this standard is to provide information on recognizing those conditions that require PPE. PPE is designed to protect the employee from health and safety hazards that cannot be practically removed from the work environment.

3. Implementation

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

4. Requirements

- A. Perform hazard assessments for those work activities that are likely to require the use of PPE.
 - 1. Use Attachment 029-1 NA to perform the assessment.
 - 2. Reevaluate completed hazard assessments when job conditions or duties change.
- B. Eliminate the hazards identified in Attachment 029-1 NA, if possible, through engineering or administrative controls.
- C. Select PPE that will protect employees if hazards cannot be controlled or eliminated.
 - 1. See Attachment 029-1 NA for recommended PPE.
 - 2. Review Material Safety Data Sheets for chemicals used for PPE recommendations.
 - 3. If needed, consult with the applicable safety representative for assistance in selecting PPE.
- D. Provide required PPE to employees free of charge (excluding, in some instances, components of standard work attire such as steel-toed boots and prescription safety glasses), assuring proper fit and providing a choice

URS Safety Management Standard **Personal Protective Equipment**

if more than one type of PPE is available. Where applicable, the local policy (office or project) regarding reimbursement for PPE will prevail.

- E. Provide the employees with the appropriate PPE whenever a hazard is recognized and PPE is required. However, when PPE is not required and the employee elects to wear his or her own PPE, the manager directing activities must ensure that the employee is properly trained in the fitting, donning, doffing, cleaning, and maintenance of his or her employee-owned equipment.
- F. Make employees aware that they are responsible for PPE maintenance, care, and proper use. Employees must inform their supervisors when a need arises to use PPE for which the employee has not received training, or when a condition exists where adequate PPE is not available.
- G. Conduct and document employee training.
 - 1. Train all employees who are required to wear PPE.
 - 2. Require that training includes:
 - a. When PPE is to be worn.
 - b. The type of PPE necessary for the task to be completed.
 - c. How to properly don, doff, adjust, and wear PPE.
 - d. Limitations of PPE.
 - e. Proper care, maintenance, useful life and disposal of PPE.
 - 3. Conduct training before PPE is assigned.
 - 4. Provide refresher training when:
 - a. The workplace changes, rendering previous PPE and training obsolete.
 - b. New types of PPE are assigned to the worker.
 - c. The worker cannot demonstrate competency in PPE use.
 - 5. Keep written records of the employees trained and type of training provided, including the date of training.

URS Safety Management Standard **Personal Protective Equipment**

H. PPE Specific Information

1. Head Protection

- a. Use hard hats in areas where there is the possible danger of head injury from the impact of falling or flying objects, striking against objects, electrical shock and/or burns, or any combination of these hazards. Hard hats will be worn when required by site safety procedures, client/site requirements, or when posted as an entry requirement.
- b. Adjust the hard hat suspension to fit the wearer and to keep the shell a minimum of 1.25 inches (3.2 cm) above the wearer's head. Do not store materials in the suspension. Cold weather liners and perspiration control bands may be utilized within the hard hat unless specifically excluded by the manufacturer.
- c. Wear hard hats in the forward position unless written verification and instructions from the hard hat manufacturer indicate your hard hat model has been tested and found to be compliant when worn backwards.
- d. Type 1 helmets are designed to protect the employee from impact and penetration caused by objects hitting the top of the head; Type II helmets extend this protection to the sides of the head as well.
- e. Class G (General) helmets provide protection against impact, penetration, and limited electrical hazards up to 2,200 volts. Class E (Electrical) helmets meet the same criteria, but electrical protection is increased to 20,000 volts. Class C (Conductive) helmets only provide impact and penetration protection.
- f. Do not use bump caps as protection against head injury, except when the only potential hazard is striking against objects and the use has been approved a Business, Country, Group, Regional Business Unit (RBU), or Strategic Business Unit (SBU) Health, Safety and Environment Manager.
- g. Do not alter hard hats in a way that will downgrade their efficiency. Typical prohibited alterations include painting,

URS Safety Management Standard **Personal Protective Equipment**

drilling holes in shell, application of metal jewelry, etc. Replace hats with these alterations or with excessive scratches.

- h. Wear integral chinstraps when working in high-wind conditions or near helicopters.
- i. Inspect hard hats before use and remove from service if any of the following are observed: cracking, tearing, fraying, chalking, and flaking.
- j. Remove hard hats and their components from service and replace as recommended by the manufacturer. Hard hats must be replaced after no more than 5 years.

2. Hearing Protection

- a. Provide hearing protection in any location where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. Each task in the work area will be evaluated for potential worker noise exposure as required.
- b. Review SMS 026 – Noise and Hearing Conservation – for additional information.

3. Eye and Face Protection

- a. Use eye and/or face protection when machines or operations create the risk of eye and/or face injuries due to physical, chemical, and/or radiation sources. Safety glasses will be worn when required by site safety procedures, client/site requirements, or when posted as an entry requirement.
- b. Provide safety glasses that can be worn over corrective spectacles for employees whose vision requires the use of corrective lenses. Employees will consult with the applicable safety representative or project managers for policies on reimbursement for prescription safety glasses.
- c. Do not use of sunglasses in place of required safety glasses. Heavily tinted safety glasses will only be used in outdoor areas with suitable lighting. Colored or lightly tinted or gradient lenses may be used indoors as appropriate to the work conditions.

URS Safety Management Standard **Personal Protective Equipment**

- d. Tasks involving potential projectiles (e.g., chipping, grinding and cutting) will require face shields over safety goggles. Tasks requiring power washing or handling corrosive chemicals will require a face shield over safety goggles. For welding tasks, refer to Supplemental Information B for lens selection criteria.
- e. Consult Supplemental Information A for additional information on types of eye and face protection and their various uses.

4. Hand Protection

- a. Wear gloves when the hands are exposed to hazards such as, but not limited to, chemical absorption, cuts or lacerations, abrasions, punctures, chemical burns, thermal burns, vibration, or temperature extremes.
- b. Gloves must always be provided to workers for tasks with potential hand hazards.
- c. Identify hand hazards during job or task hazard analysis. A supply of appropriate gloves in various sizes must be provided to workers assigned to work on that task.
- d. Inspect chemical gloves for degradation or tears prior to use. Do not remove chemical gloves from the work area if it is visibly contaminated. Chemical gloves may be decontaminated or disposed of according to specified procedures. In some cases, inner disposable chemical gloves (e.g., nitrile) will be required for protection of hands during removal of contaminated gloves.
- e. Select chemical-resistant gloves using manufacturer's hazard-based selection programs or other published guides that identify compatibility of glove material with chemical hazards. Selection must also consider physical requirements of the task with regard to puncture resistance and need for flexibility and dexterity in performing the task.
- f. Review SMS 064 – Hand Safety – for additional information.

URS Safety Management Standard **Personal Protective Equipment**

5. Foot Protection

- a. Wear appropriate specialized protective footwear in the following environments:
 - i. Using harmful corrosive substances or processes.
 - ii. Having a high probability of puncture or crushing injuries.
 - iii. Performing regular assembly or disassembly of heavy system components.
 - iv. Working in wet conditions.
 - v. Working in extreme cold.
 - vi. Working around exposed electrical wires or connections.
 - vii. When using hand-operated compactors, snow blowers, pressure washers, or steam cleaners.
 - viii. Other activities or areas as designated by supervisors or safety personnel.
- b. Employees assigned to field projects who are not required to wear specified protective footwear (e.g., steel-toed boots, metatarsal protection, rubber boots, insulated boots, etc.) will wear substantial leather, high-sided work boots. Shoes (leather, canvas, tennis, deck, or other types of material), sandals, high-heeled shoes, etc., are not allowed on field project sites.

I. Maintain Protective Equipment

- 1. Check PPE for damage, cracks, and wear prior to each use. Replace or repair equipment not found in good condition.
- 2. Decontaminate non-disposable PPE with appropriate cleaner, as necessary, to prevent degradation of the equipment. Staff will remove any non-impermeable PPE/clothing that becomes contaminated with hazardous substances. These instructions are reiterated in the emergency decontamination procedures in the Health and Safety Plans.

URS Safety Management Standard **Personal Protective Equipment**

- J. Periodically inspect worksites where employees are using PPE using Attachment 029-2 NA. Regularity of inspections should be determined by the project manager and/or site safety representative.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Completed Hazard Assessment Certification Forms (Attachment 029-1 NA).
- B. Completed Personal Protective Equipment Inspection Sheet (Attachment 029-2 NA).
- C. Documentation of employee training.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standards – [Personal Protective Equipment – 29 Code of Federal Regulations \(CFR\)1910, Subpart I](#)
- B. U.S. OSHA Construction Standard - [Personal Protective Equipment – 29 CFR 1926 Subpart E](#)
- C. [U.S. OSHA Technical Links – Personal Protective Equipment](#)
- D. American National Standards Institute – [ANSI Z89.1-2003](#), Protective Headwear
- E. American National Standards Institute – ANSI Z87.1-2003 – Eye and Face Protection
- F. American National Standards Institute /International Safety Equipment Association, ANSI/ISEA 107 - 2004 – Standard for High-Visibility Safety Apparel
- G. American National Standards Institute – ANSI Z41-1991, Protective Footwear Requirements, American Society for Testing and Materials, ASTM F-2414-2005, Standard Test Methods for Foot Protection, ASTM F-2413-2005, Standard Specification for Performance Requirements for Protective Footwear

URS Safety Management Standard
Personal Protective Equipment

- H. American National Standards Institute/International Safety Equipment Association (ANSI/ISEA) – 105-2011 – American National Standard for Hand Protection Selection Criteria"
- I. *Quick Selection Guide to Chemical Protective Clothing*, K Forsberg and S.Z. Mansdorf, Wiley Interscience, 2002
- J. Best Manufacturing Co. <http://www.bestglove.com/>. Information on chemical resistant gloves.
- K. [SMS 040](#) – Fall Protection
- L. [SMS 026](#) – Noise and Hearing Conservation
- M. [SMS 064](#) – Hand Safety
- N. [Attachment 029-1 NA](#) – Hazard Assessment Form
- O. [Attachment 029-2 NA](#) – Personal Protective Equipment Inspection Form

7. Supplemental Information

- A. [Welding Lens Selector](#)
- B. [Traffic Control Class Guidelines and Scenarios](#)



Health, Safety and Environment
**HAZARD ASSESSMENT
CERTIFICATION FORM**

Attachment 029-1 NA

Issue Date: July 2000
Revision 9: March 2012

Location: _____ Job No.: _____

Date: _____ Assessment conducted by: _____

Specific tasks performed at this location: _____

If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.

Overhead Hazards

1. Suspended/elevated loads, beams, or objects that could fall or strike head	☐ Yes ☐ No	Hard hat, ANSI Z89, Class G, E or C
2. Flying objects that could strike head	☐ Yes ☐ No	Hard hat, ANSI Z89, Class G, E or C
3. Energized wires or equipment that could strike head	☐ Yes ☐ No	Hard hat, ANZI Z89, Class G or E (dependent on potential voltage)
4. Sharp objects or corners at head level	☐ Yes ☐ No	Hard hat, ANSI Z89, Class G, E or C

Eye Hazards

5. Chemical splashes or irritating mists	☐ Yes ☐ No	See Supplemental Information A for additional information
6. Excessive dust	☐ Yes ☐ No	Safety glasses or goggles
7. Smoke and/or fumes	☐ Yes ☐ No	Safety goggles
8. Welding operations	☐ Yes ☐ No	Welding goggles; See Supplemental Information A and B for additional information
9. Lasers/optical radiation	☐ Yes ☐ No	Have URS HSE Representative assist you in proper selection
10. Projectiles	☐ Yes ☐ No	Safety goggles plus face shield
11. Sawing, cutting, chipping, and/or grinding	☐ Yes ☐ No	Safety goggles plus face shield; See Supplemental Information A for additional information

Face Hazards

12. Chemical splashes or irritating mists	☐ Yes ☐ No	Safety goggles; See Supplemental Information A for more information; add face shield if irritating or corrosive
13. Welding operations	☐ Yes ☐ No	Welding goggles or welding helmet; see Supplemental Information A and B for additional information
14. Projectiles	☐ Yes ☐ No	Safety goggles plus face shield

Hand Hazards

15. Chemical exposure	☐ Yes ☐ No	Use chemical-resistant gloves specific to hazard; consult MSDS, chemical hazard guide, or HSE Representative
16. Sharp edges, splinters, etc.	☐ Yes ☐ No	Leather or Kevlar gloves
17. Temperature extremes – heat	☐ Yes ☐ No	Leather gloves, welder's gloves, hot mill gloves



Health, Safety and Environment
**HAZARD ASSESSMENT
CERTIFICATION FORM**

Attachment 029-1 NA

Issue Date: July 2000
Revision 9: March 2012

If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.

18. Temperature extremes – cold	☐ Yes ☐ No	Insulated gloves
19. Blood, fungus, biological agents	☐ Yes ☐ No	Nitrile gloves
20. Exposure to live electrical currents	☐ Yes ☐ No	Electrical gloves; consult HSE representative
21. Sharp tools, machine parts, etc.	☐ Yes ☐ No	Leather or Kevlar gloves
22. Material handling	☐ Yes ☐ No	Leather gloves

Foot Hazards

23. Heavy materials (greater than 50 pounds) handled by employees	☐ Yes ☐ No	Safety shoes or boots
24. Potential to crush whole foot	☐ Yes ☐ No	Safety shoes or boots with metatarsal guard
25. Sharp edges or points (puncture risk)	☐ Yes ☐ No	Safety shoes or boots
26. Exposure to electrical hazards	☐ Yes ☐ No	Safety shoes or boots with: Conductive - Protects the wearer in an environment where the accumulation of static electricity on the body is a hazard. Static dissipative - Reduces the accumulation of excess static electricity by conducting body charge to ground while maintaining a sufficiently high level of resistance. Electrical hazard - Provides a secondary source of protection against accidental contact with live electrical circuits, electrically energized conductors, parts or apparatus, and is manufactured with non-conductive electrical shock resistant soles and heels.
27. Slippery conditions	☐ Yes ☐ No	Rubber-soled boots or grips
28. Chemical contamination	☐ Yes ☐ No	Rubber, PVC, or polyurethane boots or boot covers with puncture and protective toe if task required
29. Wet conditions	☐ Yes ☐ No	Rubber boots or boot covers
30. Construction/demolition	☐ Yes ☐ No	Safety boots with metatarsal guard if foot-crushing hazard exists

Fall Hazards

31. Elevations above 4 feet (general industry) or 6 feet (construction) without guardrails	☐ Yes ☐ No	ANSI A-10.14 Type 1 full-body harness
32. Suspended scaffolds, boatswain's chairs, float scaffolds, or suspended staging	☐ Yes ☐ No	ANSI A-10.14 Type 1 full-body harness
33. Working in trees	☐ Yes ☐ No	ANSI A-10.14 Type 1 full-body harness
34. Working in vehicle-mounted elevating work platforms (e.g., bucket trucks, aerial lifts)	☐ Yes ☐ No	ANSI A-10.14 Type 1 full-body harness



Health, Safety and Environment
**HAZARD ASSESSMENT
CERTIFICATION FORM**

Attachment 029-1 NA

Issue Date: July 2000
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Water Hazards

35. Working on or above water where a risk of drowning exist ☐ Yes ☐ No U.S. Coast Guard approved personal floatation device; Type I, II, or III

Excessive Heat or Flame

36. Full body chemical protective clothing in temperatures greater than 80 °F ☐ Yes ☐ No Cooling vest
37. Work around molten metal or flame ☐ Yes ☐ No Nomex or heat reflective clothing
38. Welding activities ☐ Yes ☐ No Welding leathers for those areas that are exposed to flame, spark, or molten metal

Respiratory Hazards

39. Airborne particulates, gases, vapors, or mists in excess of established exposure limits ☐ Yes ☐ No Refer to SMS 042 or URS HSE Representative for respirator selection guidance

Excessive Noise

40. Exposure to noise ☐ Yes ☐ No Ear plugs, muffs or both

Body and Leg Protection

41. Chemical exposure ☐ Yes ☐ No Contact URS HSE Representative for assistance in proper selection
42. Using chainsaw, cutting brush ☐ Yes ☐ No Chainsaw chaps
43. Exposure to snakes ☐ Yes ☐ No Snake chaps
44. Exposure to vehicle traffic or heavy equipment ☐ Yes ☐ No See SMS 032 and SMS 029 NA – Supplemental Information C for additional guidance

I certify that the above inspection was performed to the best of my knowledge and ability, based on the hazards present on: _____

Name _____ Signature _____



Health, Safety and Environment
**PERSONAL PROTECTIVE EQUIPMENT
INSPECTION SHEET**

Attachment 029-2 NA

Issue Date: July 2000
Revision 9: March 2012

Name of Inspector _____ Date Inspected _____

Hard Hats	
1. The brim or shell does not show signs of exposure and excessive wear, loss of surface gloss, chalking, or flaking.	☐ Yes ☐ No
2. Suspension system in hard hat does not show signs of deterioration, including cracking, tearing, or fraying.	☐ Yes ☐ No
3. The brim or shell is not cracked, perforated, or deformed.	☐ Yes ☐ No
4. Employees use hard hats in marked areas.	☐ Yes ☐ No
5. Areas requiring hard hat usage are marked.	☐ Yes ☐ No
Safety Shoes	
6. Safety shoes used by employees do not show signs of excessive wear.	☐ Yes ☐ No
7. Areas requiring safety shoes are marked.	☐ Yes ☐ No
Work Gloves	
8. Gloves are available and worn when needed.	☐ Yes ☐ No
9. Gloves are appropriate for the task.	☐ Yes ☐ No
10. Gloves do not show signs of excessive wear such as cracks, scrapes, or lacerations, thinning or discoloration, or break-through to the skin.	☐ Yes ☐ No
Protective Clothing	
11. Protective clothing (including traffic control apparel) is worn by employees when required.	☐ Yes ☐ No
Hearing Protection	
12. Noise hazard areas are posted.	☐ Yes ☐ No
13. Employees are using earplugs or muffs when using noise producing equipment or working in posted noise hazard areas.	☐ Yes ☐ No
Safety Glasses/Goggles	
14. Eye hazard areas are marked or posted.	☐ Yes ☐ No
15. Employees use safety glasses/goggles when working in eye hazard areas or working with equipment that produces an eye hazard.	☐ Yes ☐ No
16. Face shields are used when required and worn over safety goggles.	☐ Yes ☐ No

REMARKS (All "No" answers indicate a hazard which needs to be fixed.)

	Health, Safety and Environment WELDING LENS SELECTION	SMS 029 NA Supplemental Information A Issue Date: February 2009 Revision 2: March 2012

Operations	Electrode Size (1/32")	Arc Current	Minimum Protective Shade
Shielded metal arc welding (SMAW)	Less than 3	Less than 60	7
SMAW	3 – 5	60 – 160	8
SMAW	5 – 8	160 – 250	10
SMAW	More than 8	250 – 550	11
Gas metal arc welding and flux cored arc welding		Less than 60	7
Gas metal arc welding and flux cored arc welding		60 - 160	10
Gas metal arc welding and flux cored arc welding		160 – 250	10
Gas metal arc welding and flux cored arc welding		250 - 500	10
Gas tungsten arc welding		Less than 50	8
Gas tungsten arc welding		50 – 150	8
Gas tungsten arc welding		150 - 500	10
Air carbon arc cutting	(light)	Less than 500	10
Air carbon arc cutting	(heavy)	500 – 1000	11
Gas tungsten arc welding		Less than 20	8
Gas tungsten arc welding		20 – 100	8
Gas tungsten arc welding		100 – 400	10
Gas tungsten arc welding		400 – 800	11
Plasma arc cutting	(light)	Less than 300	8
Plasma arc cutting	(medium)	300 – 400	9
Plasma arc cutting	(heavy)	400 -800	10
Torch blazing			3
Torch soldering			2
Carbon arc welding			14
Gas welding			5 – 6
Oxygen cutting			3 - 5

	Health, Safety and Environment TRAFFIC CONTROL CLASS GUIDELINES AND SCENARIOS	SMS 029 NA Supplemental Information B Issue Date: February 2009 Revision 2: March 2012

A. Class 1 Safety Apparel

1. Class 1 safety apparel provides the minimum amount of required material to differentiate the wearer from the work environment.
2. At a minimum, this shall include 217 square inches (in²), or 0.14 square meters (m²), of fluorescent yellow-green, orange-red, or red background materials combined with 155 in² (0.10 m²) retro-reflective material. As an alternative, the apparel can have 310 in² (0.20 m²) of combined-performance material (i.e., materials that are both retro-reflective and fluorescent).
3. Class 1 safety apparel typically consists of a sleeveless traffic vest with retro-reflective bands no less than 0.98 inches (25 mm) in width.
4. Those occupational activities under which Class 1 safety apparel is typically used:
 - a. Permit full and undivided attention to approaching traffic;
 - b. Provide ample separation of the pedestrian worker from conflicting vehicle traffic; and
 - c. Permit optimum conspicuity in backgrounds that are not complex with vehicle and moving equipment speeds not exceeding 25 miles per hour (mph), or 40 kilometers per hour (kph).
5. Examples of pedestrian workers who could work in these situations may include:
 - a. Workers directing vehicle operators to parking/service locations;
 - b. Workers exposed to the hazards of warehouse equipment traffic;
 - c. Roadside “right-of-way” or sidewalk maintenance workers; and
 - d. Delivery vehicle drivers.

B. Class 2 Safety Apparel

1. Class 2 safety apparel provides superior visibility for the wearers by the additional coverage of the torso and is more conspicuous than Class 1.
2. At a minimum, this shall include 775 in² (0.50 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 201 in² (0.13 m²) retro-reflective material. Combined-performance materials may not be used without background materials in Class 2.
3. Class 2 safety apparel typically consists of a full-torso sleeveless traffic vest with retro-reflective bands no less than 1.38 inches (35 mm) in width.
4. Those occupational activities under which Class 2 safety apparel is typically used:
 - a. Greater visibility is desired during inclement weather conditions;
 - b. Complex backgrounds are present;
 - c. Employees are performing tasks which divert attention from approaching vehicle traffic;

	Health, Safety and Environment TRAFFIC CONTROL CLASS GUIDELINES AND SCENARIOS	SMS 029 NA Supplemental Information B Issue Date: February 2009 Revision 2: March 2012

- d. Work activities take place in close proximity to vehicle traffic; and
- e. Vehicle and moving equipment speeds exceed 25 mph (40 kph).
- 5. Examples of pedestrian workers who could work in these situations may include:
 - a. Roadway construction workers;
 - b. Utility workers;
 - c. Survey crews;
 - d. Railway workers;
 - e. Forestry workers;
 - f. Parking and/or toll gate personnel;
 - g. Airport baggage handlers/ground crew;
 - h. Emergency response personnel;
 - i. Law enforcement personnel; and
 - j. Accident site investigators.

C. Class 3 Safety Apparel

- 1. Class 3 safety apparel offers greater visibility to the wearer in both complex backgrounds and through a full range of body movements. Visibility is enhanced beyond Class 2 by the enhancement of background and reflective materials to the arms and/or legs.
- 2. At a minimum, this shall include 1240 in² (0.80 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 310 in² (0.20 m²) retro-reflective material. Combined-performance materials may not be used without background materials in Class 3.
- 3. Class 3 safety apparel typically consists of a coveralls, jumpsuits, long or short-sleeved jackets, or long-sleeved shirts with retro-reflective bands no less than 1.97 inches (50 mm) in width. A sleeveless garment or vest alone shall not be considered Class 3 apparel.
- 4. Those occupational activities under which Class 3 safety apparel is typically used:
 - a. Workers are exposed to significantly high vehicle speeds and/or reduced sight distances (note that several sources have interpreted the vehicle speed requirements as 50 mph (80 kph) or more);
 - b. The worker and vehicle operator have high task loads, clearly placing the worker in danger; or
 - c. The wearer must be conspicuous through a full range of body motions at a minimum of 1280 feet (390 m) and must be identifiable as a person.
- 5. Examples of pedestrian workers who could work in these situations may include:
 - a. Roadway construction personnel;
 - b. Utility workers;

	Health, Safety and Environment TRAFFIC CONTROL CLASS GUIDELINES AND SCENARIOS	SMS 029 NA Supplemental Information B Issue Date: February 2009 Revision 2: March 2012

- c. Survey crews;
- d. Emergency response personnel; and
- e. Flagging crews.

D. Class E Safety Apparel

1. Class E apparel includes trousers or shorts which are part of a Class 3 apparel ensemble. Frequently a Class 2 vest is paired with Class E trousers, creating an overall ensemble which meets Class 3 apparel requirements. Class E garments are not intended to be worn without Class 2 or 3 garments.
2. At a minimum, Class E trousers shall have 465 in² (0.30 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 108 in² (0.07 m²) retro-reflective material. Retro-reflective material shall encircle each leg (360° of visibility) and be placed not less than 1.97 inches (50 mm) above the bottom leg of the trouser.
3. At a minimum, Class E shorts shall have 465 in² (0.30 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 108 in² (0.07 m²) retro-reflective material. Retro-reflective material shall encircle each leg.

E. Headwear

1. Headwear is considered an important accessory and compliments the overall visibility of the wearer. High-visibility headwear enhances visibility to the head of a moving worker in daylight and helps define the shape of the human form during nighttime exposures.
2. At a minimum, high-visibility headwear shall have 78 in² (0.05 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 10 in² (0.0065 m²) retro-reflective material. As an alternative, the headwear can have 78 in² (0.05 m²) of combined-performance material.

URS SAFETY MANAGEMENT STANDARD

Sanitation

1. Applicability

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

2. Purpose and Scope

The purpose of this standard is to provide employees with appropriate personal hygiene facilities, including toilets, wash rooms, and eating facilities, to protect employees from unsanitary conditions.

3. Implementation

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

4. Requirements

A. Prior to the start of site activities, ensure the availability of adequate toilet and wash facilities. Note: Mobile crews having transportation readily available (within 5 minute travel time) to nearby toilet facilities need not be provided with facilities.

1. Flush toilets will be used where available.
2. For job sites without flush toilets readily available, one of the following must be provided:
 - a. Chemical toilets.
 - b. Combustion toilets.
 - c. Recirculation toilets.
3. Other than construction sites, toilets will be provided for employees of each sex at sites according to the following ratio:

Number of Employees	Minimum # of toilets ⁽¹⁾
1 to 15	1
16 to 35	2
36 to 55	3
56 to 80	4
81 to 110	5
111 to 150	6
Over 150	⁽²⁾

Notes:

(1) Where toilet facilities will not be used by women, urinals may be provided instead of the minimum specified.

(2) One (1) additional fixture for each additional 40 employees.

URS SAFETY MANAGEMENT STANDARD
Sanitation

B. A means for washing hands must be provided next to or near toilet areas.

C. For facilities under URS control:

1. Maintain toilets and toilet area in good repair and in a clean and sanitary condition. Refer to SMS 021 – Housekeeping.
2. Provide paper towels and soap or other suitable sanitizing material for washing hands.
3. Construct toilets so that the interior is lighted, by artificial or natural light, adequate ventilation is provided, and all windows and vents are screened.

D. Maintain availability and cleanliness of drinking (potable) water.

1. Use backflow prevention devices, testing, and administrative controls for all potable water supply branches. Maintain backflow prevention devices in a sanitary condition.
2. Keep water coolers and water dispensers in a sanitary condition and filled only with potable water. Clearly mark potable drinking water containers as “Drinking Water.”
3. Clean and sanitize water containers daily. Tightly close, seal, date, and mark containers as to the contents. Provide containers with a tap, and refill daily.
4. Provide fountain-type dispensers or one-use cups at each water dispenser. Provide a waste receptacle where disposable cups are used.
5. Do not use common drinking cups.
6. Conspicuously post outlets for non-potable water such as water for industrial or firefighting purposes (e.g., Danger – Water Unfit for Drinking, Washing, or Cooking).
7. Laboratory-test drinking water obtained from streams, wells, or other temporary sources in accordance with federal, state, or local regulations, or often enough to ensure it is suitable for consumption. Maintain records of testing reports and results.

URS SAFETY MANAGEMENT STANDARD

Sanitation

E. Eating Facilities

1. Operate and maintain food dispensing facilities established by URS in compliance with applicable health and sanitation regulations.
2. Ensure that buildings housing these facilities are floored completely, painted, well lighted, heated, ventilated, fly proof, and sanitary. Equip doors and windows with screens.
3. Use microwave ovens for food only.
4. Use refrigerators designated for food storage for food only (i.e., no chemical or samples storage).
5. Prohibit workers from eating and drinking or storing foods and drinks in areas where there is a potential for contamination.
6. Take positive control measures for protection against vermin, insects, and rodents.
7. Provide an ample supply of hot and cold water at all times in mess halls.
8. Clean break rooms /lunchrooms periodically. Refer to SMS 021 – Housekeeping.

F. Washing Facilities

1. Maintained each washing facility in a sanitary condition, and provide adequate water, soap, individual towels of cloth or paper, and covered receptacles for disposal of waste.
2. Provide emergency showers and eyewash facilities as required. Refer to SMS 065 – Injury Management.
3. Provide at least one shower for each 30 employees in construction camps. The use of a common towel is prohibited.

G. Waste Management:

1. Release sanitary sewage into sanitary sewer lines or to other proper disposal channels.
2. Do not dispose of garbage, refuse, or sewage in lakes, reservoirs, rivers, streams, or ditches.

URS SAFETY MANAGEMENT STANDARD
Sanitation

3. Do not discharge hazardous waste into the sanitary sewer or storm sewer system.
4. Collect garbage and trash daily.
 - a. Provide lids for garbage containers located outside buildings, and keep them closed. Transport garbage offsite at least weekly.
 - b. Remove garbage from the site daily at remote field sites where wild animals are a hazard. Do not let garbage remain on site overnight.

H. Change Rooms

Provide heated and ventilated change rooms for changing, hanging, and/or drying clothing for operations subjecting workers to prolonged wetting or contact with hazardous materials.

I. Sleeping Facilities

1. Keep temporary sleeping quarters heated, ventilated, lighted, and clean. Screen all doors and windows.
2. Keep clean and sanitary, and periodically disinfect bunkhouses, bedding, and furniture.

J. Notify property manager of sanitation issues for sites not under URS control.

K. Personal Hygiene

Wash hands and face before eating, drinking, smoking, and using facilities.

L. Inspect work sites periodically in accordance with Attachment 030-1 NA.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Completed inspection sheets.

URS SAFETY MANAGEMENT STANDARD
Sanitation

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Construction Standard – [Sanitation – 29 Code of Federal Regulations \(CFR\) 1926.51](#)
- B. U.S. OSHA General Industry Standard – [Sanitation – 29 CFR 1910.141](#)
- C. [SMS 021](#) - Housekeeping
- D. [SMS 065](#) – Injury Management
- E. [Attachment 030-1 NA](#) - Sanitation Inspection Sheet

	Health, Safety and Environment	Attachment 030-1 NA
	SANITATION INSPECTION SHEET	Issue Date: June 1999 Revision 4: September 2011

Location: _____ **Job No:** _____

Date Inspected: _____ **Name of Inspector:** _____

Toilets

1. Are there an adequate number of toilets on site? ☐ Yes ☐ No ☐ NA
 1 to 15 employees = 1 toilet
 16 to 35 employees = 2 toilets
 36 to 55 employees = 3 toilets
 56 to 80 employees = 4 toilets
 81 to 110 employees = 5 toilets
2. Toilets are in clean condition. ☐ Yes ☐ No ☐ NA
3. Toilet paper is provided. ☐ Yes ☐ No ☐ NA
4. Toilet areas are clean and sanitary. ☐ Yes ☐ No ☐ NA

Hand Washing Facilities

5. Hand washing facilities are provided near toilets. ☐ Yes ☐ No ☐ NA
6. Paper towels and soap are provided. ☐ Yes ☐ No ☐ NA

Drinking Water

7. Drinking water is provided on site. ☐ Yes ☐ No ☐ NA
8. Disposable cups are provided or fountain-type dispenser is provided. ☐ Yes ☐ No ☐ NA
9. Drinking water containers are kept clean and tightly closed or covered. ☐ Yes ☐ No ☐ NA

Break Rooms

10. Break rooms or eating areas are kept clean. ☐ Yes ☐ No ☐ NA
11. Microwaves are used for food only. ☐ Yes ☐ No ☐ NA
12. Microwave ovens are kept clean. ☐ Yes ☐ No ☐ NA
13. Refrigerators are kept clean. ☐ Yes ☐ No ☐ NA
14. Refrigerators are used to store food only. ☐ Yes ☐ No ☐ NA

Vermin

15. Rats, mice, and other vermin are not living within buildings. ☐ Yes ☐ No ☐ NA
16. Cockroaches and fleas are not thriving within buildings. ☐ Yes ☐ No ☐ NA

Employee Compliance

17. Employees only eat/drink in areas free from contamination. ☐ Yes ☐ No ☐ NA
18. Employees wash hands/face prior to eating, drinking, smoking. ☐ Yes ☐ No ☐ NA

REMARKS:

URS SAFETY MANAGEMENT STANDARD

Work Zone Traffic Control

1. Applicability

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

2. Purpose and Scope

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

3. Implementation

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

4. Requirements

- A. Review the project in the planning phase to determine if any work will be performed on or adjacent to any road that will disrupt normal traffic flow.
- B. Where project operations will be performed on or adjacent to roadways, plan work to interfere as little as possible with traffic, and to provide and maintain ingress and egress for all residences and places of business that may be impacted.
- C. When required by local regulations or when there is a potential to disrupt traffic, a traffic control plan, in detail appropriate to the complexity of the project, must be prepared by a competent person and understood by all responsible parties before activities begin. Any changes in the traffic control plan should be approved by an official trained in safe traffic control practices.
 - 1. Competent persons are those who are knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed, and who have the authority to propose and implement corrective measures to eliminate hazardous situations associated with temporary traffic control.
 - 2. Design traffic control plans to meet requirements set forth in Part 6 of the *Manual on Uniform Traffic Control Devices (MUTCD)*, as well as those rules set by state, county, and cities in which work is

URS SAFETY MANAGEMENT STANDARD

Work Zone Traffic Control

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

- a. Pedestrian and worker safety;
 - b. Temporary traffic control elements, including (but not limited to) temporary traffic control zones, advance warning zones, transition areas, activity areas, termination areas, tapers, buffers, detours, etc.;
 - c. Flagger controls, including high-visibility safety apparel, hand-signaling devices, and flagger procedures;
 - d. Temporary traffic control zone devices, including (but not limited to) signs, illuminated/flashing panels, warning devices, channelizing devices, drums, barricades, pavement markings; and
 - e. Temporary traffic control zone activities, including scope of work, duration, location, and portions of the roadway/shoulder affected.
- D. Submit the traffic control plan to the applicable road authority for approval.
- E. A Worksite Traffic Control Supervisor, certified by the American Traffic Safety Services Association (ATSSA) or an equivalent organization will be responsible for initiating, installing, and maintaining all traffic control devices. The Worksite Traffic Control Supervisor will also directly supervise all project flaggers.
- 1. Certified flaggers must attend an 8-hour work-zone traffic control course as taught by an ATSSA certified instructor (or equivalent).
- F. Execute the traffic control plan developed for the job site.
- G. Require all personnel exposed to the risks of moving roadway traffic or construction equipment to wear hardhats, safety glasses, sleeved shirts, long pants, work boots, and the appropriate class of high-visibility safety apparel. Safety apparel background material must be either fluorescent orange-red or fluorescent yellow-green, with accompanying reflective material of orange, yellow, white, silver, or yellow-green, or fluorescent versions of these colors.

URS SAFETY MANAGEMENT STANDARD

Work Zone Traffic Control

H. Wear high-visibility clothing as follows:

1. Class 2 safety apparel (as defined by American National Standards Institute/International Safety Equipment Association [ANSI/ISEA]) is required for all activities where employees could be exposed to traffic or construction equipment in work zones.
2. Apparel must be upgraded to Class 3 during night work and where visibility is impaired due to weather, limited sight distances, complicated background or other causes.
3. Refer to SMS 029 – Personal Protective Equipment for suggested apparel for each class.

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

5. Documentation Summary

The following information will be maintained in the project file:

- A. Copies of traffic control plans used on site.
- B. Training certificates for Traffic Control Supervisors and flaggers.
- C. Inspection records (Attachment 032-1 NA).

6. Resources

- A. Part VI of the [Manual on Uniform Traffic Control Devices](#) (MUTCD) – 2009 Edition
- B. [American Traffic Safety Services Association](#)
- C. [ATTSA Flagger Train-the-Trainer Program](#)
- D. [ANSI/ISEA 107-2004](#) – Standard for High-Visibility Safety Apparel
- E. [High Visibility Apparel in Work Zones](#) – Work Zone Safety
- F. [SMS 029](#) – Personal Protective Equipment
- I. [Attachment 032-1](#) – Traffic Control Device Inspection Checklist

	Health, Safety, and Environment TRAFFIC CONTROL DEVICE INSPECTION CHECKLIST	Attachment 032-1 NA Issue Date: June 1999 Revision 4: September 2012

Project Name: _____

Project Number: _____

Location Inspected: _____

- 1. Are any devices missing?** ☐ Yes ☐ No
- Do any devices need repair? ☐ Yes ☐ No
- Were all replaced or repaired? ☐ Yes ☐ No

Notes:

- 2. Are any lights (flashers, etc.) not functioning?** ☐ Yes ☐ No
- Were they all replaced or repaired? ☐ Yes ☐ No

Notes:

- 3. Are any devices improperly placed?** ☐ Yes ☐ No
- Were all positions corrected? ☐ Yes ☐ No

Notes:

- 4. Do any devices need cleaning?** ☐ Yes ☐ No
- Were all devices cleaned? ☐ Yes ☐ No

Notes:

- 5. Are flaggers certified and flagging appropriately?** ☐ Yes ☐ No

Notes:

Additional Comments:

The above check was completed by: _____

Date: _____ Time: _____

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where personnel may encounter subsurface or overhead utilities.

2. Purpose and Scope

Many field activities are conducted near aboveground and underground utilities. The primary purpose of this standard is to establish operating requirements that will permit employees to work safely in the vicinity of electrical, natural gas, fuel, water, and other utility systems and installations. The secondary purpose is to prevent economic damage to utility systems from operations associated with project-related activities.

The term *utility clearance* includes the following:

- A. The positive locating of utility systems in or near the work area.
- B. A signed statement by an appropriate representative attesting to the location of underground utilities and/or the positive de-energizing (including lockout) and testing of electrical utilities.

In some cases, utility representatives may deem it appropriate or necessary to use insulating blankets to isolate a power line. This is an acceptable alternative to positive de-energizing; however, only utility representatives can make the determination.

"Contact" with overhead power lines is considered to occur when equipment is closer to power lines than permitted by the criteria in the table in Section 4.C.2.b. (See note for operations in the United Kingdom).

On-site utilities, including emergency shut-off locations, shall be depicted on a utility drawing or plot plan. Emergency shut-off locations shall be verified before work activities commence.

3. Implementation

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

4. Requirements

- A. Time for Completion

Complete utility clearances prior to the start of any work in the area of the utility that could feasibly result in contact with or damage to that utility.

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

B. Local Regulations

Research local and state codes and regulations regarding utility locating and isolation requirements. Utility companies and locating services are among the appropriate resources.

C. Overhead Power Lines

1. Proximity to Power Lines

No work is to be conducted within 50 feet (15 meters) of overhead power lines without first contacting the utility company to determine the voltage of the system and the height (at the lowest point) of the line has been measured. No aspect of any piece of equipment is to be operated within 50 feet (15 meters) of overhead power lines without first making this determination.

An exclusion zone shall be created at ground level beneath and 50 feet (15 meters) perpendicular to the overhead power lines on each side. This exclusion zone shall be demarcated with visual indicators (e.g., signage, flagging, paint, cones). No equipment shall enter the exclusion zone without approval from URS site management.

2. Operations adjacent to overhead power lines are *prohibited* unless one of the following conditions is satisfied:

- a. Power has been shut off, positive means (such as lockout) have been taken to prevent the lines from being energized, lines have been tested to confirm the outage, and the utility company has provided a signed certification of the outage.
- b. The minimum clearance from energized overhead lines is presented in the following table, or the equipment will be repositioned and blocked so that no part, including cables, can come within the minimum clearances listed in the table.

Minimum Distances from Power Lines	
Nominal System (kilovolt, kV)	Minimum Required Distance
0–50	10 feet (3 meters)
51–100	12 feet (3.6 meters)
101–200	15 feet (4.6 meters)
201–300	20 feet (6.1 meters)
301–500	25 feet (7.6 meters)
501–750	35 feet (10.7 meters)
751–1000	45 feet (13.7 meters)

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

Note: For operations in the United Kingdom, the specific safe distance is determined by the utility company.

- c. The power line(s) has been isolated through the use of insulating blankets, which have been properly placed by the utility. If insulating blankets are used, the utility will determine the minimum safe operating distance; get this determination in writing with the utility representative's signature.
3. All inquiries regarding electric utilities must be made in writing and a written confirmation of the outage/isolation must be received by the appropriate URS representative prior to the start of the task that may impact the utility.

D. Underground Utilities

1. Do not begin subsurface work (e.g., trenching, excavation, drilling, etc.) until a check for underground utilities and similar obstructions has been conducted. The use of as-built drawings must be confirmed with additional geophysical or other surveys. Attachment 034-1 NA may be used to verify all utilities have been located prior to performing subsurface work.
2. Contact utility companies or the state/regional utility protection service at least two (2) working days prior to excavation activities to advise them of the proposed work and to ask them to establish the location of the underground utility installations prior to the start of actual excavation. One Call utility location service is available throughout the United States by calling 811. Where these services are unavailable (e.g., private properties), contract with an independent utility locating service to perform an evaluation of subsurface utilities.
3. Obtain utility clearances for subsurface work on both public and private property. Clearances are to be in writing and signed by the party conducting the clearance.
4. Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, the URS representative must notify the utility company, utility protection service, or the utility locating service to inform them that the markings have been destroyed.

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

5. Do not conduct mechanical-assisted subsurface work (e.g., work using a powered drill rig, mechanical excavator, etc.) within five (5) feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure. Confirm minimum distances for mechanical-assisted subsurface work with the utility owner, as distances beyond this five-foot minimum may be required.
6. Nondestructive clearance techniques (e.g., vacuum extraction or other hand clearing means) are required prior to drilling/excavating in higher risk locations, including chemical plants, retail service stations, or other locations with complex underground utility systems.
7. Subsurface work within five feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure must be done by nondestructive clearing techniques to the point where the obstruction is visually located and exposed. Once the obstruction location is confirmed in this manner, mechanical-assisted work may begin.
8. Reference SMS 013 – Excavation Safety for additional information regarding subsurface operations.

E. Utility Strikes

1. Utility strikes (unplanned contact with utilities resulting in damage to the utility or its protective coating) shall be reported in accordance with SMS 049 – Injury/Illness/Incident Reporting & Notifications.
2. All damaged utilities shall be repaired by a qualified and/or licensed professional.

F. Training

Conduct a briefing for site employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the method used to isolate the utility and the hazards presented by breaching the isolation.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Documents requesting utility clearance.
- B. Documents confirming utility clearance.

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

- C. Training/briefing documentation of each isolation.

6. Resources

- A. Utility Locating Services (typically under "Utility" in the Yellow Pages)
- B. National Institute for Occupational Safety and Health (NIOSH) Alert – [Preventing Electrocutions from Contact Between Cranes and Power Lines](#)
- C. [One Call Utility Locating List](#)
- D. [National Utility Locating Contractor's Association](#)
- E. [Attachment 034-1](#) – Utility Clearance Checklist
- F. [SMS 013](#) – Excavation Safety
- G. [SMS 049](#) – Injury/Illness/Incident Reporting



Health, Safety and Environment
UTILITY CLEARANCE CHECKLIST

Attachment 034-1 NA

Issue Date: June 1999
Revision 6: September 2011

Project Name:	Project Number:
Project Location:	Client Name:
URS Project Manager Name:	Date Completed:

For any item answered 'No', Project Manager approval required before work can proceed.

Within the last 10 days, and not less than 72 hours from the initiation of the task, contacts were notified that the public utility locate service (One Call) was made.	☐ Yes ☐ No ☐ N/A
Available records have been referenced and a plot plan indicating the location of all underground utilities have been provided and are available for reference at the work site.	☐ Yes ☐ No ☐ N/A

Completed Site Walk Over With Site Personnel (site manager, property owner or tenant representative)

Site Personnel Name:	Site Personnel Signature:
Does Site Personnel have any additional information regarding site utilities?	☐ Yes ☐ No Comment:
Building Utility Service Line Connections Identified:	☐ Yes ☐ No ☐ N/A Cleared: ☐ Yes ☐ No ☐ N/A

Field Observations – Any ** responses must be explained in box below.

Field walk completed and utilities identified on page 2 of this form are cleared?	☐ Yes ☐ No**
Apparent saw cuts or patches in concrete/pavement?	☐ Yes** ☐ No
Piping along building exterior? Identify purposed and layout.	☐ Yes** ☐ No ☐ N/A
Manholes, vault covers, drains, pipes present?	☐ Yes** ☐ No
Piping inside of manholes correlate to utility markings?	☐ Yes ☐ No** ☐ N/A
Clear line-of-sight (equipment/vehicles/snow not blocking view or potential utilities)?	☐ Yes ☐ No**
Work between potential utilities or manholes?	☐ Yes** ☐ No
Work areas clear of overhead utilities?	☐ Yes ☐ No**
All known utilities located on plot/site map for personnel to review?	☐ Yes ☐ No**
Explanations:	

Public Utility Locate (OneCall)

Date Called:	Called By:
Ticket Number:	Valid Until:
Area Requested To Be Cleared:	

Private Utility Locate

Company Performing Locate:	Date Completed:
Area(s) Requested To Be Cleared (including distance around marked locations):	
Method(s) Used (e.g., GPR, EM):	
Confirm Area(s) Cleared:	



Health, Safety and Environment
UTILITY CLEARANCE CHECKLIST

Attachment 034-1 NA

Issue Date: June 1999
Revision 6: September 2011

OneCall Utilities			Field Observation
Utility	Notified by	Comments	Marked (mains and services)
Electric (Red)	☐ OneCall ☐ Other		☐ Yes ☐ No ☐ Above
Gas/Petroleum Pipeline (Yellow)	☐ OneCall ☐ Other		☐ Yes ☐ No
Sewer/Drainage (Green)	☐ OneCall ☐ Other		☐ Yes ☐ No
Water (Blue)	☐ OneCall ☐ Other		☐ Yes ☐ No
Communications (Orange)	☐ OneCall ☐ Other		☐ Yes ☐ No ☐ Above
Other	☐ OneCall ☐ Other		☐ Yes ☐ No ☐ Above

Utilities Not Identified By OneCall (Includes both Public and Private along with Regional and Site Utilities)			Field Observation
Utility (Colors may vary)	Owner / Contact / Phone #	Notified	Marked
Communications: (Orange) TV, computer, phone, cell towers, site communication, cameras, security, etc.		☐ Yes ☐ No	☐ Yes ☐ No ☐ Above
Electricity: (Red) Mains / Supplies / Interior / Exterior (signs, fuel pumps, low voltage security perimeters, gates, property light posts, equipment, substations, etc.)		☐ Yes ☐ No	☐ Yes ☐ No ☐ Above
Gas: (Yellow) Mains / Supplies / Equipment / Pipelines (Natural, Process, Oil, Crude, Refined (Gas, Diesel, Jet), etc.)		☐ Yes ☐ No	☐ Yes ☐ No ☐ Above
Steam (Yellow)		☐ Yes ☐ No	☐ Yes ☐ No ☐ Above
Structures: Possible horizontally installed facilities, vaults, basements, tunnels, sub-grade structures, foundations, overhead obstructions, etc.		☐ Yes ☐ No	☐ Yes ☐ No ☐ Above
UST Systems (Tanks / piping / electric)		☐ Yes ☐ No	☐ Yes ☐ No
Sewer: (Green) Sanitary, storm, combined, septic, drainage (parking, buildings, fields), irrigation		☐ Yes ☐ No	☐ Yes ☐ No
Water: (Blue) Process, Plant, potable, well, cooling, return/makeup, fire, sprinkler, landscape irrigation, reclaim (Purple) other		☐ Yes ☐ No	☐ Yes ☐ No ☐ Above
Other: Abandoned Lines, invisible dog fences, shopping cart perimeter monitoring, traffic lights		☐ Yes ☐ No	☐ Yes ☐ No ☐ Above

If subsurface work is within five feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure, nondestructive clearing techniques (e.g., air knife, vacuum excavation, hand auger) must be completed to visually locate and expose the utility.	☐ Yes ☐ No ☐ N/A
Precautions have been taken to prevent contact with overhead or underground utilities.	☐ Yes ☐ No ☐ N/A

Printed Name of Person
Completing Checklist:

Signature:

URS SAFETY MANAGEMENT STANDARD

Cranes and Derricks

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where cranes and derricks are used.

2. Purpose and Scope

The purpose of this standard is to establish general practices for the operation and maintenance of cranes in order to minimize the potential for personal injury and property damage. These general practices must be supplemented by applicable regulatory requirements, and any practices, procedures, and/or operational requirements outlined by the crane manufacturer.

3. Implementation

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

4. Requirements

A. Introduction

1. The Cranes and Derricks standard has been revised to include the new ASME/ANSI 30.5 Standards, effective March 2009. This revised standard includes checklists and sample documents to better assist with planning for all their crane and derrick needs.
2. These procedures include the minimum requirements set forth by ASME/ANSI, and other federal and state agencies. Best practices are included that were proven to reduce the number of incidents that involve the use of hoisting, rigging, and cranes.
3. Planning is the key to successful and safe hoisting operations and the prevention of accidents and incidents. Proper planning includes, at a minimum:
 - a. Development, training, and implementation of a Job Hazard Analysis for each of the tasks to be performed during each lift.
 - b. Using the Pre-Lift Checklist (Attachment 038-1 NA). The Pre-Lift Checklist should not be considered as planning for the lift, but rather to assure that the lift has been properly prepared and set up.

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Cranes and Derricks

- c. Correctly identifying when a lift is considered “critical,” as defined by this Standard.
- d. Addressing ground conditions and power line safety in the lift pre-planning.
- e. Using the Critical Lift Plan (Attachment 038-2 NA) as an aid to assure that proper preparation was made for the lift.

B. Definitions

A full listing of Definitions is provided in Attachment 038-1 NA.

C. Ground Conditions

- 1. Do not assemble or use the equipment unless ground conditions are firm, drained (except for marshes/wetlands), and graded to a sufficient extent that, in conjunction with the use of supporting materials (if necessary), the equipment manufacturer's specifications for adequate support and degree of equipment level are met.
- 2. Controlling entity means a prime contractor, general contractor, or construction manager, or any other legal entity having the overall planning, quality, and completion responsibility for the construction of the project. The controlling entity must:
 - a. Ensure that ground preparations necessary to meet the requirements in paragraph 1 of this section are provided.
 - b. Inform the user of the equipment and the operator of the location of hazards beneath the equipment set-up area (such as voids, tanks, utilities) that are identified in documents (such as site drawings, as-built drawings, and soil analyses) if they are available to the controlling entity.
- 3. If the assembly/disassembly (A/D) supervisor determines that ground conditions do not meet the requirements for safe lifting, that project manager (or his/her designee) must notify the controlling entity regarding the ground preparations that are needed.

D. Assembly/Disassembly – General Requirements

- 1. Supervision

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Cranes and Derricks

- a. Assembly/disassembly must be supervised by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons (A/D supervisor). The supervisor must be experienced in working with the make and model of equipment being assembled or disassembled.
 - b. Where the assembly/disassembly is being performed by only one person, that person must meet the criteria for both a competent person and a qualified person.
2. Knowledge of procedures.
 - a. The A/D supervisor must understand the applicable assembly/disassembly procedures.
3. Review of procedures.
 - a. The A/D supervisor must review the applicable assembly/disassembly procedures, Job Safety Analysis (JSA) for each task, or a written Assembly/Disassembly Procedure (Supplemental Information F). This review will be completed immediately prior to the commencement of assembly/disassembly, unless the A/D supervisor has applied them to the same type and configuration of equipment (including accessories, if any) so that they are already known and understood.
4. Develop crew instructions for assembly/disassembly operation by using the minimum of a JSA for each task to be performed.
 - a. Before commencing assembly/disassembly operations, the A/D supervisor must determine that the crew members understand the following:
 - i. Their tasks;
 - ii. The hazards associated with their tasks; and
 - iii. The hazardous position/locations that they need to avoid.
 - b. During assembly/disassembly operations, before a crew member takes on a different task, or when adding new personnel during the operations, the requirements in paragraph 4.a of this section must be met with respect to the crew member's understanding regarding that task.

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Cranes and Derricks

5. Protecting assembly/disassembly crew members out of operator view.
 - a. Before a crew member goes to a location that is out of view of the operator and is either in, on, under, or near the equipment (or load) where the crew member could be injured by movement of the equipment (or load), the crew member must inform the operator that he/she is going to that location.
 - b. Where the operator knows that a crew member went to a location covered by paragraph 5.a of this section, the operator will not move any part of the equipment (or load) until the operator is informed in accordance with a pre-arranged system of communication that the crew member is in a safe position.
6. Working under the boom, jib, or other components.
 - a. When pins (or similar devices) are being removed, workers must not be under the boom, jib, or other components, except where the requirements of paragraph 6.b of this section are met.
 - b. Where the project manager (or his/her designee) demonstrates that site constraints require one or more workers to be under the boom, jib, or other components when pins (or similar devices) are being removed, the A/D supervisor must implement procedures that minimize the risk of unintended dangerous movement, and minimize the duration and extent of exposure under the boom.
7. Capacity limits. During all phases of assembly/disassembly, rated capacity limits for loads imposed on the equipment, equipment components (including rigging), lifting lugs, and equipment accessories must not be exceeded for the equipment being assembled/disassembled.
8. Addressing specific hazards. The A/D supervisor must address the hazards associated with the operation with methods to protect the workers from them, as follows:
 - a. Site and ground-bearing conditions. Site and ground conditions must be adequate for safe assembly/disassembly operations and to support the equipment during assembly/disassembly.

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- b. Blocking material. The size, amount, condition, and method of stacking blocking must be sufficient to sustain the loads and maintain stability.
- c. Proper location of blocking. When used to support lattice booms or components, blocking must be appropriately placed to:
 - i. Protect the structural integrity of the equipment; and
 - ii. Prevent dangerous movement and collapse.
- d. Verifying assist crane loads. When using an assist crane, the loads that will be imposed on the assist crane at each phase of assembly/disassembly must be verified before assembly/disassembly begins, in order to prevent exceeding rated capacity limits for the assist crane.
- e. Boom and jib pick points. The point(s) of attachment of rigging to a boom (or boom sections, or jib or jib sections) must be suitable for preventing structural damage and facilitating safe handling of these components.
- f. Center of gravity
 - i. Identify the center of gravity of the load if necessary for the method used for maintaining stability.
 - ii. Where there is insufficient information to accurately identify the center of gravity, use measures designed to prevent unintended dangerous movement resulting from an inaccurate identification of the center of gravity.
- g. Stability upon pin removal. Rig or support the boom sections, boom suspension systems (such as gantry A-frames and jib struts), or components to maintain stability upon the removal of the pins.
- h. Snagging. Do not allow suspension ropes and pendants to catch on the boom or jib connection pins or cotter pins (including keepers and locking pins).
- i. Struck by counterweights. Prevent the potential for unexpected movement from inadequately supported counterweights and from hoisting counterweights.

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Cranes and Derricks

- j. Boom-hoist brake failure. Where reliance is placed on the boom-hoist brake to prevent boom movement during assembly/disassembly, the brake will be tested to determine if it is sufficient to prevent boom movement. If it is not sufficient, a boom hoist pawl, other locking device/back-up braking device, or another method of preventing dangerous movement of the boom (such as blocking or using an assist crane) from a boom-hoist brake failure will be used.
 - k. Loss of backward stability. Consider backward stability before swinging the upper works, travel, and the attaching or removing equipment components.
 - l. Wind speed and weather. Consider wind speed and weather so that the safe assembly/disassembly of the equipment is not compromised.
9. Cantilevered boom sections. Do not exceed manufacturer's limitations on the maximum amount of boom supported only by cantilevering. When such limitations are not available, a registered professional engineer familiar with the type of equipment involved will determine this limitation in writing: this limit must not be exceeded.
10. Weight of components. The weight of the components must be readily available.
11. Components and configuration
- a. The selection of components and configuration of the equipment that affects the capacity or safe operation of the equipment must be in accordance with:
 - i. Manufacturer's instructions, limitations, and specifications. Where these are unavailable, a registered professional engineer familiar with the type of equipment involved must approve, in writing, the selection and configuration of components; or
 - ii. Approved modifications that meet the equipment requirements.
 - b. Post-assembly inspection. Upon completion of assembly, inspect the equipment to ensure compliance with the URS initial and annual crane inspection and load testing.

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12. Manufacturer's prohibitions. The project manager (or his/her designee) must comply with applicable manufacturer's prohibitions.
13. Shipping pins. Remove reusable shipping pins, straps, links, and similar equipment, and store so that they do not present a falling-object hazard.
14. Pile driving. Equipment used for pile driving must not have a jib attached during pile-driving operations.
15. Outriggers. When the load to be handled and the operating radius require the use of outriggers, or at any time when outriggers are used, the following requirements must be met:
 - a. The outriggers must be either fully extended; or, if the manufacturer's procedures permit, deployed as specified in the load chart.
 - b. The outrigger must be set with the machine-supported level, on fully extended outriggers with all tires free of the supporting surface (clear of the surface), except for locomotive cranes (see paragraph 15.f of this section for use of outriggers on locomotive cranes).
 - c. When outrigger floats are used, they must be attached to the outriggers.
 - d. Each outrigger must be visible to the operator or to a signal person during extension and setting.
 - e. Outrigger blocking must:
 - i. Meet the requirements in paragraphs 8.b and 8.c of this section.
 - ii. Be placed only under the outrigger float, and/or the outrigger jack. Where the outrigger is designed without a jack, the blocking must be placed under the outer bearing surface of the extended outrigger beam.
 - f. For locomotive cranes, when using outriggers to handle loads, the manufacturer's procedures must be followed. When lifting loads without using outriggers, the manufacturer's procedures will be met regarding truck wedges or screws.

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E. Assembly/Disassembly – Additional Requirements for Booms and Jibs

1. Do not remove any of the pins in the pendants (partly or completely) when the pendants are in tension.
2. Do not remove any of the pins (top and bottom) on boom sections located between the uppermost boom section and the crane/derrick body (partly or completely) when the boom is being supported by the uppermost boom section resting on the ground (or other support).
3. Do not remove any of the top pins on boom sections located on the cantilevered portion of the boom being removed (the portion being removed ahead of the pendant attachment points) (partly or completely) until the cantilevered section to be removed is fully supported.

F. Assembly/Disassembly – Project Manager Procedures

1. When using the project manager's (or his/her designee's) procedures instead of the manufacturer's procedures for assembling or disassembling, the project manager (or his/her designee) must ensure that the procedures are designed to:
 - a. Prevent unintended dangerous movement, and prevent collapse of all parts of the equipment.
 - b. Provide adequate support and stability of all parts of the equipment during the assembly/disassembly process.
 - c. Position workers involved in the assembly/disassembly operation so that their exposure to unintended movement or collapse of part or all of the equipment is minimized.
2. Project manager's procedures must be developed by a qualified person.

G. Assembly/Disassembly – Power-Line Safety (up to 350 kilovolts [kV])

1. Users of this standard should also refer to ANSI 30.5-3.4.5.
2. Before assembling or disassembling equipment, the project manager (or his/her designee) must determine if any part of the equipment, load line, or load (including rigging and lifting accessories) could get closer than 20 feet to a power line during the assembly/disassembly process. If so, the project manager (or

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his/her designee) must meet the requirements in Option 1, Option 2, or Option 3, as follows:

- a. Option 1 – De-energize and ground. Confirm from the utility owner/operator that the power line has been de-energized and visibly grounded at the worksite.
 - b. Option 2 – 20-foot clearance. Ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.
 - c. Option 3 – Clearance
 - i. Determine if any part of the equipment, load line, or load (including rigging and lifting accessories) could get closer than the minimum approach distance to the power line permitted under the table provided in Attachment 038-4 NA – Required Clearance for Normal Voltage. If so, then the project manager (or his/her designee) must follow the requirements in paragraph b of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum approach distance.
3. Prevent encroachment/electrocution. Where encroachment precautions are required under Option 2 or Option 3, the following requirements must be met:
- a. Conduct a planning meeting with the A/D supervisor, operator, A/D crew, and the other workers who will be in the A/D area to review the location of the power line(s), and the steps that will be implemented to prevent encroachment/electrocution.
 - b. Use only non-conductive tag lines.
 - c. At least one of the following additional measures must be in place:
 - i. Use of a dedicated spotter who is in continuous contact with the equipment operator. The dedicated spotter must:

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- a. Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: a clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter, and a building corner ahead of the dedicated spotter).
 - b. Be positioned to effectively gauge the clearance distance.
 - c. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator (radio, telephone, or other electronic transmission of signals).
 - d. Give timely information to the operator so that the required clearance distance can be maintained.
 - ii. Set a proximity alarm to give the operator sufficient warning to prevent encroachment.
 - iii. Employ a device that automatically warns the operator when to stop movement, such as a range control warning device. Set the device to give the operator sufficient warning to prevent encroachment.
 - iv. Employ a device that automatically limits range of movement, set to prevent encroachment.
 - v. Employ an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings.
4. Assembly/disassembly below power lines prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed below a power line unless the project manager (or his/her designee) has confirmed that the utility owner/operator has de-energized and visibly grounded the power line (at the worksite).
5. Assembly/disassembly inside clearance limits prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed closer

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than the minimum approach distance listed in Attachment 038-2 NA to a power line unless the project manager (or his/her designee) has confirmed that the utility owner/operator has de-energized and (at the worksite) visibly grounded the power line.

6. Voltage information. Where Option 3 of this section is used, the utility owner/operator of the power lines must provide the requested voltage information within 2 working days of the project manager's (or his/her designee's) request.
7. The project manager (or his/her designee) must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be de-energized and visibly grounded at the worksite.
8. There must be at least one electrocution hazard warning conspicuously posted in the cab so that it is in view of the operator and tower(except for overhead gantry).

H. Crane Inspection Procedures

1. Prior to using any cranes, an Initial/Annual Inspection and a Crane Load Test (see Attachment 038-5 NA for procedures) must be made on such equipment. This inspection must be made by a qualified person designated by management, or by a third-party firm qualified to perform such work.
2. Modified equipment
 - a. Equipment that has modifications or additions that affect the safe operation of the equipment (such as modifications or additions involving a safety device or operator aid, critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) or capacity must be inspected by a qualified person after such modifications/additions have been completed, prior to initial use. The inspection must meet the following requirements:
 - i. Ensure that modifications or additions have been done in accordance with the approval obtained.
 - ii. Prior to initial use, and under the direction of a qualified person, load-test all cranes in which load-sustaining parts have been altered, replaced, or repaired. The replacement of wire rope is specifically excluded from this requirement; however, a functional

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test of the crane under a normal operating load will be made prior to putting the crane back into service.

- b. Do not use equipment until an inspection under this paragraph demonstrates that the requirements of paragraph 2.a.i of this section have been met.

3. Repaired/adjusted equipment

- a. Equipment that has had a repair or adjustment relating to safe operation (such as a repair or adjustment to a safety device or operator aid, or to a critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) must be inspected by a qualified person after such a repair or adjustment has been completed, prior to initial use. The inspection must meet the following requirements:
 - i. The qualified person will determine if the repair/adjustment meets manufacturer's equipment criteria.
 - ii. Prior to use after repair or adjustment of equipment, all cranes in which load-sustaining parts have been altered, replaced, or repaired must be load-tested by, or under the direction of, a qualified person. The replacement of wire rope is specifically excluded from this requirement; however, a functional test of the crane under a normal operating load will be made prior to putting the crane back into service.
- b. Do not use equipment until an inspection under this paragraph demonstrates that the repair/adjustment meets the requirements of this section.

4. Post-Assembly

- a. Upon completion of assembly, the equipment must be inspected by a qualified person to assure that it is configured in accordance with the manufacturer's equipment criteria.
- b. Do not use equipment until an inspection under this paragraph demonstrates that the equipment is configured in accordance with the applicable criteria.

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5. Each Shift

- a. A competent person must begin a visual inspection prior to each shift or operation using the attached Daily Inspection Checklist (see Attachment 038-6 NA for procedures) to provide adequate documentation of the inspection. The inspection will consist of observation for apparent deficiencies. Disassembly is not required as part of this inspection unless the results of the visual inspection or trial operation indicate that further investigation necessitating disassembly is needed. Determinations made in conducting the inspection will be reassessed in light of observations made during operation.

6. Monthly

- a. Each month the equipment is in service, it must be inspected by a qualified person using the URS Monthly Crane Inspection Form (Attachment 038-7 NA).
- b. Equipment must not be used until an inspection under this paragraph demonstrates that no deficiencies are found.
- c. Documentation. Maintain all inspection forms on file at the job site for review by interested parties for the duration of the project.

7. Initial/Annual/Comprehensive

- a. Prior to any crane being used, conduct the Initial and Annual Inspection (see Attachment 038-5 NA). This inspection must be made by a qualified person; preferably, a third-party firm qualified to perform such work. At least every 12 months, the equipment must be inspected by a qualified person in accordance with paragraph 4 of this section, except that the corrective action set forth in this paragraph will apply.
- b. In addition, at least every 12 months, the equipment must be inspected by a qualified person using the Initial and Annual Inspection Form (see Attachment 038-5 NA).

- 8. Where the severity of use/conditions is such that there is a reasonable probability of damage or excessive wear (such as loading that may have exceeded rated capacity, shock loading that may have exceeded rated capacity, or prolonged exposure to a

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corrosive atmosphere), the project manager (or his/her designee) must stop using the equipment, and a qualified person must inspect the equipment for structural damage, as well as any items/conditions listed in paragraph 7 of this section.

9. Equipment that has been idle for 3 months or more must be inspected by a qualified person in accordance with the requirements of the Initial and Annual Inspection Form (Attachment 038-5 NA).
10. Any part of the manufacturer's procedures regarding inspections relating to safe operation (i.e., safety device or operator aid, critical part of a control system, load-sustaining structural components, load hook, or in-use operating mechanism) that is more comprehensive or has a more frequent schedule than the requirements of this section will be followed. Additional documentation requirements by the manufacturer are not required.

I. Wire Rope – Inspection

1. Shift Inspection

- a. A competent person will conduct a visual inspection of wire ropes prior to each shift. They will observe wire ropes (running and standing) that are reasonably likely to be used during the shift for apparent deficiencies, including those listed below. Untwisting (opening) of wire rope or booming down is not required as part of this inspection.

- b. Apparent Deficiencies

- i. Category I

- a. Significant distortion of the wire rope structure such as kinking, crushing, unstranding, bird caging, signs of core failure, or steel core protrusion between the outer strands.
 - b. Significant corrosion.
 - c. Electric arc (from a source other than power lines) or heat damage.
 - d. Improperly applied end connections.
 - e. Significantly corroded, cracked, bent, or worn end connections (such as from severe service).

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ii. Category II

a. Visible broken wires, as follows:

- In running wire ropes: Six randomly distributed broken wires in one rope lay, or three broken wire in one strand in one rope lay, where a rope lay is the length along the rope in which one strand makes a complete revolution around the rope.
- In rotation-resistant ropes: Two randomly distributed broken wires in six rope diameters, or four randomly distributed broken wires in 30 rope diameters.
- In pendants or standing wire ropes: More than two broken wires in one rope lay located in rope beyond end connections, and/or more than one broken wire in a rope lay located at an end connection.

b. A diameter reduction of more than 5 percent from nominal diameter.

iii. Category III

- a. In rotation-resistant wire rope, core protrusion or other distortion indicating core failure.
- b. Electrical contact with a power line.
- c. A broken strand.

c. Critical review items. The competent person will pay particular attention to:

- i. Rotation-resistant wire rope in use.
- ii. Wire rope being used for boom hoists and luffing hoists, particularly at reverse bends.
- iv. Wire rope at flange points, crossover points, and repetitive pickup points on drums.
- v. Wire rope adjacent to end connections.

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vi. Wire rope at, and on, equalizer sheaves.

d. Removal from service

- i. If a deficiency in Category I (see paragraph 1.b.i of this section) is identified, an immediate determination will be made by the competent person as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question will be prohibited until:
 - a. The wire rope is replaced; or
 - b. If the deficiency (other than power line contact) is localized, the problem is corrected by severing the wire rope in two: the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. Repair of wire rope that contacted an energized power line is also prohibited.
- ii. If a deficiency in Category II (see paragraph 1.b.ii of this section) is identified, the project manager (or his/her designee) will comply with Option A or Option B, as follows:
 - a. Option A. Consider the deficiency to constitute a safety hazard where it meets the wire rope manufacturer's established criterion for removal from service, or meets a different criterion that the wire rope manufacturer has approved in writing for that specific wire rope. If the deficiency is considered a safety hazard, operations involving use of the wire rope in question will be prohibited until the wire or the damage is removed, in accordance with all of the requirements and restrictions in paragraph 1.d.i.b of this section.
 - b. Option B. Institute the alternative measures specified in paragraph 1.d.ii of this section.
- iii. If a deficiency in Category III is identified, operations involving use of the wire rope in question will be prohibited until:
 - a. The wire rope is replaced; or

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- b. If the deficiency (other than power line contact) is localized, the problem is corrected by severing the wire rope in two: the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. Repair of wire rope that contacted an energized power line is also prohibited.
- iv. Where a wire rope is required to be removed from service under this section, either the equipment (as a whole) or the hoist with that wire rope will be tagged-out, in accordance with this procedure, until the wire rope is repaired or replaced.

2. Monthly Inspection

- a. Each month an inspection will be conducted in accordance with the monthly crane inspection. For additional information and forms, see Attachment 038-8 NA – Monthly Wire Rope and Hook Inspection.
- b. In addition, at least every 12 months, the wire ropes in use on equipment will be inspected by a qualified person for the types of deficiencies listed below
 - i. The inspection will be complete and thorough, covering the surface of the entire length of the wire ropes, with particular attention given to:
 - a. Categories 1, 2, and 3 and critical review items.
 - b. Those sections that are normally hidden during shift and monthly inspections.
 - c. Wire rope in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited.
 - d. Wire rope subject to reverse bends.
 - e. Wire rope passing over sheaves.
 - f. Wire rope at or near terminal ends.
 - ii. In the event an inspection under paragraph 3.b of this section is not feasible due to existing set-up and configuration of the equipment (such as where an

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assist crane is needed) or due to site conditions (such as a dense urban setting), such inspections will be conducted as soon as they become feasible, but no longer than an additional 6 months for running ropes; and for standing ropes, at the time of disassembly.

- c. If a deficiency is identified, an immediate determination will be made by the qualified person as to whether the deficiency constitutes a safety hazard.
 - i. If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question will be prohibited until:
 - a. The wire rope is replaced; or
 - b. If the deficiency is localized, the problem is corrected by severing the wire rope in two: the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited.
 - ii. If the qualified person determines that, although not currently a safety hazard, the deficiency needs to be monitored, the project manager (or his/her designee) must ensure that the deficiency is checked in the monthly inspections.
- d. The inspection must be documented in accordance with this standard.

- 3. Do not use rope lubricants that are of the type that hinder inspection.

J. Wire Rope – Selection and Installation Criteria

- 1. Select replacement wire rope in accordance with the requirements of this section, and the recommendations of the wire rope manufacturer, the equipment manufacturer, or a qualified person.
- 2. Boom-hoist reeving
 - a. Do not use fiber core ropes for boom-hoist reeving, except for derricks.
 - b. Use rotation-resistant ropes for boom-hoist reeving only where the requirements of paragraph 3 below are met.

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3. Rotation-resistant ropes

a. Definitions

- i. Type I rotation-resistant rope is stranded rope constructed to have little or no tendency to rotate; or, if guided, transmits little or no torque. It has at least 15 outer strands and comprises an assembly of at least three layers of strands laid helically over a center in two operations. The direction of lay of the outer strands is opposite to that of the underlying layer.
- ii. Type II rotation-resistant rope is stranded rope constructed to have significant resistance to rotation. It has at least 10 outer strands and comprises an assembly of two or more layers of strands laid helically over a center in two or three operations. The direction of lay of the outer strands is opposite to that of the underlying lay.

b. Requirements

- i. Do not use Types II and III with an operating design factor of less than five for duty cycle or repetitive lifts.
 - ii. Use rotation-resistant ropes (including Types I, II, and III) with an operating design factor of no less than 3.5.
 - iii. Type I must have an operating design factor of no less than five, except where the wire rope manufacturer and the equipment manufacturer approves the design factor, in writing.
 - iv. Types II and III must have an operating design factor of no less than five, except where the requirements of this section are met, as listed below.
- c. When Types II and III with an operating design factor of less than five are used (for non-duty cycle, non-repetitive lifts), the following requirements must be met for each lifting operation:
- i. A qualified person must inspect the rope in accordance with this procedure. The rope may be used only if the qualified person determines that there are no deficiencies constituting a hazard. In making this determination, more than one broken wire in any

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one rope lay will be considered a hazard.

- ii. Conduct operations in such a manner and at such speeds as to minimize dynamic effects.
- iii. Each lift made under these provisions will be recorded in the monthly and annual inspection documents. Such prior uses will be considered by the qualified person in determining whether to use the rope again.

d. Additional requirements

- i. Do not use rotation-resistant ropes for boom-hoist reeving, except where the requirements of this section are met, as listed below.
- ii. Rotation-resistant ropes may be used as boom-hoist reeving when load hoists are used as boom hoists for attachments such as luffing attachments or boom and mast attachment systems. Under these conditions, the following requirements must be met:
 - a. The drum must provide a first-layer rope-pitch diameter of not less than 18 times the nominal diameter of the rope used.
 - b. The requirements in this standard (regardless of the date of manufacture of the equipment).
 - c. The requirements in ASME B30.5-2007, Section 5-1.3.2(a), (a)(2) through (a)(4), (b) and (d), except that the minimum pitch diameter for sheaves used in multiple-rope reeving is 18 times the nominal diameter of the rope used, instead of the value of 16 specified in Section 5-1.3.2(d).
 - d. All sheaves used in the boom-hoist reeving system must have a rope-pitch diameter of not less than 18 times the nominal diameter of the rope used.
 - e. The operating design factor for the boom-hoist reeving system cannot be less than 5.
 - f. The operating design factor for these ropes will be the total minimum breaking force of all parts of rope in the system divided by the load imposed on the rope system when supporting

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the static weights of the structure, and the load within the equipment's rated capacity.

- g. When provided, a power-controlled lowering system must be capable of handling rated capacities and speeds as specified by the manufacturer.
- 4. Socketing will be done in the manner specified by the manufacturer of the wire rope or fitting.
 - 5. Prior to cutting a wire rope, place seizings on each side of the point to be cut. The length and number of seizings will be in accordance with the wire-rope manufacturer's instructions.

K. Safety Devices

- 1. The following safety devices are required on all equipment covered by this procedure, unless otherwise specified:
 - a. Crane-level indicator
 - i. The equipment will have a crane-level indicator that is either built into the equipment or is available on the equipment.
 - ii. If a built-in crane-level indicator is not working properly, it will be tagged-out or removed.
 - iii. This requirement does not apply to portal cranes, derricks, floating cranes/derricks, and land cranes/derricks on barges, pontoons, vessels, or other means of flotation.
 - b. Boom stops, except for derricks and hydraulic booms.
 - c. Jib stops (if jib is attached), except for derricks.
 - d. Equipment with foot-pedal brakes will have locks, except for portal cranes and floating cranes.
 - e. Hydraulic outrigger jacks will have an integral holding device/check valve.
 - f. Equipment on rails will have rail clamps and rail stops, except for portal cranes.

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2. Proper Operation Required

- a. Operations may not begin unless the devices listed in this section are in proper working order. If a device stops working properly during operations, the operator will safely stop operations. Do not resume operations until the device is working properly. Alternative measures are not permitted to be used.

L. Operational Aids for Mobile and Locomotive Cranes

1. Operational aids refer to ASME B30.5-2007, Paragraphs 5-1.9.9 and 5.3.2.1.2.
2. Two-blocking features refer to ASME B30.5-2007, Paragraph 5-1.9.9.1.
3. Load indicators, rated capacity indicators, and rated capacity limiters refer to ASME B30.5-2007, Paragraph 5-1.9.9.2.
4. Boom angle or radius indicator refers to ASME B30.5-2007, Paragraph 5-1.9.9.3.
5. Boom-hoist disconnect, shut-off, or hydraulic relief refers to ASME B30.5-2007, Paragraph 5-1.9.9.4.
6. Boom-length indicator refers to ASME B30.5-2007, Paragraph 5-1.9.9.5.
7. Crane-level indicator refers to ASME B30.5-2007, Paragraph 5-1.9.9.6.
8. Drum-rotation indicator refers to ASME B30.5-2007, Paragraph 5-1.9.9.7.

M. Tower-Crane Operational Aids

1. Do not begin operations unless the operational aids are in proper working order, except where the project manager (or his/her designee) meets the specified temporary alternative measures. Follow more protective alternative measures specified by the tower crane manufacturer, if any.
2. If an operational aid stops working properly during operations, the operator will safely stop operations until the temporary alternative measures are implemented or the device is again working properly.

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If a replacement part is no longer available, the use of a substitute device that performs the same type of function is permitted, and is not considered a modification under this procedure.

3. Category I operational aids and alternative measures. Operational aids listed in this paragraph that are not working properly must be repaired no later than 7 days after the deficiency occurs.
Exception: If the project manager (or his/her designee) documents that he/she has ordered the necessary parts within 7 days of the occurrence of the deficiency, the repair will be completed within 7 days of receipt of the parts.
 - a. Trolley-travel-limiting device. Restrict the travel of the trolley at both ends of the jib by a trolley-travel-limiting device to prevent the trolley from running into the trolley end-stops.
Temporary alternative measures:
 - i. Option A. Mark the trolley rope (so it can be seen by the operator) at a point that will give the operator sufficient time to stop the trolley prior to the end-stops.
 - ii. Option B. Use a spotter when operations are conducted within 10 feet of the outer or inner trolley end-stops.
 - b. Boom-hoist-limiting device. Limit the range of the boom at the minimum and maximum radius. Temporary alternative measures: Clearly mark the cable (so it can be seen by the operator) at a point that will give the operator sufficient time to stop the boom within the minimum and maximum boom radius, or use a spotter.
 - c. Anti-two-blocking device. Equip the tower crane with a device that automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage at all points where two-blocking could occur. As a temporary alternative, measure and clearly mark the cable so it can be seen by the operator at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking; or use a spotter.
 - d. Hoist-drum-lower-limiting device. Equip tower cranes manufactured more than 1 year after the effective date of this procedure with a device that prevents the last tow wraps

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of hoist cable from being spooled off the drum. As a temporary alternative measure, clearly mark the cable so it can be seen by the operator at a point that will give the operator sufficient time to stop the hoist prior to the last two wraps of hoist cable being spooled off the drum, or use a spotter.

- e. Load-moment-limiting device. Provide the tower crane with a device that prevents moment overloading. As a temporary alternative measure, use a radius-indicating device (if the tower crane is not equipped with a radius-indicating device, measure the radius to ensure the load is within the rated capacity of the crane). In addition, determine the weight of the load from a reliable source such as the load's manufacturer), by a reliable calculation method (such as calculating a steel beam from measured dimensions and a known per-foot weight, or by other equally reliable means. Provide this information to the operator prior to the lift.
 - f. Hoist-line pull-limiting device. Limit the capacity of the hoist to prevent overloading, including each individual gear ratio if equipped with a multiple-speed hoist transmission. As a temporary alternative measure, the operator will ensure that the weight of the load does not exceed the capacity of the hoist (including for each individual gear ratio if equipped with a multiple-speed hoist transmission).
 - g. Rail-travel-limiting device. Limit the travel distance in each direction to prevent the travel bogies from running into the end stops or buffers. As a temporary alternative measure, use a spotter when operations are conducted within 10 feet of either end of the travel rail end stops.
 - h. Boom-hoist-drum positive locking device. Equip the boom-hoist drum with a device to positively lock the boom-hoist drum. As a temporary alternative measure, manually set the device when required if an electric, hydraulic, or automatic type is not functioning.
4. Category II operational aids and alternative measures. Repair operational aids listed in this paragraph that are not working properly no later than 30 days after the deficiency occurs. Exception: If the project manager (or his/her designee) documents that he/she has ordered the necessary part within 7 days of the occurrence of the deficiency, and the part is not received in time to

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complete the repair in 30 days, complete the repair within 7 days of receipt of the parts.

- a. Boom-angle or hook-radius indicator.
 - i. Ensure luffing boom-tower cranes have a boom-angle indicator readable from the operator's station.
 - ii. Ensure hammerhead tower cranes manufactured more than 1 year after the effective date of this subpart have a hook-radius indicator readable from the operator's station.
 - iii. Temporary alternative measure: Determine hook radii or boom angle by measuring the hook radii or boom angle with a measuring device.
- b. Trolley-travel deceleration device. The trolley speed will be automatically reduced prior to the trolley reaching the end limit in both directions. Temporary alternative measure: the operator will reduce the trolley speed when approaching the trolley end limits.
- c. Boom-hoist deceleration device. The boom speed will be automatically reduced prior to the boom reaching the minimum or maximum radius limit. Temporary alternative measure: the operator will reduce the boom speed when approaching the boom maximum or minimum end limits.
- d. Load-hoist deceleration device. The load speed will be automatically reduced prior to the hoist reaching the upper limit. Temporary alternative measure: the operator will reduce the hoist speed when approaching the upper limit.
- e. Wind-speed indicator. Provide a device to display the wind speed, and mount above the upper rotating structure on tower cranes. On self-erecting cranes, mount at or above the jib level. Temporary alternative measure: use wind-speed information from a properly functioning indicating device on another tower crane on the same site; or have a qualified person estimate the wind speed.
- f. Load-indicating device. Cranes manufactured more than 1 year after the effective date of this procedure must have a device that displays the magnitude of the load on the hook. Displays that are part of load-moment-limiting devices that display the load on the hook meet this requirement.

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- g. Temporary alternative measures: Determine the weight of the load from a reliable source (such as the load's manufacturer), by a reliable calculation method (such as calculating a steel beam from measured dimensions and a known per-foot weight); or by other equally reliable means. Provide this information to the operator prior to the lift.

N. Operator Qualifications and Certification

1. It is the responsibility of the manager directing activities of the facility or site to ensure proper qualification and certification of Crane Operators prior to the operation or start-up of any crane. They must also ensure compliance with certification and qualification from state, local, or other licensing and certifying agencies.
2. The company or project manager (or his/her designee) of the operator must ensure that, prior to operating any equipment covered under this procedure, the operator is either qualified or certified to operate the equipment in accordance with one of the options listed below, or is operating the equipment during a training period. The company or project manager (or his/her designee) of the operator must verify certification and have evidence of certification on file at the project. Note that operator's qualification or certification under this section is not required for operators of derricks, side-boom cranes, and equipment with a rated hoisting/lifting capacity of 2,000 pounds or less.
3. Option 1 – Certification by an accredited crane/derrick operator testing organization.
 - a. For a testing organization to be considered accredited to certify operators under this procedure, it must:
 - i. Be accredited by a nationally recognized accrediting agency based on that agency's determination that industry-recognized criteria for written testing materials, practical examinations, test administration, grading, facilities/equipment, and personnel have been met.
 - ii. Administer written and practical tests that:
 - a. Assess the operator applicant regarding relevant knowledge and skills.

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- b. Provide different levels of certification based on equipment capacity and type.
 - iii. Have procedures for operators to re-apply and be re-tested in the event an operator applicant fails a test or is de-certified.
 - iv. Have testing procedures for re-certification designed to ensure that the operator continues to meet applicable technical knowledge and skill requirements.
 - v. Have its accreditation reviewed by the nationally recognized accrediting agency at least every 3 years.
 - b. A certification issued under this option is portable.
 - c. A certification issued under these criteria is valid for 5 years.
- 4. Option 2 – Licensing by a government entity
 - a. For purposes of this section, a government licensing department/office that issues operator licenses for operating equipment covered by this standard is considered a government-accredited crane/derrick operator testing organization if the criteria in the next paragraph are met.
 - b. Licensing criteria
 - i. The requirements for obtaining the license include an assessment, by written and practical tests, of the operator applicant regarding, at a minimum, the knowledge and skills listed in paragraph 8 of this section.
 - ii. The testing meets industry-recognized criteria for written testing materials, practical examinations, test administration, grading, facilities/equipment, and personnel.
 - iii. The government authority that oversees the licensing department/office has determined that the requirements in the preceding two paragraphs have been met.
 - iv. The licensing department/office has testing procedures for re-licensing designed to ensure that the operator continues to meet applicable technical

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knowledge and skills requirements.

- c. A license issued by a government-accredited crane/derrick operator testing organization that meets the requirements of this option:
 - i. Meets the operator-qualification requirements of this section for operation of equipment only within the jurisdiction of the government entity.
 - ii. Is valid for the period of time stipulated by the licensing department/office, but no longer than 5 years.
- 5. Pre-qualification/certification training period – All training of all apprentices or other uncertified operators must be approved by the project/facility manager.
 - a. A worker who is not qualified or certified under this section is permitted to operate equipment where the requirements of following paragraph are met.
 - b. A worker who has not passed both the written and practical tests required under this section is permitted to operate equipment as part of his/her training where the following requirements are met
 - i. The worker (“trainee/apprentice”) will be provided with sufficient training prior to operating the equipment to enable the trainee to operate the equipment safely under limitations established by this section (including continuous supervision) and any additional limitations established by the project manager (or his/her designee).
 - ii. The tasks performed by the trainee/apprentice while operating the equipment will be within the trainee’s ability.
 - iii. Supervisor. While operating the equipment, the trainee/apprentice must be continuously supervised by an individual (operator’s supervisor) who meets the following requirements:
 - a. The operator’s supervisor is a worker or agent of the trainee’s/apprentice’s project manager (or his/her designee).

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- b. The operator's supervisor is either a certified operator under this section, or has passed the written portion of a certification test under one of the options in paragraphs 2 through 5 of this section, and is familiar with the proper use of the equipment's controls.
 - c. While supervising the trainee/apprentice, the operator's supervisor performs no tasks that detract from the supervisor's ability to supervise the trainee/apprentice.
 - d. For equipment other than tower cranes, the operator's supervisor and the trainee/apprentice must be in direct line of sight of each other, and will communicate verbally or by hand signals. For tower cranes, the operator's supervisor and the trainee/apprentice will be in direct communication with each other.
- iv. Continuous supervision. The trainee/apprentice must be supervised by the operator's supervisor at all times, except for short breaks where the following are met:
 - a. The break lasts no longer than 15 minutes and there is no more than 1 break per hour.
 - b. Immediately prior to the break, the operator's supervisor informs the trainee/apprentice of the specific tasks that the trainee/apprentice is to perform, and limitations that he/she is to adhere to during the operator supervisor's break.
 - c. The specific tasks that the trainee/apprentice will perform during the operator supervisor's break are within the trainee/apprentice's abilities.
- v. The trainee/apprentice may not operate the equipment in any of the following circumstances:
 - a. If any part of the equipment, load line, or load (including rigging and lifting accessories), if operated up to the equipment's maximum

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- working radius in the work zone, could get within 20 feet of a power line that is up to 350 kV, or within 50 feet of a power line that is over 350 kV.
 - b. The equipment is used to hoist personnel.
 - c. The equipment is used over a shaft, cofferdam, or in a tank farm.
 - d. For multiple-lift rigging, except where the operator's supervisor determines that the trainee's/apprentice's skills are sufficient for this high-skill work.
- 6. A testing entity is permitted to provide training as well as testing services as long as the criteria of the applicable accrediting agency (in the option selected) for an organization providing both services are met.
- 7. Written tests under this section are permitted to be administered verbally, with answers given verbally, where the operator candidate:
 - a. Passes a written demonstration of literacy relevant to the work.
 - b. Demonstrates the ability to use the type of written manufacturer's procedures applicable to the class/type of equipment for which the candidate is seeking certification.
- 8. Certification criteria. Qualifications and certifications must be based, at a minimum, on the following:
 - a. A determination through a written test that:
 - i. The individual knows the information necessary for safe operation of the specific type of equipment the individual will operate, including the following:
 - a. The controls and operational/performance characteristics.
 - b. Use of, and the ability to calculate (manually or with a calculator), load/capacity information on a variety of configurations of the equipment.

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- c. Procedures for preventing and responding to power line contact.
- d. Technical knowledge similar to the subject matter criteria listed in Supplemental Information A of this standard applicable to the specific type of equipment the individual will operate.
- e. Technical knowledge applicable to:
 - The suitability of the supporting ground and surface to handle expected loads.
 - Site hazards.
 - Site access.
- f. This procedure, including applicable incorporated materials.
- ii. The individual is able to read and locate relevant information in the equipment manual and other materials containing information referred to in paragraph 8.a.i of this section.
- b. A determination through a practical test that the individual has the skills necessary for safe operation of the equipment, including the following:
 - i. Ability to recognize, from visual and audible observation, the items listed in shift inspection.
 - ii. Operational and maneuvering skills.
 - iii. Application of load chart information.
 - iv. Application of safe shut-down and securing procedures.

O. Signal Person Qualifications

- 1. The project manager (or his/her designee) of the signal person must ensure that each signal person meets the qualification requirements prior to giving any signals. This requirement will be met by using either of the following options:
 - a. Option 1 – Third-party–qualified evaluator: The signal person has documentation from a third-party qualified

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evaluator showing that the signal person meets the Qualification Requirements (see paragraph 3 of this section).

- b. Option 2 – Project manager's (or his/her designee's) qualified evaluator: The project manager (or his/her designee) has its qualified evaluator assess the individual and determine that the individual meets the Qualification Requirements (see paragraph 3 of this section) and provides documentation of that determination. An assessment by a project manager's (or his/her designee's) qualified evaluator under this option is not portable – other project managers (or their designees) are not permitted to use it to meet the requirements of this section.
 - c. The documentation for whichever option is used will be available while the signal person is employed by the project manager (or his/her designee).
2. If subsequent actions by the signal person indicate that the individual may not meet the Qualification Requirements (see paragraph 3 of this section), the project manager (or his/her designee) must not allow the individual to continue working as a signal person until retraining is provided and a reassessment is made in accordance with paragraph 1 of this section, which confirms that the individual meets the Qualification Requirements.
3. Qualification Requirements. Each signal person must:
- a. Know and understand the type of signals used. If hand signals are used, the signal person must know and understand the Standard Method for hand signals (see Supplemental Information B).
 - b. Be competent in the application of the type of signals used.
 - c. Have a basic understanding of equipment operation and limitations, including the crane dynamics involved in swinging and stopping loads, and boom deflection from hoisting loads.
 - d. Know and understand the relevant requirements of this procedure.
 - e. Demonstrate that he/she meets the requirements in paragraph 3.a through 3.d of this section through a verbal or written test and through a practical test.

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P. Maintenance and Repair Workers' Qualifications

Maintenance, inspection, and repair personnel are permitted to operate the equipment only if the following requirements are met:

1. The operation is limited to those functions necessary to perform maintenance, and to inspect or verify the performance of the equipment.
2. The personnel either:
 - a. Operate the equipment under the direct supervision of an operator who meets the requirements of Section 4.N (Operator Qualifications and Certification) of this standard; or
 - b. Are familiar with the operation, safe limitations, characteristics, and hazards associated with the type of equipment.
3. Maintenance and repair personnel must meet the definition of a qualified person with respect to the equipment and maintenance/repair tasks performed.

Q. Power-Line Safety (up to 350 kV) – Assembly and Disassembly

When involved in assembly/disassembly operations in or around power lines, refer to Section 4.G (Crane Assembly/Disassembly – Power Line Safety (up to 350 kV)) for instructions.

R. Power Line Safety (up to 350 kV) – Equipment Operations

1. Hazard assessments and precautions inside the work zone. Before beginning equipment operations, the project manager (or his/her designee) must:
 - a. Identify the work zone by either:
 - i. Defining a work zone by demarcating boundaries (such as with flags, or a device such as a range-limit device or range-control warning device) and prohibit the operator from operating the equipment past those boundaries; or
 - ii. Defining the work zone as the area 360 degrees around the equipment, up to the equipment's maximum working radius.

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- b. Determine if any part of the equipment, load line, or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line. If so, the project manager (or his/her designee) must meet the requirements in Option 1, Option 2, or Option 3, as follows:
 - i. Option 1 – De-energize and ground. Confirm from the utility owner/operator that the power line has been de-energized and visibly grounded at the worksite.
 - ii. Option 2 – 20-foot clearance. Ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.
 - iii. Option 3 – Clearance.
 - a. Determine the line's voltage and the minimum approach distance permitted under the table provided in Attachment 038-4 NA.
 - b. Determine if any part of the equipment, load line, or load (including rigging and lifting accessories), while operating up to the equipment's maximum working radius in the work zone, could get closer than the minimum approach distance of the power line permitted under Attachment 038-4 NA. If so, then the project manager (or his/her designee) must follow the requirements in paragraph (b) of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum approach distance.
2. Preventing encroachment/electrocution. Where encroachment precautions are required under Option 2 or Option 3 (see paragraphs 1.b.ii and 1.b.iii of this section), the following requirements must be met:
- a. Conduct a planning meeting with the operator and the other workers who will be in the area of the equipment or load to review the location of the power line(s), and the steps that will be implemented to prevent encroachment/electrocution.

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- b. If tag lines are used, they must be non-conductive.
- c. Erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings, at 20 feet from the power line (if using Option 2, see paragraph 1.b.ii of this section).
- d. Implement at least one of the following measures:
 - i. A proximity alarm set to give the operator sufficient warning to prevent encroachment.
 - ii. A dedicated spotter who is in continuous contact with the operator. Where this measure is selected, the dedicated spotter must:
 - a. Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: a clearly visible line painted on the ground; a clearly visible line of stanchions; or a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).
 - b. Be positioned to effectively gauge the clearance distance.
 - c. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator (radio, telephone, or other electronic transmission of signals).
 - d. Give timely information to the operator so that the required clearance distance can be maintained.
 - iii. A device that automatically warns the operator when to stop movement, such as a range-control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.
 - iv. A device that automatically limits range of movement, set to prevent encroachment.
 - v. An insulating link/device installed at a point between the end of the load line (or below) and the load.

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3. Voltage information. Where Option 3 of this section is used, the utility owner/operator of the power lines must provide the requested voltage information within 2 working days of the project manager's (or his/her designee's) request.
4. Operations below power lines.
 - a. No part of the equipment, load line, or load (including rigging and lifting accessories) is allowed below a power line unless the project manager (or his/her designee) has confirmed that the utility owner/operator has de-energized and (at the worksite) visibly grounded the power line, with the exceptions listed below.
 - b. Exceptions. Paragraph 4.a of this section is inapplicable where the project manager (or his/her designee) demonstrates that one of the following applies:
 - i. For equipment with non-extensible booms: The uppermost part of the equipment, with the boom at true vertical, would be more than 20 feet below the plane of the power line, or more than the minimum clearance distance (provided in the table in Attachment 038-4 NA) below the plane of the power line.
 - ii. For equipment with articulating or extensible booms: The uppermost part of the equipment, with the boom in the fully extended position, at true vertical, would be more than 20 feet below the plane of the power line, or more than the minimum clearance distance (provided in the table in Attachment 038-4 NA) below the plane of the power line.
 - iii. The project manager (or his/her designee) demonstrates that compliance with paragraph 4.a of this section is infeasible.
5. The project manager (or his/her designee) must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be de-energized and visibly grounded at the worksite.
6. When working near transmitter/communication towers where the equipment is close enough for an electrical charge to be induced in the equipment or materials being handled, the transmitter will be

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de-energized, or the following precautions will be taken when necessary to dissipate induced voltages:

- a. Provide the equipment with an electrical ground.
- b. Use non-conductive rigging or an insulating link/device.

7. Training

- a. Train operators and crew assigned to work with the equipment on the following:
 - i. The procedures to be followed in the event of electrical contact with a power line, including:
 - a. Information regarding the danger of electrocution from the operator simultaneously touching the equipment and the ground.
 - b. The importance to the operator's safety of remaining inside the cab, *except* where there is an imminent danger of fire, explosion, or other emergency that necessitates leaving the cab.
 - c. The safest means of evacuating from equipment that may be energized.
 - d. The danger for the potentially energized zone around the equipment.
 - e. The need for crew in the area to avoid approaching or touching the equipment.
 - f. Safe clearance distance from power lines.
 - ii. Power lines are presumed to be energized unless the utility owner/operator confirms that the power line has been and continues to be de-energized and visibly grounded at the worksite.
 - iii. Power lines are presumed to be un-insulated unless the utility owner/operator or a registered engineer who is a qualified person with respect to electrical power transmission and distribution confirms that a line is insulated.
 - iv. The limitations of an insulating link/device, proximity alarm, and range control (and similar) device, if used.

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- b. Train persons working as dedicated spotters to enable them to effectively perform their task, including training on the applicable requirements of this section.
8. Devices originally designed by the manufacturer for use as: a safety device, operational aid, or a means to prevent power line contact or electrocution, when used to comply with this section, must meet the manufacturer's procedures for use and conditions of use.

S. Power Line Safety (Over 350 kV)

The requirements of this procedure apply to power lines over 350 kV, except that wherever the distance "20 feet" is specified, the distance "50 feet" will apply in its place.

T. Power Line Safety (All Voltages) – Equipment Operations

Equipment operations in which any part of the equipment, load line, or load, including rigging and lifting accessories, is closer than the minimum approach distance (provided in Attachment 038-4 NA of this standard to an energized power line is prohibited, except where the project manager (or his/her designee) demonstrates that the following requirements are met:

1. The project manager (or his/her designee) determines that it is infeasible to do the work without breaching the minimum approach distance provided in Attachment 038-4 NA of this standard.
2. The project manager (or his/her designee) determines that, after consultation with the utility owner/operator, it is infeasible to de-energize and ground the power line or relocate the power line.
3. Minimum clearance distance

The power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution determines the minimum clearance distance that must be maintained to prevent electrical contact in light of the on-site conditions. The factors that must be considered in making this determination include, but are not limited to: conditions affecting atmospheric conductivity; time necessary to bring the equipment, load line, and load (including rigging and lifting accessories) to a complete stop; wind conditions; degree of sway in the power line; lighting conditions; and conditions affecting the ability to prevent electrical contact.

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4. A planning meeting with the project manager (or his/her designee) and utility owner/operator (or a qualified person with respect to electrical power transmission and distribution) is held to determine the procedures that will be followed to prevent electrical contact and electrocution. At a minimum, these procedures will include:
 - a. If the power line is equipped with a device that automatically reenergizes the circuit in the event of a power line contact, the automatic reclosing feature of the circuit-interrupting device must be made inoperative before work begins.
 - b. A dedicated spotter who is in continuous contact with the operator. The dedicated spotter must:
 - i. Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to, a line painted on the ground; or a clearly visible line-of-sight landmark (such as a fence post behind the dedicated spotter, and a building corner ahead of the dedicated spotter).
 - ii. Be positioned to effectively gauge the clearance distance.
 - iii. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
 - iv. Give timely information to the operator so that the required clearance distance can be maintained.
 - c. An insulating link/device installed at a point between the end of the load line (or below) and the load.
 - d. Non-conductive rigging if the rigging may be within the minimum approach distance (identified in Attachment 038-4 NA) during the operation.
 - e. If the equipment has a device that automatically limits range of movement, it must be used, and set to prevent any part of the equipment, load line, or load (including rigging and lifting accessories) from breaching the minimum approach distance.
 - f. If a tag line is used, it must be of the non-conductive type.

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- g. Erect barricades to form a perimeter at least 10 feet away from the equipment to prevent unauthorized personnel from entering the work area. In areas where obstacles prevent the barricade from being at least 10 feet away, the barricade must be as far from the equipment as feasible.
 - h. Prohibit workers other than the operator from touching the load line above the insulating link/device and crane.
 - i. Permit only personnel essential to the operation to be in the area of the crane and load.
 - j. Properly ground the equipment.
 - k. Insulating-line hose or cover-up will be installed by the utility owner/operator except where such devices are unavailable for the line voltages involved.
- 5. The procedures developed to comply with this section are documented and immediately available on-site.
- 6. The equipment user and utility owner/operator will meet with the equipment operator and the other workers who will be in the area of the equipment or load to review the procedures that will be implemented to prevent breaching the minimum approach distance established in paragraph 3 of this section and prevent electrocution.
- 7. The procedures developed to comply with this section are implemented.
- 8. The utility owner/operator and all project managers (or their designees) of workers involved in the work will identify one person who will direct the implementation of the procedures, and will have the authority to stop work at any time to ensure safety.
- 9. If a problem occurs implementing the procedures to comply with this section, or indicating that those procedures are inadequate to prevent electrocution, the project manager (or his/her designee) must safely stop operations, and either develop new procedures to comply with this section, or have the utility owner/operator de-energize and visibly ground or relocate the power line before resuming work.
- 10. Devices originally designed by the manufacturer for use as a safety device, operational aid, or a means to prevent power line contact or

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electrocution, when used to comply with this section, must meet the manufacturer's procedures for use and conditions of use.

U. Power Line Safety – While Traveling

This section establishes procedures and criteria that must be met for equipment traveling under a power line on the construction site with no load.

1. The project manager (or his/her designee) must ensure that:
 - a. The boom/mast and boom/mast support system are lowered sufficiently to meet the requirements of this paragraph.
 - b. Maintain the clearances specified in Attachment 038-4 NA – Required Clearance for Normal Voltage.
 - c. The effects of speed and terrain on equipment movement (including movement of the boom/mast) are considered so that hose effects do not cause the minimum clearance distances specified in Attachment 038-4 NA – Required Clearance for Normal Voltage, to be breached.
 - d. Dedicated spotter. If any part of the equipment will get closer than 20 feet to the power line while traveling, the project manager (or his/her designee) must ensure that a dedicated spotter who is in continuous contact with the operator is used. The dedicated spotter must:
 - i. Be positioned to effectively gauge the clearance distance.
 - ii. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
 - iii. Give timely information to the operator so that the required clearance distance can be maintained.
 - e. When traveling at night, or in conditions of poor visibility, in addition to the measures specified in paragraphs 1.a through 1.d of this section, the project manager (or his/her designee) must ensure that:
 - i. The power lines are illuminated, or another means of identifying the location of the lines is used.
 - ii. A safe path of travel is identified and used.

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V. Equipment Modifications

1. Modifications or additions that affect the capacity or safe operation of the equipment are prohibited except where the requirements listed below apply.
2. Manufacturer's review and approval.
 - a. The manufacturer approves the modifications/additions in writing.
 - b. The load charts, procedures, instruction manuals, and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.
 - c. The original safety factor of the equipment is not reduced.
3. Unavailable manufacturer. The manufacturer is unavailable and the requirements of paragraphs 1.a and 1.b of this section are met.

W. Design, Construction and Testing

1. The following requirements apply to equipment that has a manufacturer-rated hoisting/lifting capacity of more than 2,000 pounds.
2. Crawler, truck and locomotive cranes must meet the applicable requirements for design, construction, and testing as prescribed in ANSI B30.5-2007, "Crawler, Locomotive, and Truck Cranes," "PCSA Standard No. 2," or the applicable DIN standards that were in effect at the time of manufacture.
3. Mobile (including crawler and truck) and locomotive cranes must meet the following portions of ASME B30.5-2007, "Mobile and Locomotive Cranes," as applicable.

X. Fall Protection

All workers must follow the requirements of the Fall Protection Standard specified in SMS 040.

Y. Operation

1. The project manager (or his/her designee) will comply with all the manufacturer's procedures applicable to the operational functions of equipment, including its use with attachments. The project manager (or his/her designee) should consider the use of

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equipment that has all the manufacturer's procedures and information available during the planning stages of the project.

2. Operational procedures

- a. All cranes arriving on site require pre-inspection, initial and annual inspections, load test, and verification of operator qualifications.
- b. Prior to operation of crane on site, conduct pre-lift planning in accordance with the pre-lift checklist or assembly/disassembly procedures.
- c. Equipment set-up.
 - i. Ensure the equipment will be uniformly level, within 1 percent of level grade, and located on footing that a qualified person has determined to be sufficiently firm and stable.
 - ii. Equipment with outriggers must have all outriggers extended and locked. The amount of extension must be the same for all outriggers, and in accordance with the manufacturer's procedures and load charts.
- d. Procedures related to the capacity of the equipment must be developed and signed by a registered professional engineer familiar with the equipment.

3. Accessibility of procedures

- a. The procedures applicable to the operation of the equipment, including rated capacities (load charts), recommended operating speeds, special hazard warnings, instructions, and operator's manual, must be readily available in the cab at all times for use by the operator.
 - b. Where rated capacities are available in the cab only in electronic form: in the event of a failure that makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities are available.
4. The operator must not engage in any practice that diverts his/her attention while actually engaged in operating the crane, such as the use of cell phones (other than when used for signal communications) or other attention-diverting activities.

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5. Leaving the equipment unattended

- a. The operator must not leave the controls while the load is suspended, except where the following are met:
 - i. The operator remains adjacent to the equipment and is not engaged in any other duties.
 - ii. The load is to be held suspended for a period of time exceeding normal lifting operations.
 - iii. The competent person determines that it is safe to do so, and implements measures necessary to restrain the boom hoist and telescoping, load, swing, and outrigger functions.
 - iv. Barricades or caution lines (and notices) are erected to prevent all workers from entering the fall zone. Do not permit workers in the fall zone.
- b. The provisions in paragraph 5 of this section do not apply to working gear (such as slings, spreader bars, ladders, and welding machines) where the load is not suspended over an entrance or exit.

6. Tag-Out

- a. Where the project manager (or his/her designee) has taken the equipment out of service, a tag must be placed in the cab stating that the equipment is out of service and is not to be used. Where the project manager (or his/her designee) has taken a function(s) out of service, a tag must be placed in a conspicuous position stating that the function is out of service and is not to be used.
- b. Response to "Do Not Operate" tag-out signs
 - i. If there is a warning (tag-out or maintenance/do not operate) sign on the equipment or starting control, the operator must not activate the switch or start the equipment until the sign has been removed by a management person authorized to remove it. An inspection of the entire area must be completed, and all attempts must be made to locate the person who applied the tag or lock prior to any actions. If the person who applied the tag or lock cannot be located, the following steps must be adhered to. Management must determine that:

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- a. No one is servicing, working on, or otherwise in a dangerous position on the machine.
 - b. The equipment has been repaired and is working properly.
- 7. Before starting the engine, the operator must verify that all controls are in the proper starting position and that all personnel are in the clear.
- 8. When a local storm warning has been issued, the competent person will determine whether it is necessary to implement manufacturer's recommendations for securing the equipment.
- 9. The operator must be familiar with the equipment and its proper operation. If adjustments or repairs are necessary, the operator must promptly inform the person designated by the project manager to receive such information; and, where there are successive shifts, inform the next operator.
- 10. In all cases verified weights, measured radii, and manufacturer's loads and capacity chart/capacities and instructions will take precedence over operational aids when handling a load.
- 11. If the competent person determines that there is a slack rope condition requiring re-spooling of the rope, it will be verified (before starting to lift) that the rope is seated on the drum and in the sheaves as the slack is removed.
- 12. The competent person will consider the effect of wind, ice, and snow on equipment stability and rated capacity. Additional information on wind effects is provided in Supplemental Information C.
- 13. Compliance with rated capacity
 - a. Do not operate the equipment in excess of its rated capacity.
 - b. The operator will verify that the load is within the rated capacity of the equipment by at least one of the following methods:
 - i. The weight of the load will be determined from a reliable source (such as the load's manufacturer), by a reliable calculation method (such as calculating a steel beam from measured dimensions and a known per-foot weight), or by other equally reliable means.

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In addition, when requested by the operator, this information will be provided to the operator prior to the lift; or

- ii. The operator will begin hoisting the load to determine—using a load-weighing device—load-moment indicator, rated-capacity indicator, or rated-capacity limiter, if it exceeds 75 percent of the maximum rated capacity at the longest radius that will be used during the lift operation. If it does, the operator will not proceed with the lift until management verifies the weight of the load.

- 14. The boom or other parts of the equipment must not contact any obstruction.
- 15. Do not use the equipment to drag or pull loads sideways.
- 16. On wheel-mounted equipment, do not lift loads over the front area, except as permitted by the manufacturer.
- 17. The operator will test the brakes each time a load that is 90 percent or more of the maximum line pull is handled by lifting the load a few inches and applying the brakes. In duty cycle and repetitive lifts where each lift is 90 percent or more of the maximum line pull, this requirement applies to the first lift, but not to successive lifts.
- 18. Do not lower the load or the boom below the point where less than two full wraps of rope remain on their respective drums.
- 19. Traveling with a load.
 - a. Traveling with a load is prohibited if the practice is prohibited by the manufacturer.
 - b. Where traveling with a load, the project manager (or his/her designee) will ensure that:
 - i. A competent person supervises the operation, determines if it is necessary to reduce rated capacity, and makes determinations regarding load position, boom location, ground support, travel route, overhead obstructions, and speed of movement necessary to ensure safety.
 - ii. The determinations of the competent person required in paragraph 19.b.i of this section are implemented.

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- iii. For equipment with tires, maintain tire pressure specified by the manufacturer.

- 20. Rotational speed of the equipment must be such that the load does not swing out beyond the radius at which it can be controlled.
- 21. A tag or restraint line must be used if necessary to prevent rotation of the load that would be hazardous.
- 22. Adjust the brakes in accordance with the manufacturer's procedures to prevent unintended movement.
- 23. The operator must obey a stop (or emergency stop) signal, irrespective of who gives it.
- 24. A locomotive crane must not be swung into a position where it is reasonably foreseeable that railway cars on an adjacent track could strike it, until it is determined that cars are not being moved on the adjacent track, and that proper flag protection has been established.
- 25. Counterweight/Ballast
 - a. The following applies to equipment other than tower cranes:
 - i. Do not operate equipment without the counterweight or ballast in place, as specified by the manufacturer.
 - ii. Do not exceed the maximum counterweight or ballast specified by the manufacturer for the equipment.

26. Authority to Stop Operation

Whenever there is a safety concern, the operator or any other workers associated with the operation have the authority to stop, and refuse to handle loads until a qualified person has determined that safety has been assured.

Z. Swing Radius Hazards

- 1. The requirements in paragraph 2 of this section apply where there are accessible areas in which the equipment's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:
 - a. Striking and injuring a worker; or

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- b. Pinching/crushing a worker against another part of the equipment or another object.
- 2. To prevent workers from entering these hazard areas, the project manager (or his/her designee) must:
 - a. Instruct workers assigned to work on or near the equipment (authorized personnel) in how to recognize struck-by and pinch/crush hazards areas posed by the rotating superstructure.
 - b. Erect and maintain control lines, warning lines, railings, or similar barriers to mark the boundaries of the hazard areas. Exception: where it is neither feasible to erect such barriers on the ground nor on the equipment, the hazards areas must be clearly marked by a combination of warning signs and high-visibility markings on the equipment that identify the hazard areas. In addition, the project manager (or his/her designee) must train the workers to understand what these markings signify.
- 3. Protecting Workers in the Hazard Area
 - a. Before a worker goes to a location in the hazard area that is out of view of the operator, the worker (or someone instructed by the worker) must ensure that the operator is informed that he/she is going to that location.
 - b. Where the operator knows that a worker went to a location covered by paragraph 1 of this section, the operator will not rotate the superstructure until the operator:
 - i. Gives a warning that is understood by the worker as a signal that the superstructure is about to be rotated and allows time for the worker to get to a safe position, or
 - ii. Is informed in accordance with a pre-arranged system of communication that the worker is in a safe position.
- 4. Multiple Equipment Coordination. Where any part of a crane/derrick is within the working radius of another crane/derrick, the controlling entity must institute a system to coordinate operations. If there is no controlling entity, the project manager (or his/her designee) must institute such a system.
- 5. Keeping Clear of the Load

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- a. Where available, hoisting routes that minimize the exposure of workers to hoisted loads will be used, to the extent consistent with public safety.
 - b. Although the operator is not moving a suspended load, no worker will be within the fall zone, except for workers:
 - i. Engaged in hooking, unhooking, or guiding a load;
 - ii. Engaged in the initial attachment of the load to a component or structure; or
 - iii. Operating a concrete hopper or concrete bucket.
6. When workers are engaged in hooking, unhooking, or guiding the load, or in the initial connection of a load to a component or structure and are within the fall zone, the following criteria must be met:
- a. Rig the materials being hoisted to prevent unintentional displacement.
 - b. Use hooks with self-closing latches or their equivalent.
Exception: "J" hooks are permitted to be used for setting wooden trusses.
 - c. Ensure the materials are rigged by a qualified rigger.
7. Receiving a load. Only workers needed to receive a load will be permitted to be within the fall zone when a load is being landed.
8. During a tilt-up or tilt-down operation:
- a. No worker will be directly under the load.
 - b. Only workers essential to the operation will be in the fall zone (but not directly under the load). Note: Boom free-fall is prohibited when a worker is in the fall zone of the boom or load, and load-line free-fall is prohibited when a worker is directly under the load.

AA. Free-fall and Controlled-Load Lowering

1. Boom free-fall prohibitions

- a. The use of equipment in which the boom is designed to free-fall (live boom) is prohibited in each of the following circumstances:

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- i. A worker is in the fall zone of the boom or load.
 - ii. A worker is being hoisted.
 - iii. The load or boom is directly over a power line, or over any part of the area extending the minimum clearance distance (identified in Attachment 038-4 NA) to each side of the power line.
 - iv. The load is over a shaft.
 - v. The load is over a cofferdam, except where there are no workers in the fall zone.
 - vi. Lifting operations are taking place in a refinery or tank farm.
 - b. The use of equipment in which the boom is designed to free-fall (live boom) is permitted only where none of the circumstances listed in paragraph 1.a of this section are present and:
 - i. The equipment was manufactured prior to October 31, 1984; or
 - ii. The equipment is a floating crane/derrick or a land crane/derrick on a vessel/flotation device.
2. Preventing boom free-fall. Where the use of equipment with a boom that is designed to free-fall (live boom) is prohibited, the boom hoist must have a secondary mechanism or device designed to prevent the boom from falling in the event the primary system used to hold or regulate the boom hoist fails, as follows:
- a. Friction drums; these must have:
 - i. A friction clutch and a braking device to allow for controlled boom lowering.
 - ii. A secondary braking or locking device, which is manually or automatically engaged, to back up the primary brake while the boom is held (such as a secondary friction brake or a ratchet and pawl device).
 - b. Hydraulic drums must have an integrally mounted holding device or internal static brake to prevent boom hoist movement in the event of hydraulic failure.

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- c. Neither clutches nor hydraulic motors will be considered brake or locking devices for purposes of this subpart.
 - d. Hydraulic boom cylinders must have an integrally mounted holding device.
- 3. Preventing uncontrolled retraction. Hydraulic telescoping booms must have an integrally mounted holding device to prevent the boom from retracting in the event of hydraulic failure
- 4. Load line free-fall. In each of the following circumstances, controlled-load lowering is required, and free-fall of the load-line hoist is prohibited:
 - a. A worker is directly over a power line, or over any part of the area extending the minimum clearance distance (as defined in Attachment 038-4 NA) to each side of the power line.
 - b. The load is over a shaft or cofferdam.

BB. Signals – General Requirements

- 1. A signal person must be provided in each of the following situations:
 - a. The point of operation, meaning the load travel or the area near or at load placement, is not in full view of the operator.
 - b. When the equipment is traveling, the view in the direction of travel is obstructed.
 - c. Due to site-specific safety concerns, either the operator or the person handling the load determines that it is necessary.
- 2. Types of signals. Signals to operators must be by hand, voice or audible.
- 3. Hand signals. When using hand signals, the Standard Method must be used (see Supplemental Information B for additional information).
- 4. Signals other than hand, voice, or audible signals may be used where the project manager (or his/her designee) demonstrates that:
 - a. The new signals provide communication at least equally effective as voice, audible, or standard method hand signals; or

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- b. There is a national consensus standard for the new signals.
- 5. The signals used (hand, voice, audible, or new), and means of transmitting the signals to the operator (such as direct line of sight, video, radio, etc.), must be appropriate for the site conditions.
- 6. During operations requiring signals, the ability to transmit signals between the operator and signal person must be maintained. If that ability is interrupted at any time, the operator will safely stop operations requiring signals until it is reestablished, and a proper signal is given and understood.
- 7. If the operator becomes aware of a safety problem and needs to communicate with the signal person, the operator must safely stop operations. Operations may not resume until the operator and signal person agree that the problem has been resolved.
- 8. Only one person gives signals to a crane/derrick at a time, unless anyone who becomes aware of a safety problem must alert the operator or signal person by giving the stop or emergency stop signal. Note that this procedure requires the operator to obey a stop or emergency stop signal.
- 9. All directions given to the operator by the signal person must be given from the operator's direction perspective.
- 10. Communication with multiple cranes/derricks. Where a signal person(s) is in communication with more than one crane/derrick, a system for identifying the crane/derrick each signal is for must be used, as follows:
 - a. For each signal, prior to giving the function/direction, the signal person will identify the crane/derrick the signal is for; or
 - b. An equally effective method of identifying which crane/derrick the signal is for must be used.

CC. Signals – Radio, Telephone, or other Electronic Transmission

- 1. Test the device(s) used to transmit signals on site before beginning operations to ensure that the signal transmission is clear and reliable.
- 2. Signal transmission must be through a dedicated channel.
Exception: Multiple cranes/derricks and one or more signal persons

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may share a dedicated channel for the purpose of coordinating operations.

3. The operator's reception of signals must be by a hands-free system.

DD. Signals – Voice

1. Prior to beginning operations, the operator, signal person, and lift supervisor (if there is one), will contact each other and agree on the voice signals that will be used. Once the voice signals are agreed upon, these workers need not meet again to discuss voice signals unless another worker is substituted; there is confusion about the voice signals; or a voice signal is to be changed.
2. Each voice signal must contain the following three elements, given in the following order: function (such as hoist, boom, etc.), direction (distance and/or speed); and the 'stop' command.
3. The operator, signal person, and lift supervisor (if there is one), must be able to effectively communicate in the language used.

EE. Signals – Hand Signal Chart

Hand signal charts must either be posted on the equipment, or readily available at the site.

FF. Training

1. The project manager (or his/her designee) must provide training as follows:
2. Overhead power lines. Train workers specified in Section 4.N of this standard in accordance with the requirements of that section.
3. Signal persons. Train workers who will be assigned to work as signal persons who do not meet the requirements of this section in the areas addressed in Section 4.O of this standard.
4. Operators.
 - a. Train operators who are not qualified or certified under the conditions within this standard in those areas addressed in this standard. Provide retraining if necessary for re-qualification or re-certification or if the operator does not pass a qualification or certification test.

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- b. Train operators in the following practices:
 - i. On friction equipment, whenever moving a boom off a support, first raise the boom a short distance (sufficient to take the load off the boom) to determine if the boom hoist brake needs to be adjusted. On other types of equipment, the same practice is applicable, except that typically there is no means of adjusting the brake; if the brake does not hold, a repair is necessary.
 - ii. Where available, the manufacturer's emergency procedures for halting unintended equipment movement.
- 5. Competent persons and qualified persons. Train competent persons and qualified persons regarding the requirements of ASME B30 standards applicable to their respective roles.
- 6. Crush/pinch points. Instruct workers who work with the equipment to keep clear of holes, and crush/pinch points and the hazards addressed in this procedure (work area control).
- 7. Lock-out /Tag-out. Train operators and other workers authorized to start/energize equipment or operate equipment controls (such as maintenance and repair workers) in the tag-out measures in this procedure.
- 8. Training administration
 - a. The project manager (or his/her designee) must ensure that workers required to be trained under this procedure are evaluated to confirm that they understand the information provided in the training.
 - b. Provide refresher training in relevant topics when, based on the conduct of the worker or an evaluation of the worker's knowledge, there is an indication that retraining is necessary.

GG. Critical Lifts

- 1. Critical lift identifies loads classified as requiring a formal, written plan. A critical lift is defined as a non-routine crane lift requiring detailed planning, and additional or unusual safety precautions. Critical lifts include lifts made when the load is greater than

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75 percent of the rated capacity of the crane in the configuration that the lift will be made; lifts that require the load to be lifted, swung, or placed out of the operators view; lifts made with more than one crane; lifts involving non-routine or technically difficult rigging arrangements; lifts of long lead time permanent materials; lifts that involve lifting loads over structures or equipment; lifts taking place in a confined or limited access areas; hoisting personnel with a crane or derrick; or any lift that the lift supervisor thinks should be considered critical.

2. The following items should be documented/included with (critical) lift plans:
 - a. Copy of the completed Attachment 038-3 NA – Critical Lift Plan Form (note: this same form may also be used for non-critical lifts).
 - b. Sketch of elevation view of the crane and load.
 - c. Sketch of plan view of crane and load indicating associated radius and distances, or setup and load.
 - d. Copy of the crane load chart.
 - e. Copy of the crane range diagram.
 - f. Copy of the crane outline dimensions.
 - g. Rigging diagram indicating minimum size of slings and shackles.
 - h. Calculation indicating adequacy of rigging.
3. Critical Lift Plan Requirements
 - a. A Critical Lift Plan consists of as many drawings, specifications, and procedures as necessary to accurately assess all important load factors and site factors relating to a Critical Lift. These items are included as a guide, but should not be interpreted as being all-inclusive in the analysis and preparation of a Critical or Pre-Engineered Lift. Sound engineering and planning is still the responsibility of the engineer and/or project supervisor associated with the lift. Supplemental Information D (Checklist for Lift Planning) summarizes those factors. Most lifts do not involve all of the factors listed there.

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- b. The following is the minimum level of information required for completing an adequate critical lift plan:
 - i. Elevation View Drawing of the crane, load, and any nearby structures that could cause interference. This drawing must be made to scale and should note:
 - a. Crane manufacturer(s), model(s), and counterweight(s), if variable.
 - b. Boom length(s) and lifting radius.
 - c. Maximum load elevation during lifting procedure.
 - d. Any jibs or special lifting devices required.
 - e. Minimum number of parts of crane hoist line required for lifting the load.
 - f. All required slings, shackles, and other rigging components identified by capacity, size, length, and location.
 - g. Calculated center of gravity of load.
 - ii. Plan View Drawing of the crane, load, and nearby structures that could cause interference. This drawing must be made to scale and should note:
 - a. Route that transport will take to position the load for lifting.
 - b. Initial lifting position of the load, including radius. Lifting radius must be accurately determined.
 - c. Final placement position of the load, including radius. Lifting radius must be accurately determined.
 - d. Location of the crane(s), including tail swing limits.
 - e. Route that crane(s) will take if walking with the load, as well as associated matting requirements.

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- f. Any utilities located within the work zone. Underground facilities—piping, ducts, etc.—must be accurately located.
 - g. Space may be needed to assemble crane.
 - h. Planning must include load transportation considerations, such as how to get the load close enough to the crane. This may be a function of the type of crane being used, because some cranes perform better in certain sectors (quadrants) of operation than others.
 - iii. Lift Analysis, including:
 - a. Tabulation of the gross load weight, including the weight of all blocks and rigging tackle.
 - b. Rigging attachment points and special rigging requirements.
 - c. Gross rated capacity of the crane in the configuration specified.
 - d. Calculation of the percentage of the crane's rated capacity at which the lift will be made.
 - e. Crane-imposed soil loads must be determined. Soil analysis may be needed to verify crane-imposed loads can be safely supported.
 - f. Allowable weather conditions for the lift, and the effect of wind loading.
 - g. Sequence of work, including lift-off, steady-state conditions, and set-down of load (including positions where there is a shift in the location of the center of gravity, for the pick points).
 - h. Completed Critical Lift Plan (see Attachment 038-2 NA).
 - i. Copy of crane range diagram.
 - j. Copy of crane load chart.
 - k. Copy of crane outline dimensions.

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- iv. All potential complicating issues for any lift must be addressed in the lift plan; however, for a relatively simple operation, the above items can provide sufficient information, and may even be organized onto one drawing.

HH. Personnel Hoisting

1. Hoisting personnel is considered to be a Critical Lift. All of the following criteria must be observed and in place prior to any personnel hoisting. The Personnel Platform Lifting Form (see Attachment 038-9 NA) with applicable signatures must be completed prior to lifting, as well as any criteria required in the Critical Lifts section of this standard. Additional information on hoisting personnel is provided in Supplemental Information E.
2. Procedures
 - a. Personnel are only allowed to ride in a personnel platform supported by the crane load line attachment or boom-mounted platform when used in accordance with the requirements of ASME B30.23 and the crane manufacturer's instructions. The crane may not be used for other purposes while handling personnel.
3. The requirements of this section are supplemental to the other requirements in this standard, and apply when one or more workers are hoisted.
4. The use of equipment to hoist workers is prohibited except where the project manager (or his/her designee) demonstrates that the erection, use, and dismantling of conventional means of reaching the worksite, such as a personnel hoist ladder, stairway, aerial lift, elevating work platform, or scaffold, would be more hazardous, or is not possible because of the project's structural design or worksite conditions.
5. Use of personnel platform:
 - a. When using equipment to hoist workers, the workers must be in a personnel platform that meets the requirements of paragraph 8 of this section.
 - b. Exceptions: A personnel platform is not required for hoisting workers:

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- i. Into and out of drill shafts that are up to and including 8 feet in diameter (see paragraph 16 of this section for requirements for hoisting these workers).
- ii. In pile driving operations (see paragraph 17 of this section for requirements for hoisting these workers).
- iii. Solely for transfer to or from a marine worksite in a marine hoisted-personnel transfer device (see paragraph 18 of this section for requirements for hoisting these workers).
- iv. In storage tank (steel or concrete), shaft, and chimney operations (see paragraph 19 of this section for requirements for hoisting these workers).

6. Equipment set-up

- a. The equipment must be uniformly level, within 1 percent of level grade, and located on footing that a qualified person has determined to be sufficiently firm and stable.
- b. Equipment with outriggers must have them all extended and locked. The amount of extension must be the same for all outriggers and in accordance with the manufacturer's procedures and load charts.

7. Equipment criteria

- a. Capacity – Use of suspended personnel platforms. The total load (with the platform loaded, including the hook, load line, and rigging) will not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing.
- b. Capacity – Use of boom-attached personnel platforms. The total weight of the loaded personnel platform will not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing.
- c. Capacity – Hoisting personnel without a personnel platform. When hoisting personnel without a personnel platform, the total load (including the hook, load line, rigging and any other equipment that imposes a load) will not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing.

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- d. When the occupied personnel platform is in a stationary working position, the load and boom hoist brakes, swing brakes, and operator-actuated secondary braking and locking features (such as pawls or dogs) or automatic secondary brakes must be engaged.
- e. Devices.
 - i. Equipment (except for derricks) with a variable-angle boom must be equipped with:
 - a. A boom angle indicator, readily visible to the operator.
 - b. A boom hoist limiting device.
 - ii. Equipment with a luffing jib must be equipped with:
 - a. A jib angle indicator, readily visible to the operator.
 - b. A jib hoist limiting device.
 - iii. Equipment with telescoping booms must be equipped with a device to indicate the boom's extended length clearly to the operator, or have measuring marks on the boom.
 - iv. Anti two-block. A device that automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component) must be used. The device(s) must prevent such damage/failure at all points where two-blocking could occur.
 - v. Controlled load lowering. The load line hoist drum must have a system, other than the load line hoist brake, that regulates the lowering rate of speed of the hoist mechanism. This system or device must be used when hoisting personnel. Free-fall of the load line hoist is prohibited. The use of equipment in which the boom hoist mechanism can free-fall is prohibited.
 - vi. Proper operation required. Personnel hoisting operations will not begin unless the devices listed in this section are in proper working order. If a device stops working properly during such operations, the

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operator must safely stop operation. Personnel hoisting operations must not resume until the device is again working properly. Alternative measures are not permitted.

- f. Direct attachment of a personnel platform to a luffing jib is prohibited.

8. Personnel platform criteria

- a. The personnel platform and attachment/suspension system must be designed for hoisting personnel by a qualified person familiar with structural design.
- b. The system used to connect the personnel platform to the equipment must allow the platform to remain within 10 degrees of level, regardless of boom angle.
- c. The suspension system must be designed to minimize tipping of the platform due to movement of workers occupying the platform.
- d. The personnel platform itself (excluding the guardrail system and personal fall arrest system anchorages), must be capable of supporting, without failure, its own weight and at least five times the maximum intended load.
- e. All welding of the personnel platform and its components must be performed by a certified welder familiar with the weld grades, types, and material specified in the platform design.
- f. Equip the personnel platform with a guardrail system that meets the requirements of URS Fall Protection procedures as specified in SMS 040, and is enclosed at least from the toe-board to mid-rail with either solid construction material, or expanded metal having openings no greater than ½ inch (1.27 centimeters). Points to which personal fall arrest systems are attached must meet the anchorage requirements in URS Fall Protection procedures, as specified in SMS 040.
- g. Install a grab rail inside the entire perimeter of the personnel platform except for access gates/doors.

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- h. Access gates/doors. If installed, access gates/doors of all types (including swinging, sliding, folding, or other types) will:
 - i. Not swing outward.
 - ii. Be equipped with a device that prevents accidental opening.
 - i. Ensure headroom is sufficient to allow workers to stand upright in the platform.
 - j. In addition to the use of hard hats, protect workers by overhead protection on the personnel platform when workers are exposed to falling objects.
 - k. All edges exposed to worker contact must be smooth enough to prevent injury.
 - l. Conspicuously post the weight of the platform and its rated capacity on the platform with a plate or other permanent marking.
- 9. Personnel platform loading
 - a. Do not load the personnel platform in excess of its rated capacity.
 - b. Use.
 - i. Personnel platforms will be used only for workers, their tools, and the materials necessary to do their work. Platforms must not be used to hoist materials or tools when not hoisting personnel.
 - ii. Exception: materials and tools to be used during the lift, if secured and distributed in accordance with paragraph 9.c below of this section, may be in the platform for trial lifts.
 - c. Materials and tools must be:
 - i. Secured to prevent displacement.
 - ii. Evenly distributed within the confines of the platform while it is suspended.
 - d. The number of workers occupying the personnel platform will not exceed the maximum number the platform was designed

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to hold, or the number required to perform the work, whichever is less.

10. Attachment and rigging

- a. Dedicated rigging: Do not use the rigging used for hoisting personnel for any other hoisting activities such as materials or equipment.
- b. Hooks and other detachable devices.
 - i. Hooks used in the connection between the hoist line and the personnel platform (including hooks on overhaul ball assemblies, lower load blocks, bridle legs, or other attachment assemblies or components) must be:
 - a. Of a type that can be closed and locked, eliminating the throat opening.
 - b. Closed and locked when attached.
 - ii. Shackles used in place of hooks must be of the alloy anchor type, with either:
 - a. A bolt, nut, and retaining pin designed for the shackle, in place; or
 - b. Of the screw type, with the screw pin secured from accidental removal.
 - iii. Where other detachable devices are used, they must be of the type that can be closed and locked to the same extent as the devices addressed in paragraph 7.b.i and 7.b.ii of this section. Such devices must be closed and locked when attached.
- c. Rope bridle. When a rope bridle is used to suspend the personnel platform, each bridle leg must be connected to a master link or shackle (see paragraph 10 of this section) in a manner that ensures that the load is evenly divided among the bridle legs.
- d. Rigging hardware (including wire rope, shackles, rings, master links, and other rigging hardware) and hooks must be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation-resistant rope is used, the slings

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must be capable of supporting, without failure, at least ten times the maximum intended load.

- e. Fabricate eyes in wire rope slings with thimbles.
- f. Use bridles and associated rigging for suspending the personnel platform only for the platform and the necessary workers, their tools, and materials necessary to do their work, and do not use for any other purpose when not hoisting personnel.

11. Trial lift and inspection

- a. Make a trial lift with the unoccupied personnel platform loaded at least to the anticipated lift weight from ground level, or any other location where workers will enter the platform, to each location at which the platform is to be hoisted and positioned. Where there is more than one location to be reached from a single set-up position, perform either individual trial lifts for each location, or a single trial lift for all locations.
- b. Perform the trial lift immediately prior to each shift in which personnel will be hoisted. In addition, repeat the trial lift prior to hoisting workers in each of the following circumstances:
 - i. The equipment is moved and set up in a new location or returned to a previously used location.
 - ii. The lift route is changed, unless the competent person determines that the new route presents no new factors affecting safety.
- c. The competent person must determine that:
 - i. Safety devices and operational aids required by this section are activated and functioning properly. Other safety devices and operational aids must meet the requirements of this procedure.
 - ii. Nothing interferes with the equipment or the personnel platform in the course of the trial lift.
 - iii. The lift will not exceed 50 percent of the equipment's rated capacity at any time during the lift.
 - iv. The load radius to be used during the lift has been accurately determined.

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- d. Immediately after the trial lift, the competent person must:
 - i. Conduct a visual inspection of the equipment, base support or ground, and personnel platform to determine whether the trial lift has exposed any adverse effect.
 - ii. Confirm that, upon the completion of the trial lift process, the test weight has been removed.
- e. Immediately prior to each lift:
 - i. Hoist the platform a few inches and have it inspected by a competent person to ensure that it is secure and properly balanced.
 - ii. The following conditions must be determined to exist by a competent person before the lift of personnel proceeds:
 - a. Hoist ropes are free of deficiencies in accordance with this procedure.
 - b. Multiple part lines are not twisted around each other.
 - c. The primary attachment is centered over the platform.
 - d. If the load rope is slack, the hoisting system must be inspected to ensure that all ropes are properly seated on drums and in sheaves.
- f. Any condition found during the trial lift and subsequent inspection(s) that fails to meet a requirement of this procedure or otherwise creates a safety hazard must be corrected before hoisting personnel.

12. Proof testing

- a. At each jobsite, prior to hoisting workers on the personnel platform, and after any repair or modification, the platform and rigging must be proof-tested to 125 percent of the platform's rated capacity. The proof test may be done concurrently with the trial lift.
- b. The platform must be lowered by controlled load lowering; braked; and held in a suspended position for a minimum of

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5 minutes with the test load evenly distributed on the platform.

- c. After proof testing, a competent person must inspect the platform and rigging to determine if the test has been passed. If any deficiencies are found that pose a safety hazard, the platform and rigging cannot be used to hoist personnel unless the deficiencies are corrected; the test is repeated; and a competent person determines that the test has been passed.
- d. Do not conduct personnel hoisting until the competent person determines that the platform and rigging have successfully passed the proof test.

13. Work practices

- a. Perform the hoisting of the personnel platform in a slow, controlled, cautious manner, with no sudden movements of the equipment or the platform.
- b. Platform occupants must:
 - i. Keep all parts of the body inside the platform during raising, lowering, and horizontal movement. This provision does not apply to an occupant of the platform when necessary to position the platform or while performing the duties of a signal person.
 - ii. Not stand, sit on, or work from the top or intermediate rail or toe board, or use any other means/device to raise their working height.
 - iii. Not pull the platform out of plumb in relation to the hoisting equipment.
- c. Before workers exit or enter a hoisted personnel platform that is not landed, the platform must be secured to the structure where the work is to be performed, unless securing to the structure would create a greater hazard.
- d. If the platform is tied to the structure, the operator must not move the platform until the operator receives confirmation that it is freely suspended.
- e. Use tag lines when necessary to control the platform.

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- f. Platforms without controls. Where the platform is not equipped with controls, the equipment operator must remain at the equipment controls at all times while the platform is occupied.
- g. Platforms with controls. Where the platform is equipped with controls, the following must be met at all times while the platform is occupied:
 - i. The occupant using the controls in the platform must be a qualified person with respect to their use, including the safe limitations of the equipment and hazards associated with its operation.
 - ii. The equipment operator must be at the equipment controls, or in the personnel platform, or on site and in view of the equipment.
 - iii. The platform operating manual must be in the platform or on the equipment.
- h. Environmental conditions.
 - i. Wind. When wind speed (sustained or gusts) exceeds 20 mph at the personnel platform, a qualified person must determine if, in light of the wind conditions, it is not safe to lift personnel. If it is not, the lifting operation will not begin (or, if already in progress, will be terminated).
 - ii. Other weather and environmental conditions. A qualified person must determine if, in light of indications of dangerous weather conditions, or other impending or existing danger, it is not safe will not begin (or, if already in progress, will be terminated).
- i. Workers being hoisted must remain in direct communication with the signal person (where used), or the operator.
- j. Fall protection
 - i. Except over water, workers occupying the personnel platform must be provided and use a personal fall arrest system. The system must be attached to a structural member within the personnel platform.
 - ii. The fall arrest system, including the attachment point (anchorage) used to comply with paragraph 10.j.i of

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this section, must meet the requirements of SMS 040 – Fall Protection.

k. Other load lines

- i. Do not make lifts on any other of the equipment's load lines while personnel are being hoisted, except in pile driving operations.
- ii. Factory-produced boom-mounted personnel platforms that incorporate a winch as original equipment: Loads are permitted to be hoisted by such a winch while workers occupy the personnel platform only where the load on the winch line does not exceed 500 pounds, and does not exceed the rated capacity of the winch and platform.

l. Traveling – Equipment other than derricks

Hoisting of workers while the equipment is traveling is prohibited.

m. Traveling – Derricks.

Derricks are prohibited from traveling while personnel are hoisted.

14. Pre-lift meeting. A pre-lift meeting will be:

- a. Held to review the applicable requirements of this section and the procedures that will be followed.
- b. Attended by the equipment operator, signal person (if used for the lift), workers to be hoisted, and the person responsible for the task to be performed.
- c. Held prior to the trial lift at each new work location, and repeated for any workers newly assigned to the operation.

15. Hoisting personnel near power lines. Hoisting personnel within 20 feet of a power line that is up to 350 kV, and hoisting personnel within 50 feet of a power line that is over 350 kV, is prohibited.

16. Hoisting personnel in drill shafts. When hoisting workers into and out of drill shafts that are up to and including 8 feet in diameter, the following requirements must be met:

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- a. The worker must be in either a personnel platform or on a boatswain's chair.
 - b. If using a personnel platform, paragraphs (a) through (n) of this section apply.
 - c. If using a boatswain's chair:
 - i. The following paragraphs of this section apply: 4; 6; 7.a; 7.c; 7.d; 8.a through 8.c; 9.a; 9.b.i; 9.c.i; 10; 11; 13.a; 13.f; 13.h; 13.i; 13.k.i; 14; and 15. Where the terms "personnel platform" or "platform" are used in these paragraphs, the term "boatswain's chair" applies in their place.
 - ii. Station a signal person at the shaft opening.
 - iii. Hoist the worker in a slow, controlled descent and ascent.
 - iv. The worker must use personal fall protection equipment, including a full body harness, attached independent of the crane/derrick.
 - v. The fall protection equipment must meet the applicable Fall Protection requirements (SMS 040).
 - vi. The boatswain's chair itself (excluding the personal fall arrest system anchorages), must be capable of supporting, without failure, its own weight and at least five times the maximum intended load.
 - vii. No more than one person will be hoisted at a time.
17. Hoisting personnel for pile-driving operations. When hoisting a worker in pile-driving operations, the following requirements must be met:
- a. The worker must be in a personnel platform or boatswain's chair.
 - b. For lattice-boom cranes, clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, and use a spotter.
 - c. If using a personnel platform, paragraphs 4 through 15 of this section apply.

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- d. If using a boatswain's chair:
 - i. "Platform" is used in these paragraphs; the term "boatswain's chair" applies in their place.
 - ii. Worker must be hoisted in a slow, controlled descent and ascent.
 - iii. The worker must use personal fall protection equipment, including a full body harness, independently attached to the lower load block or overhaul ball.
 - iv. The fall protection equipment must meet the applicable Fall Protection requirements as specified in SMS 040.
- 18. Hoisting personnel for marine transfer. When hoisting workers solely for transfer to or from a marine worksite, the following requirements must be met:
 - a. The worker must be in either a personnel platform or a marine-hoisted personnel transfer device.
 - b. If using a personnel platform, paragraphs 4 through 15 of this section apply.
 - c. If using a marine-hoisted personnel transfer device:
 - i. The following paragraphs of this section apply: 4; 6.b; 7.a; 7.c; 7.d; 8.a through 8.e; 8.l; 9.a; 10; 11; 12; 13.a; 13.f; 13.h; 13.i; 13.j.ii; 13.k.i; 13.l; 14; and 15. Where the terms "personnel platform" or "platform" are used in these paragraphs, the term "marine-hoisted personnel transfer device" applies in their place.
 - ii. The transfer device will be used only for transferring workers.
 - iii. The number of workers occupying the transfer device will not exceed the maximum number it was designed to hold.
 - iv. Each worker must wear a U.S. Coast Guard personal flotation device approved for industrial use.
- 19. Hoisting personnel for storage tank (steel or concrete), shaft, and chimney operations. When hoisting a worker in storage tank (steel

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or concrete) shaft, and chimney operations, the following requirements must be met:

- a. The worker must be in a personnel platform, except where use of a personnel platform is infeasible; in such a case, a boatswain's chair will be used.
- b. If using a personnel platform, paragraphs 4 through 15 of this section apply.
- c. If using a boatswain's chair:
 - i. The following paragraphs of this section apply: 4; 6; 7.a; 7.c; 7.d; 8.a; 8.b; 8.c; 9.a; 9.b.i; 9.c.i; 10; 11; 13.a; 13.f; 13.h; 13.i; 13.k.i; 14; and 15. Where the terms "personnel platform" or "platform" are used in these paragraphs, the term "boatswain's chair" applies in their place.
 - ii. The worker must be hoisted in a slow, controlled descent and ascent.
 - iii. The worker must use personal fall protection equipment, including a full-body harness, attached independent of the crane/derrick.
 - iv. The fall protection equipment must meet the applicable requirements as specified in SMS 040 – Fall Protection.
 - v. The boatswain's chair itself (excluding the personal fall arrest system anchorages), must be capable of supporting, without failure, its own weight and at least five times the maximum intended load.
 - vi. Do not hoist more than one person at a time.

II. Floating Cranes/Derricks and Land Cranes/Derricks on Barges

- 1. This section contains supplemental requirements for floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels, or other means of flotation (vessel/flotation device). The requirements of this section do not apply when using jacked barges when the jacks are deployed to the river/lake/sea-bed, and the barge is fully supported by the jacks.
- 2. Work area control. The project manager (or his/her designee) must either:

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- a. Erect and maintain control lines, warning lines, railings, or similar barriers to mark the boundaries of the hazard areas; or
 - b. The hazard areas must be clearly marked by a combination of warning signs and high-visibility markings on the equipment that identify the hazard areas. In addition, the project manager (or his/her designee) must train the workers to understand what these markings signify.
3. Keep clear of the load.
4. Additional Safety devices. In addition to the safety devices listed in this procedure, the following safety devices are required:
 - a. Barge, pontoon, vessel, or other means of flotation list and trim device will be located in the cab; or, where there is no cab, at the operator's station.
 - b. Horn.
 - c. Positive equipment house lock.
 - d. Wind speed and direction indicator. A competent person will determine if wind is a factor that needs to be considered; if so, a wind speed and direction indicator will be used.
5. Operational aids.
 - a. An anti-two-block device is required only when hoisting personnel or hoisting over an occupied cofferdam or shaft.
 - b. Section (load weighing and similar devices) does not apply to dragline, clamshell (grapple), magnet, drop ball, container handling, concrete bucket, and pile driving work.
6. Accessibility of procedures applicable to equipment operation. If the crane/derrick has a cab, the requirements of this procedure apply. If the crane/derrick does not have a cab:
 - a. Rated capacities (load charts) must be posted at the operator's station. If the operator's station is moveable (such as with pendant-controlled equipment), the load charts must be posted on the equipment.

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- b. Procedures applicable to the operation of the equipment (other than load charts), recommended operating speeds, special hazard warnings, instructions and operators manual, must be readily available on board.
- 7. Inspections. In addition to meeting the requirements of this procedure for inspecting the crane/derrick, the project manager (or his/her designee) must ensure that the barge, pontoons, vessel, or other means of flotation used to support a floating crane/derrick or land crane/derrick is inspected as follows:
 - a. Shift. The means used to secure/attach the equipment to the vessel/flotation device must be inspected for wear, corrosion, loose or missing fasteners, defective welds, and, where applicable, insufficient tension.
 - b. Monthly. Inspect the vessel/flotation device used as follows:
 - i. The means used to secure/attach the equipment to the vessel/flotation device must be inspected for wear, corrosion, loose or missing fasteners, defective welds, and, where applicable, insufficient tension.
 - ii. Taking on water.
 - iii. Deck load for proper securing.
 - iv. Chain lockers, storage, fuel compartments and battening of hatches for serviceability as a water-tight appliance.
 - v. Firefighting and lifesaving equipment in place and functional.
 - c. The shift and monthly inspections must be conducted by a competent person. If any deficiency is identified, an immediate determination will be made by a qualified person as to whether the deficiency constitutes a hazard. If the deficiency is determined to constitute a hazard, the vessel/flotation device must be removed from service until it has been corrected.
 - d. Annual: External vessel/flotation device inspection.
 - i. The external portion of the barge, pontoons, vessel, or other means of flotation used must be inspected annually by a qualified person who has expertise with

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respect to vessels/flotation devices. The inspection must include the following items:

- a. The items identified in paragraphs 6.a and 6.b of this section.
 - b. Cleats, bitts, chocks, fenders, capstans, ladders, and stanchions for significant corrosion, wear, deterioration, and deformation.
 - c. External evidence of leaks and structural damage.
 - d. Four-corner draft readings.
 - e. Firefighting equipment for serviceability.
 - ii. Rescue skiffs, lifelines, work vests, life preservers and ring buoys must be inspected for proper condition.
 - iii. If any deficiency is identified, an immediate determination will be made by the qualified person as to whether the deficiency constitutes a hazard; or, although not yet a hazard, needs to be monitored in the monthly inspections. If the deficiency is determined to constitute a hazard, the vessel/flotation device must be removed from service until it has been corrected.
 - iv. If the qualified person determines that, although not currently a hazard, the deficiency needs to be monitored, the project manager (or his/her designee) must ensure that the deficiency is checked in the monthly inspections.
- e. Quadrennial: Internal vessel/flotation device inspection:
- i. The internal portion of the barge, pontoons, vessel, or other means of flotation used must be surveyed once every 4 years by a marine engineer, marine architect, licensed surveyor, or other qualified person who has expertise with respect to vessels/flotation devices.
 - ii. If any deficiency is identified, an immediate determination will be made by the surveyor as to whether the deficiency constitutes a hazard; or, although not yet a hazard, needs to be monitored in the monthly inspections as appropriate.

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- iii. If the deficiency is determined to constitute a hazard, the vessel/flotation device must be removed from service until it has been corrected.
 - iv. If the surveyor determines that, although not currently a hazard, the deficiency needs to be monitored, the project manager (or his/her designee) must ensure that the deficiency is checked in the monthly or annual inspections as appropriate.
 - f. Documentation. The monthly and annual inspections required in paragraphs 6.a and 6.d of this section must be documented in accordance with this procedure. The quadrennial inspection required in paragraph 6.e of this section must be documented in accordance with this procedure, except that the documentation for that inspection will be retained for a minimum of 4 years.
8. Working with a diver. The following additional requirements apply when working with a diver in the water:
- a. If a crane/derrick is used to get a diver into and out of the water, it cannot be used for any other purpose until the diver is back on board. When used for more than one diver, it cannot be used for any other purpose until all divers are back on board.
 - b. The operator must remain at the controls of the crane/derrick at all times.
 - c. In addition to the signals requirements in this procedure (Sections BB through EE); either:
 - i. A clear line of sight must be maintained between the operator and tender, or
 - ii. The signals between the operator and tender must be transmitted electronically.
 - d. The means used to secure the crane/derrick to the vessel/flotation device cannot allow any amount of shifting in any direction.
9. The project manager (or his/her designee) must ensure that the manufacturer's specifications and limitations with respect to environmental, operational, and in-transit load for the barge,

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pontoons, vessel, or other means of flotation are not exceeded or violated.

10. Floating cranes/derricks. For equipment designed by the manufacturer (or project manager or his/her designee) for marine use by permanent attachment to barges, pontoons, vessels, or other means of flotation:

a. Load Charts

- i. The manufacturer's load charts applicable to operations on water cannot be exceeded. When using these charts, the project manager (or his/her designee) must comply with all parameters and limitations (such as dynamic/environmental parameters) applicable to the use of the charts.
- ii. The load charts will take into consideration a minimum wind speed of 40 miles per hour.

b. The requirements for maximum allowable list and maximum allowable trim as specified below must be met.

Rated Capacity	Maximum Allowable List	Maximum Allowable Trim
Equipment designed for marine use by permanent attachment (other than derricks):		
25 tons or less	5 degrees	5 degrees
Over 25 tons	7 degrees	7 degrees
Derricks designed for marine use by permanent attachment:		
Any rated capacity	10 degrees	10 degrees

- c. If the equipment is project manager (or his/her designee)-made, it cannot be used unless the project manager (or his/her designee) has documents demonstrating that the load charts and applicable parameters for use meet the requirements of paragraphs 11.a through 11.c of this section. Such documents must be signed by a registered professional engineer who is a qualified person with respect to the design of this type of equipment (including the means of flotation).
- d. The barge, pontoons, vessel, or other means of flotation used must:
 - i. Be structurally sufficient to withstand the static and dynamic loads of the crane/derrick when operating at

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the crane/derricks' maximum-rated capacity with all anticipated deck loads and ballasted compartments.

- ii. Have a subdivided hull with one or more longitudinal watertight bulkheads for reducing the free-surface effect.
- iii. Have access to void compartments to allow for inspection and pumping.

11. Land cranes/derricks. For land cranes/derricks used on barges, pontoons, vessels, or other means of flotation:

- a. The rated capacity of the equipment (load charts) applicable for use on land must be reduced to:
 - i. Account for increased loading from list, trim, wave action, and wind.
 - ii. Be applicable to a specified location(s) on the specific barge, pontoons, vessel, or other means of flotation that will be used, under the expected environmental conditions.
 - iii. Ensure that the conditions required in paragraphs 11.c and 11.d of this section are met.
- b. The rated capacity modification required in paragraph 11.b of this section must be done by the equipment manufacturer, or a qualified person who has expertise with respect to both land crane/derrick capacity, and the stability of vessels/flotation devices.
- c. List and trim.
 - i. The maximum allowable list and the maximum allowable trim for the barge, pontoon, vessel, or other means of flotation cannot exceed the amount necessary to ensure that the conditions in paragraph 11.d of this section are met. In addition, the maximum allowable list and the maximum allowable trim cannot exceed the least of the following: 5 degrees, the amount specified by the crane/derrick manufacturer; or, where an amount is not so specified, the amount specified by the qualified person.

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- ii. The maximum allowable list and the maximum allowable trim for the land-crane derrick cannot exceed the amount specified by the crane/derrick manufacturer; or, where an amount is not so specified, the amount specified by the qualified person.
- d. The following conditions must be met:
 - i. All deck surfaces of the barge, pontoons, vessel, or other means of flotation used must be above water.
 - ii. The entire bottom area of the barge, pontoons, vessel, or other means of flotation used must be submerged.
- e. Physical attachment, corraling, rails system, and centerline cable system. The project manager (or his/her designee) must meet the requirements in Option 1, Option 2, Option 3, or Option 4, as follows. Whichever option is used, the requirements of paragraph 11.e.v of this section must also be met.
 - i. Option 1 – Physical attachment. The crane/derrick must be physically attached to the barge, pontoons, vessel, or other means of flotation. Methods of physical attachment include crossed-cable systems attached to the crane/derrick and vessel flotation device (this type of system allows the crane/derrick to lift up slightly from the surface of the vessel/means of flotation), bolting or welding the crane/derrick to the vessel/flotation device, strapping the crane/derrick to the vessel/flotation device with chains, or other methods of physical attachment.
 - ii. Option 2 – Corraling. The crane/derrick must be prevented from shifting by installing barricade restraints (a corraling system). Corraling systems must not allow any amount of shifting in any direction by the equipment.
 - iii. Option 3 – Rails. The crane/derrick must be prevented from shifting by being mounted on a rail system. Rail clamps and rail stops are required unless the system is designed to prevent movement during operation by other means.

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- iv. Option 4 – Centerline cable system. The crane/derrick must be prevented from shifting by being mounted to a wire rope system. The wire rope system must meet the following requirements:
 - a. The wire rope and attachments must be of sufficient size/strength to support the side load of crane/derrick.
 - b. The wire rope must be physically attached to the vessel/flotation device.
 - c. The wire rope must be attached to the crane/derrick by appropriate attachment methods (such as shackles or sheaves) on the undercarriage, which will allow the crew to secure the crane/derrick from movement during operation, and to move the crane/derrick longitudinally along the vessel/flotation device for repositioning.
 - d. A method will be employed to prevent the crane/derrick from passing the forward or aft end of the wire rope attachments.
 - e. The crane/derrick must be secured from movement during operation.
- v. The systems/means used to comply with Option 1, Option 2, Option 3, or Option 4 will be designed by a marine engineer, registered professional engineer familiar with floating crane/derrick design, or qualified person familiar with floating crane/derrick design.
- vi. Exception. For mobile auxiliary cranes used on the deck of a floating crane/derrick, the requirement to use Option 1, Option 2, Option 3, or Option 4 of this section does not apply where the project manager (or his/her designee) demonstrates implementation of a plan and procedures that meet the following requirements:
 - a. A marine engineer or registered professional engineer familiar with floating crane/derrick design develops and signs a written plan for the use of the mobile auxiliary crane.

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- b. The plan must be designed so that the applicable requirements of this section will be met despite the position, travel, operation, and lack of physical attachment (or corraling, use of rails, or cable system) of the mobile auxiliary crane.
 - c. The plan must specify the areas of the deck where the mobile auxiliary crane is permitted to be positioned, travel, and operate, and the parameters/limitations of such movement and operation.
 - d. The deck must be marked to identify the permitted areas for positioning, travel, and operation.
 - e. The plans all specify the dynamic/environmental conditions that must be present for use of the plan.
 - f. If the dynamic/environmental conditions in paragraph 11.e.vi.5 of this section are exceeded, the mobile auxiliary crane must be physically attached or corralled in accordance with Option 1, Option 2, Option 3, or Option 4 (see paragraphs 11.d.i, 11.d.ii, and 11.d.iv of this section).
- f. The barge, pontoons, vessel, or other means of flotation used must:
- i. Be structurally sufficient to withstand the static and dynamic loads of the crane/derrick when operating at the crane/derrick's maximum rated capacity with all anticipated deck loads and ballasted compartments.
 - ii. Have a subdivided hull with one or more longitudinal watertight bulkheads for reducing the free surface effect.
 - iii. Have access to void compartments to allow for inspection and pumping.

JJ. Dedicated pile drivers.

1. The provisions of this standard apply to dedicated pile drivers, except as specified in this section.

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2. Information provided elsewhere in this standard on anti two-block devices does not apply.
3. Section 4.N (Operator Qualification and Certification) applies, except that the qualification or certification will be for operation of either dedicated pile drivers, or equipment that is the most similar to dedicated pile drivers.

KK. Overhead and Gantry Cranes

1. Permanently installed overhead and gantry cranes.
 - a. This paragraph applies to the following equipment when used in construction and permanently installed in a facility: Overhead and gantry cranes, including semi-gantry, cantilever gantry, wall cranes, storage bridge cranes, and others having the same fundamental characteristics.
 - b. The requirements of this procedure apply to the equipment identified in paragraph 1.a of this section.
2. Overhead and gantry cranes that are not permanently installed in a facility.
 - a. This paragraph applies to the following equipment when used in construction and not permanently installed in a facility: overhead and gantry cranes, overhead/bridge cranes, semi gantry, cantilever gantry, wall cranes, storage bridge cranes, launching gantry cranes, and similar equipment, irrespective of whether it travels on tracks, wheels, or other means.
 - b. For equipment manufactured on or after September 19, 2001, the following sections of ASME B.30.2-2007 apply: 2-1.3.1; 2-1.3.2; 2-1.4.1; 2-1.6; 2-1.7.2; 2-1.8.2; 2-1.9.1; 2-1.9.1.2; 2-1.11; 2-1.12.2; 2-1.13.7; 2-1.14.2; 2-1.14.3; 2-1.14.5; 2-1.15; 2-2.2.2; 2-2.3.2.1.1. In addition, 2-3.5 applies, except in 2-3.5.1(b), "so CFR 1910.147" applies in place of "ANSI Z244.1."

LL. Derricks

1. This section contains supplemental requirements for derricks, whether temporarily or permanently mounted; all sections of this procedure apply to derricks unless specified otherwise. A derrick is powered equipment consisting of a mast or equivalent member that

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is held at or near the end by guys or braces, with or without a boom, and its hoisting mechanism. The mast/equivalent member and/or the load are moved by the hoisting mechanism (typically base-mounted) and operating ropes. Derricks include A-frame, basket, breast, Chicago boom, gin pole (except gin poles used for erection of communication towers), guy, shear leg, and variations of such equipment.

2. Operation

- a. "Operation" applies except for "accessibility of procedures".
- b. Load chart contents. Load charts must contain at least the following information:
 - i. Rated capacity at corresponding ranges of boom angle or operating radii.
 - ii. Specific lengths of components to which the rated capacities apply.
 - iii. Required parts for hoist reeving.
 - iv. Size and construction of rope will be included on the load chart or in the operating manual.
- c. Load chart location.
 - i. Permanent installations. For permanently installed derricks with fixed lengths of boom, guy, and mast, a load chart must be posted where it is visible to personnel responsible for the operation of the equipment.
 - ii. Non-permanent installations. For derricks that are not permanently installed, the load chart must be readily available at the job site to personnel responsible for the operation of the equipment.

3. Construction

- a. General requirements.
 - i. Derricks must be constructed to meet all stresses imposed on members and components when installed and operated in accordance with the manufacturer's/builder's procedures, and within its rated capacity.

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- ii. Welding of load-sustaining members must conform to recommended practices in ANSI/AWSD 14.3-94 or D1.1-02.

- b. Guy derricks.

- i. The minimum number of guys will be six, with equal spacing, except where a qualified person or derrick manufacturer approves variations from these requirements and revises the rated capacity to compensate for such variations.
- ii. Guy derricks will not be used unless the project manager (or his/her designee) has the following guy information:
 - a. The number of guys.
 - b. The spacing around the mast.
 - c. The size, grade, and construction of rope to be used for each guy.
- iii. For guy derricks manufactured after December 18, 1970, in addition to the information required in paragraph 3.b.ii of this section, the project manager (or his/her designee) must have the following guy information:
 - a. The amount of initial sag or tension.
 - b. The amount of tension in guy line rope at anchor.
- iv. The mast base must permit the mast to rotate freely, with allowance for slight tilting of the mast caused by guy slack.
- v. The mast cap must:
 - a. Permit the mast to rotate freely.
 - b. Withstand tilting and cramping caused by the guy loads.
 - c. Be secured to the mast to prevent disengagement during erection.
 - d. Be provided with means for attaching guy ropes.

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- c. Stiff leg derricks.
 - i. The mast will be supported in the vertical position by at least two stiff legs: one end of each will be connected to the top of the mast, and the other end securely anchored.
 - ii. The stiff legs must be capable of withstanding the loads imposed at any point of operation within the load chart range.
 - iii. The mast base must:
 - a. Permit the mast to rotate freely (when necessary).
 - b. Permit deflection of the mast without binding.
 - iv. The mast must be prevented from lifting out of its socket when the mast is in tension.
 - v. The stiff leg connecting member at the top of the mast must:
 - a. Permit the mast to rotate freely (when necessary).
 - b. Withstand the loads imposed by the action of the stiff legs.
 - c. Be secured so as to oppose separating forces.
- d. Gin pole derricks.
 - i. Guy lines must be sized and spaced so as to make the gin pole stable in both boomed and vertical positions. Exception: Where the size and/or spacing of guy lines do not result in the gin pole being stable in both boomed and vertical positions, the project manager (or his/her designee) must ensure that the derrick is not used in an unstable position.
 - ii. The base of the gin pole must permit movement of the pole (when necessary).
 - iii. The gin pole must be anchored at the base against horizontal forces (when such forces are present).
- e. Chicago boom derricks. The fittings for stepping the boom and for attaching the topping lift must be arranged to:

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- i. Allow the derrick to swing at all permitted operating radii and mounting heights between fittings.
 - ii. Accommodate attachment to the upright member of the host structure.
 - iii. Withstand the forces applied when configured and operated in accordance with the manufacturer's/builder's procedures, and within its rated capacity.
 - iv. Prevent the boom or topping lift from lifting out under tensile forces.
- 4. Anchoring and guying
 - a. Load anchoring data developed by the manufacturer or a qualified person must be used.
 - b. Guy derricks.
 - i. Anchor the mast base.
 - ii. Secure the guys to the ground or other firm anchorage.
 - iii. Design the anchorage and guying to withstand maximum horizontal and vertical forces encountered when operating within rated capacity with the particular guy slope and spacing specified for the application.
 - c. Stiff Leg derricks.
 - i. Anchor the mast base and stiff legs.
 - ii. Design the anchorage and guying to withstand maximum horizontal and vertical forces encountered when operating within rated capacity with the particular stiff leg spacing and slope specified for the application.
- 5. Swingers and hoists
 - a. The boom, swinger mechanisms, and hoists must be suitable for the derrick work intended, and must be anchored to prevent displacement from the imposed loads.
 - b. Base-mounted drum hoists.

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- i. Base-mounted drum hoists must meet the requirements in the following sections of ASME B30.7-2001:
 - a. Sections 7-1.1 (Load ratings and markings).
 - b. Section 7-1.2 (Construction), except: 7-1.2.13 (Operator's cab); 7-1.2.15 (Fire extinguishers).
 - c. Section 7-1.3 (Installation).
 - d. Applicable terms in Section 7-0.2 (Definitions).
- ii. Load tests for new hoists. The project manager (or his/her designee) must ensure that new hoists are load tested to a minimum of 110 percent of rated capacity, but not more than 125 percent of rated capacity, unless otherwise recommended by the manufacturer. This requirement is met where the manufacturer has conducted this testing.
- iii. Repaired or modified hoists. Hoists that have had repairs, modifications, or additions affecting their capacity or safe operation must be evaluated by a qualified person to determine if a load test is necessary. If it is, load testing will be conducted in accordance with paragraphs 5.b.ii and 5.b.iv of this section.
- iv. Load test procedure. Load tests required by paragraphs 5.b.ii or 5.b.iii of this section must be conducted as follows:
 - a. Hoist the test load a vertical distance to assure that the load is supported by the hoist and held by the hoist brake(s).
 - b. The test load will be lowered, stopped, and held with the brake(s).
 - c. Do not use the hoist unless a competent person determines that the test has been passed.

6. Operational Aids

- a. Section 4.L (Operational Aids) applies, except for "Boom hoist limiting device" and "Boom angle or radius indicator" and "Load weighing and similar devices."

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- b. Boom angle aid. The project manager (or his/her designee) must ensure that either:
 - i. The boom hoist cable is marked with caution and stop marks. The stop marks correspond to maximum and minimum allowable boom angles. The caution and stop marks are in view of the operator, or a spotter who is in direct communication with the operator; or
 - ii. An electronic or other device that signals the operator in time to prevent the boom from moving past its maximum and minimum angles, or automatically prevents such movement, is used.
 - c. Load weight/capacity devices. Derricks manufactured more than 1 year after the effective date of this procedure with a maximum rated capacity over 6,000 pounds must have at least one of the following: load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter. Temporary alternative measures: the weight of the load must be determined from a reliable source (such as the load's manufacturer), by a reliable calculation method (such as calculating a steel beam from measured dimensions and a known per-foot weight), or by other equally reliable means. This information will be provided to the operator prior to the lift.
- 7. Post-assembly approval and testing – new or reinstalled derricks
 - a. Anchorages
 - i. Anchorages, including the structure to which the derrick is attached (if applicable), must be approved by a qualified person.
 - ii. If using a rock or hairpin anchorage, the qualified person must determine if any special testing of the anchorage is needed. If so, it will be tested accordingly.
 - b. Functional test. Prior to initial use, new or reinstalled derricks must be tested by a competent person with no hook load to verify proper operation. This test must include:
 - i. Lifting and lowering the hook(s) through the full range of hook travel.

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- ii. Raising and lowering the boom through the full range of boom travel.
 - iii. Swinging in each direction through the full range of swing.
 - iv. Actuating the anti-two-block and boom-hoist-limit devices (if provided).
 - v. Actuating locking, limiting, and indicating devices (if provided).
 - c. Load test. Prior to initial use, new or reinstalled derricks must be load tested by a competent person. The test load must meet the following requirements:
 - i. Test loads must be at least 100 percent, and no more than 110 percent, of the rated capacity, unless otherwise recommended by the manufacturer or qualified person, but in no event must the test load be less than the maximum anticipated load.
 - ii. The test must consist of:
 - a. Hoisting the test load a few inches and holding to verify that the load is supported by the derrick and held by the hoist brake(s).
 - b. Swinging the derrick, if applicable, the full range of its swing, at the maximum allowable working radius for the test load.
 - c. Lowering, stopping, and holding the load with the brake(s).
 - iii. The derrick cannot be used unless the competent person determines that the test has been passed.
 - d. Documentation. Tests conducted under this paragraph will be documented. The document will be retained until the derrick is re-tested or dismantled, whichever occurs first.
8. Load testing repaired or modified derricks. Derricks that have had repairs, modifications for additions affecting the derrick's capacity or safe operation must be evaluated by a qualified person to determine if a load test is necessary. If it is, load testing must be conducted and documented in accordance with paragraph (g) for this section.

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9. Power failure procedures. If power fails during operations, the derrick operator must safely stop operations. This includes:
 - a. Setting all brakes or locking devices.
 - b. Moving all clutch and other power controls to the off position.
10. Use of winch heads
 - a. Do not handle ropes on a winch head without the knowledge of the operator.
 - b. While a winch head is being used, the operator must be within reach of the power unit control lever.
11. Securing the boom
 - a. When the boom is being held in a fixed position, engage dogs, pawls, or other positive holding mechanisms on the boom hoist.
 - b. When taken out of service for 30 days or more, secure the boom by one of the following methods:
 - i. Lay it down.
 - ii. Secure it to a stationary member, as nearly under the head as possible, by attachment of a sling to the load block.
 - iii. For guy derricks, lift to a vertical position and secure to the mast.
 - iv. For stiff leg derricks, secure against the stiff leg.
12. The process of jumping the derrick must be supervised by the A/D supervisor.
13. Derrick operations must be supervised by a competent person.
14. Inspections. In addition to the requirements in this procedure, the following additional items must be included in the inspections of Tower and Cableway Cranes:
 - a. Daily: Guys for proper tension.
 - b. Monthly.

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- c. Annual.
 - i. Gudgeon pin for cracks, wear, and distortion.
 - ii. Foundation supports for continued ability to sustain the imposed loads.

MM. Side-Boom Cranes

1. All provisions of this standard apply, except 4.C (Ground Conditions), 4.K (Safety Devices), 4.L (Operational Aids), and 4.N (Operator Qualification and Certification).
2. Section 4.AA (Free-fall and Controlled-Load Lowering) applies, except when side boom cranes in which the boom is designed to free-fall (live boom) are permitted only if manufactured prior to January 2009.
3. Side-boom cranes mounted on wheel or crawler tractors must meet the following requirements of ASME B30.14-2004 (Side-Boom Tractors):
 - a. Section (Load Ratings).
 - b. Section (Side Boom Tractor Travel).
 - c. Section (Ropes and Reeving Accessories)
 - d. Section (Booms).
 - e. Section (General Requirements – Exhaust Gases).
 - f. Section (General Requirements – Stabilizers (Wheel-Type Side-Boom Tractors)).
 - g. Section (General Requirements – Welded Construction).
 - h. Selection (General Requirements – Clutch and Brake Protection).
 - i. Section (Testing – Rated Load Test) except that it applies only to equipment that has been modified or repaired.
 - j. In Section (Operator Qualifications), paragraph (a), except the phrase “When required by law.”
 - k. In Section (Operating Practices), paragraphs (5), (6)(a) – (d), (f), (g); (8), and (9).

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- I. In Section (Moving the Load), paragraphs (9), (10), and (11m).

NN. Boom-Truck Procedures

1. Prior to the manipulation of any controls, operators are to ensure that all personnel are clear of all moving parts. Workers working with boom truck operators must review the boom-truck hazard check list to heighten awareness while working on and around the boom truck. Access has been improved on boom trucks; these are the ONLY approved access and egress on/off the bed of the truck.
2. The operator is in control of ALL operations associated with this equipment. The operator will ensure the following items have been performed and reviewed and signed by all parties working with boom truck PRIOR TO THE START OF OPERATIONS. The completed form (see Attachment 038-10) will be returned to the safety department at the end of each shift.

OO. Equipment with Rated Hoisting/Lifting Capacity of 2,000 pounds or Less

1. For equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 pounds or less:
2. The following sections of this standard apply: 4.B, 4.C, 4.I, 4.J, 4.K, 4.M, 4.Q through 4.U, 4.V, 4.X, 4.AA, 4.BB through 4.EE, 4.GG, 4.II, 4.KK, and 4.LL.
3. Assembly/Disassembly
 - a. Section 4.F of this standard applies.
 - b. Components and configuration.
 - i. The selection of components and configuration of the equipment that affects the capacity or safe operation of the equipment must be in accordance with:
 - a. Manufacturer's instructions, recommendations, limitations, and specifications. Where these are unavailable, a registered professional engineer familiar with the type of equipment involved must approve, in writing, the selection and configuration of components; or

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- b. Approved modifications that meet the requirements of Section 4.V of this standard.
 - ii. Post-assembly inspection. Upon completion of assembly, the equipment must be inspected to ensure compliance with paragraph 2.b.i of this section for post-assembly inspection requirements.
 - c. Manufacturing prohibitions. The project manager (or his/her designee) must comply with applicable manufacturer prohibitions.
- 4. Operation
 - a. The project manager (or his/her designee) must comply with all the manufacturer's procedures applicable to the operational functions of the equipment, including its use with attachments.
 - b. Unavailable Operation Procedures
 - i. Where the manufacturer's procedures are unavailable, the project manager (or his/her designee) will develop and ensure compliance with all procedures necessary for the safe operation of the equipment and attachments.
 - ii. Procedures for the operational controls must be developed by a qualified person.
 - iii. Procedures related to the capacity of the equipment must be developed and signed by a registered professional engineer familiar with the equipment.
 - c. Accessibility
 - i. The load chart will be available to the operator at the control station.
 - ii. Procedures applicable to the operation of the equipment, recommended operating speeds, special hazard warnings, instructions, and operator's manual, must be readily available for use by the operator.
 - iii. Where rated capacities are available at the control station only in electronic form, in the event of a failure that makes the rated capacities inaccessible, the operator must immediately cease operations or follow

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safe shut-down procedures until the rated capacities (in electronic or other form) are available.

5. Safety Devices and Operational Aids

- a. Originally equipped safety devices and operational aids must be maintained in accordance with the manufacturer's procedures.
 - b. Anti-two-blocking. Equipment covered by this section manufactured more than 1 year after the effective date of this standard will have either an anti-two-block device, or will be designed so that, in the event of a two-block situation, no damage will occur, and there will be no load failure (such as where the power unit will stall in the event of a two-block).
6. Operator qualifications. The project manager (or his/her designee) must ensure that, prior to operating the equipment, the operator is trained on the safe operation of the type of equipment the operator will be using.
7. Signal person qualifications. The project manager (or his/her designee) must ensure that signal persons are trained in the proper use of signals applicable to the use of the equipment.
8. Inspections. The equipment will be inspected in accordance with the manufacturer's procedures.
9. Hoisting personnel. Hoisting personnel using equipment covered by this section is prohibited.
10. Design. The equipment will be designed by a qualified engineer.

5. Documentation Summary

- A. Complete checklists at intervals required by standard.
- B. Document training of operators, signal persons, and repair/maintenance staff.

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6. Resources

- A. American Society of Mechanical Engineers (ASME) [B30.2-2005 – Overhead and Gantry Cranes](#)
- B. American National Standards Institute (ANSI)/[ASME B30.3-2004 – Construction Tower Cranes](#)
- C. ANSI/[ASME B30.4-2003 – Portal, Tower, and Pedestal Cranes](#)
- D. ANSI/[ASME B30.5-2007 – Mobile and Locomotive Cranes](#)
- E. [ASME B30.6-2003](#) - Derricks
- F. ANSI/[ASME B30.8-2004 – Floating Cranes and Floating Derricks](#)
- G. ANSI/[ASME B30.11-2004 – Monorails and Underhung Cranes](#)
- H. [ASME B30.14-2004](#) – Side-Boom Tractors
- I. ANSI/[ASME B30.22-2005](#) – Articulating Boom Cranes
- J. ANSI/[ASME B30.23-2005 – Personnel Lifting Systems](#)
- K. Power Crane Shovel Association (PCSA) [Mobile Hydraulic Crane Standard](#)
- L. [Attachment 038-1 NA](#) – Definitions
- M. [Attachment 038-2 NA](#) – Pre-Lift Checklist
- N. [Attachment 038-3 NA](#) – Critical Lift Plan
- O. [Attachment 038-4 NA](#) – Required Clearance for Normal Voltage
- P. [Attachment 038-5 NA](#) – Crane Safety Inspection – Initial and Annual
- Q. [Attachment 038-6 NA](#) – Daily Crane Inspection Checklist
- R. [Attachment 038-7 NA](#) – Monthly Crane Inspection Checklist
- S. [Attachment 038-8 NA](#) – Monthly Wire Rope and Hook Inspection
- T. [Attachment 038-9 NA](#) – Personnel Platform Lifting Form
- U. [Attachment 038-10 NA](#) – Boom Truck Hazard Checklist

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7. Supplemental Information

- A. [Criteria for Developing a Written Exam](#)
- B. [Standard Hand Signals](#)
- C. [Wind Pressure Formula](#)
- D. [Checklist for Lift Planning](#)
- E. [Determining if Hoisting Personnel is Permissible](#)
- F. [Assembly/Disassembly Sample Procedure](#)

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1. Altered means any change to the original manufacturers design configuration, such as replacement of weight-handling equipment parts and components with parts or components not identical to the original (i.e., change in material, dimensions, or design configuration; the addition of parts or components not previously a part of the equipment; the removal of components previously a part of the load handling equipment; rearrangement of original parts or components).
2. Anti-two-block device is activated to prevent two-blocking, and disengages the particular function whose movement is causing the two-blocking.
3. Articulating crane is a crane whose boom consists of a series of folding, pin-connected structural members, typically manipulated to extend or retract by power from hydraulic cylinders.
4. Assembly/Disassembly means the assembly and/or disassembly of equipment covered under this procedure.
5. Assist crane is a crane used to assist in assembling or disassembling a crane.
6. Attachments are any devices that expand the range of tasks that can be done by the equipment.
7. Audible signal means a signal made by a distinct sound or series of sounds.
8. Boom angle is the angle between the horizontal and the centerline of boom base and inserts, and is an indication of operating radius.
9. Boom point elevation is the vertical distance from the ground to the centerline of the boom point shaft.
10. Blocking or cribbing is wood or other material used to support equipment or a component and distribute loads to the ground.
11. Boatswain's chair is a single-point adjustable suspension scaffold consisting of a seat or sling designed to support one employee in a sitting position.
12. Bogie means travel bogie, and is defined as two or more axles mounted in tandem in a frame so as to divide the load between the axles, and permit vertical oscillation of the wheels.
13. Boom, other than tower crane, means an inclined spar, strut, or other long structural member that supports the upper hoisting tackle on a crane or derrick.
14. Boom – tower cranes means that if the principal horizontal structure is fixed, it is a jib, or, if it is moveable, it is referred to as a boom.
15. Boom angle indicator is the angle between the horizontal and the centerline of the boom base and inserts, and is an indication of operating radius.
16. Boom-hoist-limiting device includes boom hoist disengaging device, boom hoist shut-off, boom hoist disconnect, boom hoist hydraulic relief, boom hoist kick-outs, automatic boom stop device, or derricking limiter.
17. Boom length indicator indicates the length of the permanent part of the boom (such as ruled markings on the boom) or, as in some computerized systems, the length of the boom with extensions/attachments.

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18. Boom stop includes belly straps with struts/standoff boom stops, telescoping boom stops, attachment boom stops, and backstops. These devices restrict the boom from moving above a certain maximum angle and toppling over backward.
19. Boom suspension system is a system of pendants, running ropes, sheaves, and other hardware that supports the boom tip and controls the boom angle.
20. Bridge is that part of a gantry or overhead crane that carries the trolley(s).
21. Builder means an employee builder/constructor of equipment.
22. Cathead is a spool shaped attachment on a winch around which rope is wound for hoisting and pulling.
23. Center of gravity is the point in the object around which its weight is evenly distributed.
24. Certified Welder is a welder who meets nationally recognized certification requirements applicable to the task being performed.
25. Climbing means the process in which a tower crane is raised to a new working height.
26. Top climbing is adding tower sections to the top of the crane.
27. Inside climbing is a system in which the entire crane is raised inside the structure.
28. Come-a-long means a mechanical device typically consisting of a chain or cable attached at each end that is used to facilitate movement of materials through leverage.
29. Competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
30. Controlled-load lowering means lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled-load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.
31. Controlling entity means a prime contractor, general contractor, construction manager, or any other legal entity that has the overall planning, quality, and completion responsibility for the construction of the project.
32. Counterweight means a weight used to supplement the equipment weight in providing stability for lifting loads by counterbalancing those loads.
33. Crane/derrick includes all equipment covered by this SMS 038.
34. Cribbing is a system of timber, arranged in a rectangular pattern, used to support and distribute the weight of equipment.
35. Crawler crane means equipment that has a type of base mounting which incorporates a continuous belt of sprocket-driven track.
36. Critical Lift identifies loads classified as requiring a formal, written plan. A critical lift plan is defined as a non-routine crane lift requiring detailed planning and additional or unusual safety precautions. Critical lifts include lifts made when the load is greater than 75 percent of the rated capacity of the crane in the configuration that the lift will be made; lifts that require the load to be lifted, swung, or placed out of the operator's view;

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lifts made with more than one crane or hoisting device; lifts involving non-routine or technically difficult rigging arrangements; lifts of long lead time permanent materials; lifts that involve lifting loads over structures or equipment; lifts taking place in a confined or limited access areas; hoisting personnel with a crane or derrick; or any lift which the lift supervisor, operator, or other management personnel believes should be considered critical.

37. Crossover points are locations on a wire rope that are spooled on a drum where one layer of rope climbs up on and crosses over the previous layer.
38. Dedicated channel means a line of communication assigned by the employer who controls the communication system to only one signal person and crane/derrick, or to a coordinated group of cranes/derricks/signal person(s).
39. Dedicated pile-driver is a machine that is designed to function exclusively as a pile-driver; hoisting the material and pile-driving it.
40. Dedicated spotter (power lines) must meet the requirement of this procedure (signal person qualifications), and the sole responsibility is to watch the separation between the power line and the equipment, load line, and load (including rigging and lifting accessories), and ensure through communication with the operator that the applicable minimum approach distance is not breached.
41. Deficiency is the state of being deficient; inadequacy; failure; imperfection; defect.
42. Derrick is a lifting device consisting of a mast secured at the top by guys or braces and, used with a hoisting mechanism and rigging, with or without a boom.
43. Dismantling includes partial dismantling (i.e., shorten a boom or substitute a different component).
44. Dragline is a bucket attachment for a crane that excavates by the crane drawing the bucket towards itself with a cable.
45. Duty cycle includes operations involving repetitive pick and swing, such as with a dragline, grapple, or clamshell; such operations are conducted primarily for production, as opposed to placement.
46. Drum rotation indicator means a device on a crane or hoist that indicates in which direction and at what relative speed a particular hoist drum is turning.
47. Electrical contact occurs when a person, object, or equipment makes contact or comes in close proximity with an energized conductor or equipment that allows the passage of current.
48. Employer-made equipment means floating cranes/derricks designed and built by an employer for the employer's own use.
49. Encroachment is where any part of the crane, load line, or load (including rigging and lifting accessories) breaches a minimum clearance distance required to be maintained from a power line.
50. Equipment criteria mean instructions, recommendation, limitations, and specifications.
51. Fall-protection equipment means guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, or fall restraint systems.

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52. Fall restraint system means a fall protection system that prevents the user from falling any distance, either by a body belt or body harness, along with an anchorage, connectors, and other necessary equipment. Other components typically include a lanyard, and may also include a lifeline and other devices.
53. Fall zone means the area (including, but not limited to, the area directly beneath the load) in which it is reasonably foreseeable that partially or completely suspended material could fall in the event of an accident.
54. Fixed lead means pile-driving leads which are rigidly attached to a boom by horizontal struts extending from the leads to extended boom foot pins, thus providing a fixed triangular frame of boom, struts, and leads.
55. Flange points are points of contact between rope and rum flange where the rope changes layers.
56. Floating cranes/derricks are equipment designed by the manufacturer or employer for marine use by permanent attachment to a barge, pontoons, vessel, or other means of flotation.
57. Free fall (of the load line) means that only the brake is used to regulate the descent of the load line (drive mechanism is not used to drive the load down faster or retard its lowering).
58. Free surface effect is the uncontrolled transverse movement of liquids in compartments that reduce a vessel's transverse stability.
59. Gantry crane is a crane similar to an overhead crane except that a bridge is rigidly supported on two or more legs running on fixed rails or other runway.
60. Ground condition means the ability of the ground to support the equipment (including slope, compaction, and firmness).
61. Guy derrick is a fixed derrick consisting of a vertical mast capable of being rotated 360 degrees (but not continuous rotation) supported by guys, and a boom that is pivoted at the bottom and capable of moving in a vertical plane; a reeved rope between the head (top) of the mast and the boom harness (at the boom point) allows lifting and lowering of the boom, and a reeved rope from the boom point allows lifting and lowering of the load.
62. Hammerhead tower crane is a lifting machine arranged with a tower (mast), an upper structure that rotates, a horizontally-extended load jib (boom) with trolley, and a counterweight jib extending in the direction opposite of the load jib: neither jib is arranged for luffing. The trolley on the load jib traverses the length of the jib and contains the sheaves and accessory parts that make up the upper load block; the lower load block is suspended from the trolley.
63. Hoist means a mechanical device for lifting and lowering loads by winding rope onto or off of a drum.
64. Hoisting is the act of raising, lowering, or otherwise moving a load in the air with equipment covered by this procedure. In conformance with this procedure, "hoisting" can be done by means other than wire rope/hoist drum equipment.
65. Insulating link/device means an insulating device listed, labeled, or accepted by a nationally recognized testing laboratory. Jib stop, or jib backstop is the same type of device as a boom stop but is for a fixed or luffing jib.

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66. Jib on hammerhead cranes is the horizontal structural member attached to the rotating superstructure of a crane and upon which the load trolley travels; on mobile cranes, an extension attached to the boom to provide added boom length for lifting specified loads. An extension attached to the boom to provide added boom length for lifting specified loads. The jib may be in line with the boom, or offset to a fixed or various angles.
67. Land crane/derrick is equipment not originally designed by the manufacturer for marine use by permanent attachment to any means of floatation.
68. Lead is the device on a pile driver that maintains the hammer in position during the driving. A lead typically is made up of two vertical rails or guides, held together by a frame, in which the hammer moves vertically.
69. Lift supervisor is the person designated to be in charge of crane lifting; this may be the crane operator or an individual whose function it is to supervise lifting operations.
70. List means the angle of inclination about the longitudinal axis of a barge, pontoons, vessel, or other means of floatation.
71. Live boom is a boom that is lowered by free-fall rather than controlled boom lowering under power.
72. Load refers to the object(s) and the load-attaching equipment being hoisted, and/or the weight of the object(s).
73. Load block is an assembly of hook or shackle, swivel, pins, and frame.
74. Load moment indicator (or rated capacity) is a system that aids the equipment operator by sensing the overturning moment on the equipment; that is, load multiplied by radius. It compares this lifting condition to the equipment's rated capacity, and indicates to the operator the percentage of capacity at which the equipment is working. Lights, bells, or buzzers may be incorporated as a warning of an approaching overload condition.
75. Load moment limiter (or rated capacity) is a system that aids the equipment operator by sensing the overturning moment on the equipment (i.e., load multiplied by radius). It compares this lifting condition to the equipment's rated capacity, and when the rated capacity is reached, it shuts off power to those equipment functions that can increase the severity of loading on the equipment (e.g., hoisting, telescoping out, or luffing out). Typically, those functions that decrease the severity of loading on the equipment remain operational (e.g., lowering, telescoping in, or luffing in).
76. Load performance test is a test of a crane's performance, structural competence, and stability while lifting at a percentage of its rated load capacity.
77. Load ratings are crane ratings in pounds established by the manufacturer.
78. Locomotive crane means a crane mounted on a base or car equipped for travel on a railroad track.
79. Luffing is the act of raising or lowering the boom or jib of a crane.
80. Luffing jib limiting device is similar to a boom hoist limiting device, except that it limits the movement of the luffing jib.
81. Luffing jib crane is a type of jib on a crane that is pivoted at the jib foot and supported by luffing cables. The hoist rope usually passes over a sheave at the jib point, and the hook radius is changed by luffing, or changing the angle of inclination, of the jib. Rear

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pivoted luffing jibs are similar, but the pivot is towards the rear of the top of the tower, rather than at the jib foot.

82. Marine-hoisted personnel transfer device means a device, such as a “transfer net” (not to include boatswain’s chairs) that is designed to protect the employees being hoisted during a marine transfer, and to facilitate rapid entry into and exit from the device.
83. Marine worksite means a construction worksite located in, on, or immediately above the water.
84. Machine list is a side-to-side out of level, which affects the crane’s capacity rating, and is measured by the angle between horizontal and a line drawn through the centerline of the boom hinge pins.
85. Mobile crane is a lifting device incorporating a cable-suspended, latticed boom or hydraulic telescopic boom designed to be moved between operating locations by transport over the road.
86. Monorail is a single run of overhead track.
87. Moving point-to-point means the times during which an employee is in the process of going to or from a work station.
88. Multi-purpose machine means a machine that is designed to be configured in various ways, at least one of which allows it to hoist (by means of a winch or hook) and horizontally move a suspended load. For example, a machine that can rotate and can be configured with removable tongs (for use as a forklift) or with a winch pack, jib (with a hook at the end), or jib used in conjunction with a winch.
89. Multiple (tandem) crane lift is the use of two or more cranes/lifting devices to lift a load.
90. Non-conductive means that, because of the nature and condition of the materials used, and the conditions of use (including environmental conditions and condition of the material), the object in question has the property of not becoming energized (that is, it has high dielectric properties offering a high resistance to the passage of current under the conditions of use).
91. Not Portable means that an operator has a qualification that is not transferable to another job site or project, the qualification only meets the requirements of the location where the operator is employed by (and operating the equipment for) the employer that issued the qualification.
92. Operating radius is the horizontal distance from the crane’s rotation to the center of the vertical hoist line or load block/ball.
93. Operational aids are devices that assist the crane operator in the safe operation of the crane, including two-block warning devices, two-block prevention devices, load and load moment indicator devices, boom angle and radius indicators, boom and jib stops, boom hoist disengaging devices, limit switches, drum rotation indicators, etc. These load indication or moment devices do not replace the manufacturer-rated load capacity charts for boom angle and radius.
94. Operational controls are levers, switches, pedals and other devices for controlling equipment operation.

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95. Operational performance test is a test, conducted without a test load, to determine the proper operation of a crane.
96. Operator is the person who is operating the equipment.
97. Outrigger is an extendable or fixed structural member(s) with one end attached to the base of a piece of equipment and the other end resting on floats on the ground: used to distribute loads in supporting equipment.
98. Outrigger float is the pedestal (or bearing pad) on which an outrigger beam is supported.
99. Overhead crane is a crane with a single- or multiple-girder moveable bridge or fixed hoisting mechanism, traveling on an overhead fixed runway structure.
100. Overhead and gantry cranes include overhead/bridge cranes, semi-gantry, cantilever gantry, wall cranes, storage bridge cranes, launching gantry cranes, and similar equipment, irrespective of whether it travels on tracks, wheels, or other means.
101. Pendants includes both wire and bar types. Pendants are typically used in latticed boom crane systems to easily change the length of the boom suspension system without completely changing the rope on the drum when the boom length is increased or decreased.
 - a. *Wire type*: A fixed length of wire rope with mechanical fittings at both ends for pinning segments of wire rope together.
 - b. *Bar type*: Instead of wire rope, a bar is used.
102. Performance test is a test to determine the proper operation of a crane and the ability of the crane, to safely lift loads within its performance rating.
103. Personal fall arrest system is a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, and a body harness, and may include a lanyard, deceleration device, lifeline, or suitable combination of these.
104. Pillar crane is a fixed crane consisting of a vertical member, held in position at its base to resist overturning moment, and normally with a constant-radius revolving boom supported at the outer end by a tension member.
105. Portable means any operator with a certification that is usable for other job sites or projects, and meets the requirements of paragraph (a) of this procedure with respect to that operator.
106. Portal Crane is a type of crane consisting of a rotating upper structure, hoist machinery, and boom mounted on top of a structural gantry that may be fixed in one location, or have travel capability. The gantry legs or columns usually have portal openings in between to allow passage of traffic beneath the gantry.
107. Power-controlled lowering is a system or device in the power train, other than the load hoist brake, which can control the lowering rate of speed of the load hoist mechanism.
108. Power lines are electric transmission and distribution lines.
109. Procedures include, but are not limited to, instructions, diagrams, recommendations, warnings, specifications, protocols, and limitations.
110. Proximity alarm is a device that provides a warning of proximity to a power line that has been listed, labeled, or accepted by a Nationally Recognized Testing Laboratory.

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111. Qualified evaluator (not a third party) is a person who, due to their independence and expertise, has demonstrated that they are competent in accurately assessing whether individuals meet the Qualification Requirements for a signal person.
112. Qualified evaluator (third party) is a person who, due to their independence and expertise, has demonstrated that they are competent in accurately assessing whether individuals meet the Qualification Requirements for a signal person.
113. Qualified person is a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.
114. Range control warning device is a device that can be set by an equipment operator to warn that the boom or jib tip is at a plane or multiple planes.
115. Rated capacity means the maximum working load permitted by the manufacturer under specified working conditions, typically including a specific combination of factors such as equipment configuration, radii, boom length, and other parameters of use.
116. Reeving is a rope system in which the rope travels around drums and sheaves.
117. Reconfiguration is the addition or subtraction of boom, jib, and counterweight; or, for a fixed crane, a change in foundation.
118. Repetitive pickup points refers to, when operating on a short cycle operation, the rope being used on a single layer and being spooled repetitively over a short portion of the drum.
119. Running wire rope is a wire rope that moves over sheaves or drums.
120. Runway means a firm level surface designed, prepared, and designated as a path of travel for the weight and configuration of the crane being used to lift and travel with the crane's suspended platform. An existing surface may be used as long as it meets these criteria.
121. Saddle-jib is a type of jib on a tower crane supported by pendants. The jib is horizontal or nearly horizontal, non-luffing, and the load hook is suspended by a trolley that moves along the jib.
122. Sideboom crane is a track-type or wheel-type tractor with a boom mounted on the side of the tractor, used for lifting, lowering, or transporting a load suspended on the load hook. The boom or hook can be lifted or lowered in a vertical direction only.
123. Side loading is a load applied at an angle to the vertical plane of the boom.
124. Special hazard warnings mean warnings of site-specific hazards; for example, proximity of power lines.
125. Stability (flotation device) means the tendency of a barge, pontoons, vessel, or other means of floatation to return to an upright position after having been inclined by an external force.
126. Standby crane is a crane not in regular service, but which is used occasionally or intermittently as required.

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127. Standing rope is a supporting rope that maintains a constant distance between two components connected by the rope.
128. Stiffleg derrick is a derrick similar to a guy derrick, except that the mast is supported or held in place by two or more stiff members (stifflegs) capable of resisting either tensile or compressive forces. Sills are generally provided to connect the lower ends of the stifflegs to the foot of the mast.
129. Supporting materials include blocking, mats, cribbing, marsh buggies (in marshes/wetland), or similar supporting materials or devices.
130. Swinger mechanism is the device that rotates a derrick mast.
131. Swinging (hanging) lead is a pile-driving lead suspended from an extended boom pint sheave pin at the top of the boom. The bottom points of the leads are positioned astride the pile location, the hammer is vertically above the top of the pile. Often the bottoms of the leads are pointed, and the weight of the pile leads and hammer force the bottom points into the ground, holding them in position.
132. Slewing is a rotation of the crane's upperworks.
133. Tagline means a rope (usually fiber) attached to a lifted load for purposes of controlling load spinning and pendular motions, or used to stabilize a bucket or magnet during material-handling operations.
134. Tailing crane lift is a procedure sometimes used in erecting large-pressure vessels or structural elements in which one crane (lead crane) lifts the top of the load, and a second crane (tail crane), rigged to the bottom of the load, either secures the bottom of the load from movement, or assists in the horizontal positioning of the load.
135. Telescoping boom consists of a boom base from which one or more boom sections are telescoped for additional length.
136. Tender means an individual responsible for monitoring and communicating with a diver.
137. Tilt-up or tilt-down operation means raising/lowering a load from the horizontal to vertical, or vertical to horizontal.
138. Top running bridge is a bridge that travels over the top of a runway track.
139. Tower crane is a type of lifting structure that uses a vertical mast or tower to support a working boom (jib) in an elevated position. Loads are suspended from the working boom.
 - a. While the working boom may be of the fixed type (horizontal or angled) or have luffing capability, it can always rotate to swing loads, either by rotating on the top of the tower (top slewing) or by the rotation of the tower (bottom slewing).
 - b. The tower base may be fixed in one location or ballasted and moveable between locations.
140. Travel bogie (tower cranes) is an assembly of two or more axels arranged to permit vertical wheel displacement and equalize the loading on the wheels.
141. Trim means angle of inclination about the transverse axis of a barge, pontoons, vessel, or other means of floatation.
142. Trolley is the unit that travels on bridge rails and supports the load block.

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143. Two-blocking means a condition in which a component that is uppermost on the hoist line such as the load block, hook block, overhaul ball, or similar component, comes in contact with the boom tip, fixed upper block, or similar component. This binds the system, and continued application of power can cause failure of the hoist rope or other component.
144. Underhung crane (hoist) is a crane that is suspended from the bottom flange of a runway track or a single-track monorail system.
145. Upperworks mean the revolving frame of equipment on which the engine and operating machinery are mounted, along with the operator's cab. The counterweight is typically supported on the rear of the upper structure, and the boom or other front-end attachment is mounted on the front.
146. Wire rope is rope made of wire.
- a. *Rope Lay* signifies the direction of the rotation of the wire and strands in the rope. Rotation can either be clockwise or counterclockwise; the lay of the rope affects its flexibility and resistance to wear.
 - b. *Rope Lay Length* is the distance measured along a rope in which a strand makes one complete revolution around the rope axis.
 - c. *Right Lay Rope*: the wires in the strands are laid in one direction while strands in the rope are laid in the opposite direction. The result is that wire crown runs approximately parallel to the longitudinal axis of the rope. These ropes are stable, have good resistance to kinking and twisting, and are easy to handle. They are also able to withstand considerable crushing and distortion due to the short length of the exposed wires.
 - d. *Lang Lay Rope*: the wires in the strands and the strands in the ropes are laid in the same direction. The outer wires run diagonally across the rope and are exposed for longer lengths than regular lay rope. With the outer wires presenting greater wearing surfaces, lang lay ropes have greater resistance to abrasion. They are also flexible and possess greater resistance to fatigue. They are more liable to kinking and untwisting, and are not capable of withstanding the same abuse from distortion and crushing. Lang lay ropes should have both ends permanently fastened to prevent untwisting, and should not be recommended for use on single-part hoist lines, nor should they be used with swivel-end terminals.
 - e. *Alternate Lay Ropes* have three strands made with right lay and three with left lay. The six strands are then positioned in the finished rope so that the strands alternate.
 - f. *Rotation-Resistant Rope* is a wire rope consisting of an inner-lay of strand in one direction covered by a layer of strand laid in the opposite direction. This has the effect of counteracting torque by reducing the tendency of the finished rope to rotate.



Health, Safety and Environment
CRANE PRE-LIFT CHECKLIST

Attachment 038-2 NA
Issue Date: September 2001
Revision 7: February 2009

Date of Lift(s): _____	Contractor/Subcontractor Name: _____
Project Name & Number: _____	Location of Activity: _____
Crane Operator: _____	Supervisor in Charge: _____

The purpose of this checklist is to document the Crane Pre-lift assessment and planning. If any condition and/or situation is not clearly understood or if the lift is identified as Critical, additional documentation and assessment are required.

“ALWAYS LOOK UP AND LIVE.” Be aware of overhead hazards, primarily OVERHEAD POWER LINES.

If the lifts are repetitive and the crane is NOT repositioned, consider the heaviest load and the most limited crane configuration for this checklist at the initial lift.

Description of load to be hoisted:

Pre-Operational Inspection

Is there a daily/pre-shift inspection available on the equipment?	☐ Yes ☐ No
Is the crane in safe working condition? If No, DO NOT OPERATE!	☐ Yes ☐ No

Equipment and Operator

Is the crane operator licensed/certified?	☐ Yes ☐ No
Are the crane's certifications current (i.e., annual, every 4 years)?	☐ Yes ☐ No
Are the operator and the signal person qualified?	☐ Yes ☐ No

Site and Ground Assessment (Assess PRIOR to moving crane)

Has the boom has been fully retracted and stored/secured?	☐ Yes ☐ No
Have you identified and planned for overhead utilities and/or obstructions?	☐ Yes ☐ No
Are ground conditions stable, free of water, etc.?	☐ Yes ☐ No
Is there an existing/previously disturbed excavation, trench, or vault within 10 feet of the crane set-up? If yes, additional outrigger pads/plates may be necessary.	☐ Yes ☐ No
Is the area location where the load will be landed stable, free of other obstructions, etc.?	☐ Yes ☐ No
Is there a clear path of travel?	☐ Yes ☐ No

Weather Conditions

Is wind speed within safe operating conditions (see manufacturer's recommendations / Supplemental Information C)?	☐ Yes ☐ No
Is rain, snow, ice, etc., present?	☐ Yes ☐ No
Is there a thunderstorm, electrical storm, or lightning in close proximity?	☐ Yes ☐ No

Crane Set-up/Configuration

Can all outriggers be fully extended?	☐ Yes ☐ No
If not, does the manufacturer allow for an intermediate outrigger lift?	☐ Yes ☐ No
Will the lift require the use of the "On-Rubber" lift chart?	☐ Yes ☐ No
Is this a pick and carry lift?	☐ Yes ☐ No

	Health, Safety and Environment	Attachment 038-2 NA
	CRANE PRE-LIFT CHECKLIST	Issue Date: September 2001 Revision 7: February 2009

Rigging			
Has rigging been inspected for proper capacity and condition by a competent person?			☐ Yes ☐ No
Name of Competent Person: _____			
What is the capacity of the weakest part of the rigging? If it is less than the load, explain why (e.g., multiple slings used, etc.).			_____ lbs
Material/Equipment to be Hoisted			
Are pick-points identified?			☐ Yes ☐ No
Will the lift be made over/adjacent to any critical piece of equipment/piping/system?			☐ Yes ☐ No
If the answer to the previous question is Yes , can the crane(s) be relocated or the radius adjusted to reduce exposure?			☐ Yes ☐ No
Is the weight of the heaviest load to be hoisted known?			☐ Yes ☐ No
Verified By: _____			
A. Weight of the load to be hoisted:			_____ lbs
B. Weight of the rigging, including the block, jib, and wire rope:			_____ lbs
C. Total weight of the lift (Sum of load weight [Row A] and rigging weight [Row B]):			_____ lbs
D. Radius from the crane's center-pin to the center of the furthest landing or lifting point:			_____ ft
E. Boom Angle _____ degrees		Boom length _____ feet	
F. Maximum Load Chart Capacity weight (360-degree capacity) as crane is configured:			_____ lbs
If the weight in Row C is greater the Row F, DO NOT MAKE THE LIFT!			
G. If the weight in Row C is less than the weight in Row F, divide the weight in Row C by the weight in Row F and enter as a percentage:			_____ %
If the percentage in Row G is 75% or greater, DO NOT MAKE THE LIFT YET! THIS IS NOW A CRITICAL LIFT. Contact your safety representative or supervisor for a Critical Lift Checklist and procedures.			
If the percentage in Row F is less than 75%, or no unusual conditions have been identified, you may continue with the lift after this form has been signed by the following individuals:			
Crane Operator			
_____		_____	_____
Print Name		Signature	Date
Superintendent or CM			
_____		_____	_____
Print Name		Signature	Date
Have you held a pre-lift meeting			☐ Yes ☐ No
Attendees:			
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
Note: Attach any data, manifest, diagrams, or photos necessary to support information presented here.			



CRITICAL LIFT PLAN

Issue Date: September 2001
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Location: _____

Date of lift: _____

Load description: _____

Does this lift involve lifting personnel? ☐ Yes ☐ No

Lift description: _____

A. WEIGHT

1. Weight Empty (load or basket) _____ lbs
2. Weight of Headache Ball or block _____ lbs
3. Weight of Lifting Bar _____ lbs
4. Weight of Slings and Shackles _____ lbs
5. Weight of Jib _____ lbs
6. Weight of Headache Ball on Jib _____ lbs
7. Weight of Cable (Load Fall) _____ lbs
8. Allowance for Unaccounted Material in Equipment (10% of weight) _____ lbs
9. No. of people lifted x 250 _____ lbs
10. Other _____ lbs
- Total Weight _____ lbs

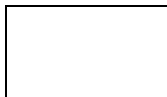
Source of Load Weight:

(Name Plate, Drawings, Calculated)

Weights Verified By:

B. JIBErected ☐ Stored ☐

1. Is Jib to be used? ☐ Yes ☐ No
2. Length of Jib _____
3. Angle of Jib _____
4. Rated Capacity of Jib (From Chart) _____

**C. CRANE PLACEMENT**

1. Any Deviation from Smooth, Solid Foundation in the Area?

2. Electrical Hazards in Area?

3. Obstacles or Obstructions to Lift or Swing?

4. Swing Direction and Degree (Boom Swing)?

D. CABLE

1. Number of Parts of Cable: _____
2. Size of Cable: _____

E. SIZING OF SLINGS

1. Sling Selection
 - a. Type of Arrangement _____
 - b. Number of Slings in Hook-up _____
 - c. Sling Length _____
 - d. Rated Capacity of Sling _____
2. Shackle Selection
 - a. Capacity (tons) _____
 - b. Shackle attached to load by: _____
 - c. Number of shackles _____





CRITICAL LIFT PLAN

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F. CRANE

1. Type of Crane _____
2. Crane Capacity _____ Tons
3. Lift Arrangement
 - a. Max Distance-Center of Load to center pin of crane _____ ft.
 - b. Length of Boom _____ ft.
 - c. Angle of Boom at pick-up _____ degrees
 - d. Angle of Boom at set _____ degrees
 - e. Rated capacity of crane under most severe lifting conditions (From Chart)
 1. Over Rear _____ lbs
 2. Over Front _____ lbs
 3. Over Side _____ lbs
4. From chart – Rated capacity of the crane for the Lift
5. Max. Load on Crane _____ lbs.
6. Lift is within Crane's Rated Capacity _____

G. PRE-LIFT CHECKLIST

YES NO

1. Matting Acceptable	☐	☐
2. Outriggers fully extended	☐	☐
3. Crane in good condition	☐	☐
4. Swing Room	☐	☐
5. Head Room Checked	☐	☐
6. Max. Counterweights used	☐	☐
7. Tag line used	☐	☐
8. Experienced Operator	☐	☐
9. Experienced Flagman (Designated)	☐	☐
10. Experienced Rigger	☐	☐
11. Load Chart in Crane	☐	☐
12. Wind Conditions: _____		
13. Crane Inspected By:: _____		
14. Functional Test of Crane By: _____		

SPECIAL INSTRUCTIONS OR RESTRICTIONS FOR CRANE, RIGGING, LIFT, ETC.

DIAGRAM CRANE AND
LOAD PLACEMENT

DIAGRAM RIGGINGS CONFIGURE

SIGNATURE OF RIGGING
SUPERVISOR

DATE

SIGNATURE-PLAN CHECKED BY

DATE

SIGNATURE OF SAFETY SUPERVISOR

DATE

SIGNATURE-SITE/FACILITY
MANAGER

DATE

	Health, Safety and Environment REQUIRED CLEARANCE FOR NORMAL VOLTAGE	Attachment 038-4 NA Issue Date: September 2001 Revision 7: February 2009

Required Clearance for Normal Voltage in Operation near High-Voltage Power Lines and Operation in Transit with No Load, and Boom or Mast Lowered

Normal Voltage, kV (Phase to Phase)	Minimum Required Clearance in Feet (meters)
Operation near High-Voltage Power Lines	
Up to 50	10 (3.05)
Over 50 to 200	15 (4.60)
Over 200 to 350	20 (6.10)
Over 350 to 500	25 (7.62)
Over 500 to 750	35 (10.67)
Over 750 to 1,000	45 (13.72)
Operation in Transit With No Load and Boom or Mast Lowered	
Up to 0.75	4 (1.22)
Over 0.75 to 50	6 (1.83)
Over 50 to 345	10 (3.05)
Over 345 to 750	16 (4.87)
Over 750 to 1,000	20 (6.10)

NOTE: Environmental conditions such as fog, smoke, or precipitation may require increased clearances.



Attachment 038-5 NA

Issue Date: September 2001
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EQ. Number:	Machine Hours:	Date:	Manufacturer:	Model:	Capacity:	Serial Number:	Location:
Codes: ☒ Satisfactory ☐ Not Satisfactory - Not applicable			Crane Type ☐ Gantry ☐ Crawler ☐ Truck ☐ RT ☐ Tower				

GENERAL CHECKS	
1.	☐ Operator's Manual/Configuration Drawings
2.	☐ Hand Signal Sign
3.	☐ Anti-Two-Block Warning Sign
4.	☐ High-Voltage Warning Sign
5.	☐ Capacity Chart
6.	☐ Warning Horn
7.	☐ Fire Extinguisher
8.	☐ Boom-Angle Indicator
9.	☐ Back-up Alarm
10.	☐ Anti-Two-Block Device (Main)
11.	☐ Anti-Two-Block Device (Auxiliary)
12.	☐ Load-Moment Indicator
13.	☐ Handholds and Steps
14.	☐ Non-Skid Surfaces
15.	☐ Catwalks and Handrails
16.	☐ Tailswing Barrier
17.	☐ Housekeeping, Interior
18.	☐ General Appearance, Exterior
19.	☐ Operator's Seat
20.	☐ Controls Marked
21.	☐ Cab Glass
22.	☐ Drum Turn Indicator
23.	☐ Directional Signals
24.	☐ Head, Tail and Brake Lights
25.	☐ Fluid Levels and Fluid Condition
CRANE CONFIGURATION COMPLIES WITH MANUFACTURER'S DESIGN	
1.	☐ Counterweights
2.	☐ Boom Type for Application
3.	☐ Boom Section Location
4.	☐ Pendant Length Relationship
5.	☐ Gantry Position
6.	☐ Mast Position
7.	☐ Boom Hoist Reeving/Bridle
8.	☐ Jib Suspension Reeving
9.	☐ Wire Rope Type/Size
10.	☐ Maximum Boom Not Exceeded
11.	☐ Maximum Jib Not Exceeded
LATTICE BOOM	
1.	☐ Boom Stops
2.	☐ Boom Hoist Kickout Operation
3.	☐ Alignment with Revolving Frame
4.	☐ Butt Section Chords, Lacing, Welds
5.	☐ First Intermediate Section, Chords, Lacing, Weld Length _____
6.	☐ Second Intermediate Section, Chords, Lacing, Weld Length _____
7.	☐ Third Intermediate Section, Chords, Lacing, Weld Length _____
8.	☐ Fourth Intermediate Section, Chords, Lacing, Weld Length _____
9.	☐ Fifth Intermediate Section, Chords, Lacing, Weld Length _____
10.	☐ Boom Point Section, Chords, Lacing, Welds, Sheaves, Shaft, Rope Guards, Dead End Device

LATTICE BOOM (Cont.)	
11.	☐ Boom in Storage, Chords, Lacing, Welds Length _____
12.	☐ Boom Connecting Pins, Bolts, Keepers
13.	☐ Boom Hinge Pins, Bushings, Keepers
14.	☐ Boom Paint Condition
15.	☐ Boom Top Rollers, Wire Rope Guides
16.	☐ Boom Repairs are According to Manufacturer's Procedures and Documented
JIB	
1.	☐ Butt Section, Chords, Lacing, Welds, Pins, Keepers
2.	☐ Intermediate Section, Chords, Lacing, Welds
3.	☐ Point Section, Chords, Lacing, Welds, Sheaves, Shaft, Keepers
4.	☐ Jib Mast or Shear Leg
5.	☐ Jib Stop Installation
6.	☐ Jib Suspension Condition and Proper Anchoring
7.	☐ No Unauthorized Repairs
HYDRAULIC BOOM	
1.	☐ Check Operation, Fully Retracting and Extending Boom
2.	☐ Check for Twists, Bends, Viewing Over Top of Boom
3.	☐ Check for Bends, Fully Extended, Viewing from Slide
4.	☐ Check Slide Wear Pads
5.	☐ Check Wear Pad Side Clearance
6.	☐ Attaching Shafts/Keepers
7.	☐ Boom Extension Cylinders
8.	☐ Boom Extension Cables
9.	☐ Boom Hoist Cylinders
10.	☐ Check Visible Welds, Attaching Lugs, Pins and Rollers, Check Top, Side and Bottom Boom Plates for Distortion or Cracking
11.	☐ Check Point Sheaves
12.	☐ Check Boom Extension or Jib Chords, Welds, Sheaves, Pins
13.	☐ Boom Repair According to Manufacturer's Procedures and Documented
14.	☐ Paint Condition
GANTRY AND BACK HITCH	
1.	☐ Check Welds and Check for Cracks
2.	☐ Sheaves, Shafts, Pins and Keepers
3.	☐ Check for Elongated Pin Holes, Stretched Metal
4.	☐ Lubrication
5.	☐ Crane Roof Condition

WIRE ROPE AND PENDANTS	
1.	☐ Pendant Lengths Match
2.	☐ Pendant Pins and Keepers
3.	☐ Pendant Condition at Sockets, and Broken Wire Check
4.	☐ Main Hoist Rope Condition/Reeving
5.	☐ Auxiliary Hoist Rope Condition
6.	☐ Boom Hoist Rope Condition/Reeving
7.	☐ All Hoist Rope Dead Ends
8.	☐ Equalizer Frame, Sheaves, Bearings and Keepers
9.	☐ Wire Rope Guides/Rollers
10.	☐ Lubrication and Preservation
11.	☐ Boom Hoist Rope Certification
12.	☐ Main Hoist Rope Certification
13.	☐ Auxiliary Hoist Rope Certification
REVOLVING FRAME, COUNTERWEIGHT	
1.	☐ Check Frame for Cracks and Defects
2.	☐ House Rollers
3.	☐ Hook Rollers and Bolts
4.	☐ Roller Path
5.	☐ Rotec Bearing and Bolts
6.	☐ Counterweight Bolts
7.	☐ "A" Frame and Pins
8.	☐ Cab Condition
LOAD BLOCK, OVERHAUL BALL	
1.	☐ Check Main Hook for Cracks
2.	☐ Main Hook Safety Latch
3.	☐ Check Auxiliary Hook for Cracks
4.	☐ Auxiliary Hook Safety Latch
5.	☐ Sheaves, Bearings
6.	☐ Dead End Sockets
7.	☐ Load Block Capacity _____
8.	☐ Overhaul Ball Capacity _____
9.	☐ N.D.T. Main Hook Documentation or Certification by Manufacturer N.D.T. Date _____
10.	☐ N.D.T. Auxiliary Hook Documentation or Certification by Manufacturer N.D.T. Date _____
HOIST AND SWING MACHINERY	
1.	☐ Hydraulic Main Hoist
2.	☐ Hydraulic Auxiliary Hoist
3.	☐ Hydraulic Swing and Brake
4.	☐ Hydraulic Supply System
5.	☐ Hydraulic Controls
6.	☐ Swing Pinion
7.	☐ Swing Rock or Gear
8.	☐ Continuous Rotation Test
9.	☐ Swing Clutches
10.	☐ Swing Brake
11.	☐ Swing or House Lock
12.	☐ Swing Reversing Gears
13.	☐ Main Hoist Brake
14.	☐ Main Hoist Clutch
15.	☐ Auxiliary Hoist Brake

HOIST AND SWING MACHINERY (Cont.)	
16.	☐ Auxiliary Hoist Clutch
17.	☐ Third Drum Clutch and Brake
18.	☐ Boom Hoist Clutch and Brake
19.	☐ Boom Hoist Dog
20.	☐ Control Rods and Pins
21.	☐ Drive Chains
22.	☐ Drivelines/U-Joints
23.	☐ Power Down Drive and Operation
24.	☐ Hoist Gears
25.	☐ Deck or Travel Gears
26.	☐ Jaw Clutches, Travel, Swing
27.	☐ Gear and Drive Guards
28.	☐ Control Operation, Response
29.	☐ Gauges
30.	☐ Lubrication
UPPER ENGINE, TRANSMISSION, T.C.	
1.	☐ Mounting Bolts
2.	☐ Radiator, Fan, Hoses
3.	☐ Belts
4.	☐ Air Cleaner
5.	☐ Air Compressor Pressure: High _____ Low _____
6.	☐ Transmission
7.	☐ Torque Converter
8.	☐ Electrical System/Batteries
9.	☐ Exhaust System, Rain Cap
10.	☐ Engine Operation
11.	☐ _____
12.	☐ _____
13.	☐ _____
14.	☐ _____
15.	☐ _____
CARBODY AND CRAWLERS	
1.	☐ Check for Structural Cracks
2.	☐ Center Pin Bushing
3.	☐ Travel Shaft Gears
4.	☐ Lower Jaw Clutches
5.	☐ Travel Brakes and Dogs
6.	☐ Axles and Fasteners
7.	☐ Travel Chains
8.	☐ Travel Sprockets
9.	☐ Carrier Rollers, Slide Metal
10.	☐ Bottom Rollers
11.	☐ Pad Lugs and Roller Path
12.	☐ Pad Pin Wear and Locks
13.	☐ Travel Motors, Hydraulic, Electric
14.	☐ Travel Reduction Gear Case
15.	☐ Hydraulic Supply System
16.	☐ Crawler Extension Mechanism
17.	☐ Lubrication
CARRIER	
1.	☐ Outrigger Operation
2.	☐ Outrigger Structure and Pads
3.	☐ Frame, Cracks and Welds
4.	☐ Drive, Axles, Linkage

CARRIER (Cont.)	
5.	☐ Steering Axles, Linkage
6.	☐ Wheel Lug Nuts
7.	☐ Tire Condition, Pressures
8.	☐ Steering Apparatus
9.	☐ Cab, Seat, Gauges, Horn
10.	☐ Radiator, Hoses, Supports
11.	☐ Engine Operation and Mounts
12.	☐ Belts
13.	☐ Air Cleaner
14.	☐ Alternator, Batteries
15.	☐ Main Transmission or Converter
16.	☐ Auxiliary Transmission or Transfer Case
17.	☐ Air Compressor
18.	☐ Record Air Pressures: High _____ Low _____
19.	☐ Service Brakes
20.	☐ Brake Hoses
21.	☐ Parking Brake/Safety Brakes
22.	☐ Exhaust System
23.	☐ Hydraulic Supply
24.	☐ Lubrication
LOAD ENHANCEMENT DEVICE	
1.	☐ Ringer Type
2.	☐ Skyhorse
3.	☐ Linkbelt Heavy Life Type
4.	☐ Configuration Complies with Manufacturer's Design
5.	☐ Integrity
MISCELLANEOUS	
1.	☐ Log Book, In Machine and Up to Date
2.	☐ All Safety Decals & Warning on Machine
3.	☐ _____
4.	☐ _____
5.	☐ _____

NOTE: Make sure deficient items are noted and corrected. (File in Record Book)

Inspection Date: _____

Inspector: _____

Comments: _____



CRANE SAFETY INSPECTION – INITIAL AND ANNUAL

Issue Date: September 2001
Revision 7: February 2009

CRANE LOAD TEST							
MAXIMUM LOAD REQUIRED		AT RADIUS		WITH BOOM LENGTH			
CRAWLER POSITION			OUTRIGGER POSITION				
☐ Extended ☐ Retracted			☐ Full ☐ Intermediate ☐ Retracted				
SUPERSTRUCTURE POSITION		LOAD/POUNDS		RADIUS/FT		BOOM LENGTH	
1.							
2.							
3.							
RESULTS OF TEST: ☐ Passed ☐ Failed							
REMARKS:							
Inspected By (Please Print):				Title:			
Signature:				Date:			
Operator (Please Print):				Date:			
Signature:				Date:			
Repairs Completed By:				Date:			

1. Regulations/Standards

A. OSHA Requires compliance with Code of Federal Regulations (CFR) 1926.550. Section A, Paragraph 6, reads as follows: A thorough annual inspection of the hoisting machinery shall be made by a competent person, or by a government or private agency recognized by the US Department of Labor. The employer shall maintain a record of the dates and results of inspections for each hoisting machine and piece of equipment.

B. ASME B30.5-2000, Section 5-2.1.5, reads as follows:
Written, dated, and signed inspection reports and records shall be made monthly on critical items in use such as brakes, crane hooks, and ropes. Records shall be kept where readily available.
2. The mobile, hydraulic, and crawler crane inspector and operator should be familiar with the requirements of:

A. OSHA 29 CFR 1926.550

B. ASME B30.5-2000

C. PCSA Mobile Hydraulic Crane Standard No.2
3. In addition, regulations sometimes found in nuclear plant construction, marine construction or areas covered by more stringent local laws may require compliance with some or all of the following:

A. Load Moment Indicators

B. Manufacturers’ or suppliers’ certification of breaking strengths of boom hoist, main hoist, and auxiliary hoist ropes. Whenever replacement ropes are purchased, the certification should be requested from the supplier and kept with the equipment records.

C. Non-destructive testing of load hooks or certification by the hook and block manufacturer.

D. Load testing, not to exceed 110 percent of rated load at specific radii with the superstructure in various positions or swinging 360°. Limitations based on structural strength should never be exceeded.

E. Provisions are made for A, B, C, and D in this inspection form if required.
4. No modifications will be made to any of the load-carrying parts or structure of any crane, without written approval of the manufacturer.
5. Welding repairs to booms are to be made according to procedures established by the manufacturer. Booms thus repaired are to be load tested between 100 and 110 percent of rated load prior to being placed back in service.
6. Checks peculiar to a machine may be written under the “Miscellaneous Checks” heading.
7. All inspection reports must be dated and signed.
8. Where discrepancies exist, explain the discrepancies in the “Remarks” section.
9. A monthly inspection form with checks, meeting ASME B30.5-2000, Section 5-2.1.5, is available.
10. Wire rope must be taken out of service when any of the following conditions exist:

A. In running ropes, six randomly distributed wires in one lay, or three broken wires in one strand in one lay.

B. Wear 1/3 the original diameter of outside individual wires; kinking, crushing, bird caging, or any other damage resulting in distortion of the rope structure.

C. Evidence of heat damage from any cause.

D. Reductions from nominal diameter of more than 1/64” for diameters up to and including 5/16”; 1/32” for diameters 3/8” to and including 1/2”; 3/64” for diameters 9/16” to and including 3/4”; 1/16” for diameters 7/8”.

E. In standing ropes, more than two broken wires in one lay in section beyond end connections or more than one broken wire at end connection.

F. Wire rope safety factors must be in accordance with ASME B30.5-2000.



	Health, Safety and Environment DAILY CRANE INSPECTION CHECKLIST	Attachment 038-6 NA Issue Date: September 2001 Revision 7: February 2009

	Health, Safety and Environment DAILY CRANE INSPECTION CHECKLIST	Attachment 038-6 NA Issue Date: September 2001 Revision 7: February 2009

	Health, Safety and Environment DAILY CRANE INSPECTION CHECKLIST	Attachment 038-6 NA Issue Date: September 2001 Revision 7: February 2009

[illegible]

Load Charts/Operator Manual/Log Book	☐	☐	☐
Drum/Winch Brakes	☐	☐	☐
Hoist/Boom Wire Rope and Sheaves	☐	☐	☐
Hooks and Safety Latches	☐	☐	☐
A-T-B/Load and Boom Angle Indicators	☐	☐	☐
Drum Rotation Indicators	☐	☐	☐
Boom/Pins and Keepers	☐	☐	☐
Hydraulic Controls/Cylinder Leaks	☐	☐	☐
Outrigger Beams/Pads	☐	☐	☐



Health, Safety and Environment
MONTHLY CRANE INSPECTION CHECKLIST

Attachment 038-7 NA

Issue Date: September 2001
Revision 7: February 2009

Equipment Number:	Hr. Meter Reading:	Capacity:
Date:	Manufacturer:	Model:
S/N:	Inspection Period:	Location:
Block Codes: ✓ Satisfactory X Not Satisfactory — Not Applicable		Crane Type: ☐ Crawler ☐ Truck ☐ Hydraulic
GENERAL CHECKS		HYDRAULIC BOOM
1. ☐ Operators Manual/Configuration Drawings 2. ☐ Hand Signals Posted 3. ☐ Anti-Two-Block Warning Signs 4. ☐ High Voltage Warning Sign 5. ☐ Capacity Chart in Cab 6. ☐ Warning Horn Operational 7. ☐ Fire Extinguisher (10BC, 5 LB) 8. ☐ Boom Angle Indicator 9. ☐ Backup Alarm 10. ☐ Anti-Two-Block Device (Main) 11. ☐ Anti-Two-Block Device (Auxiliary) 12. ☐ Load-Moment Indicator (If required) 13. ☐ Handholds and Steps 14. ☐ Non-Skid Surfaces 15. ☐ Catwalks and Handrails 16. ☐ Directional Signals 17. ☐ Head, Tail, Brake Lights 18. ☐ Housekeeping 19. ☐ Lubrication, Fluid Levels, and Fluid Condition 20. ☐ Overhead Protection 21. ☐ Window Glass 22. ☐ Log Book 23. ☐ Drum Rotation Indicators 24. ☐ Swing Radius Barricades		1. ☐ Check operation by fully extending and retracting 2. ☐ Check for twists and bends by viewing from over top of boom as it is being extended 3. ☐ Check for bends, fully extended, view from side 4. ☐ Check welds and check for cracks 5. ☐ Check boom pivot shaft and keepers 6. ☐ Check boom hoist cylinders and pins 7. ☐ Check boom extension cables and sheaves 8. ☐ Check boom point sheaves 9. ☐ Check wear pads and adjustment
CRANE CONFIGURATION COMPLIES WITH MANUFACTURER'S DESIGN		GANTRY/BACK HITCH/COUNTERWEIGHT
1. ☐ Counterweights 2. ☐ Gantry Position 3. ☐ Mast Position 4. ☐ Boom Hoist Reeving 5. ☐ Maximum Boom Not Exceeded 6. ☐ Maximum Jib Not Exceeded		1. ☐ Check welds and check for cracks 2. ☐ Check sheaves, shafts, pins, and keepers 3. ☐ Check counterweight bolts/retainers
LATTICE BOOM/JIB		WIRE ROPE AND PENDANTS
1. ☐ Check integrity of boom stops 2. ☐ Check boom hoist kickout 3. ☐ Check boom for alignment with revolving frame, cords, and lacing for damage or improper and undocumented repairs 4. ☐ Check for cracked welds 5. ☐ Check jib for alignment, damage, or improper and undocumented repairs 6. ☐ Check jib backstop NOTE: Cable-type belly slings do not comply with 1926.550 7. ☐ Check all boom and jib connecting pins and locks 8. ☐ Check point sheaves and wire rope guides 9. ☐ Check jib suspension		1. ☐ Use Monthly Wire Rope/Hook Inspection Work Sheet (SMS 038-7) 2. ☐ Check condition of main hoist rope 3. ☐ Check condition of auxiliary hoist rope 4. ☐ Check condition of boom hoist rope 5. ☐ Check condition of pendants, especially at sockets 6. ☐ Check all hoisting rope dead ends, clamps and sockets.
		LOAD BLOCK AND OVERHAUL BALL
		1. ☐ Check main hook for cracks, bending, and safety latch 2. ☐ Check auxiliary hook for cracks, bending, and safety latch 3. ☐ Check sheaves 4. ☐ N.D.T. main hook 5. ☐ N.D.T. auxiliary hook
		The mobile, hydraulic, and crawler crane inspector and operator should be familiar with the requirements of: ASME B30.5 - 2000 PCSA Mobile Hydraulic Crane Standard # 2



Health, Safety and Environment
MONTHLY CRANE INSPECTION CHECKLIST

Attachment 038-7 NA

Issue Date: September 2001
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HOIST AND SWING MACHINERY	CARRIER
1. ☐ Hydraulic Main Hoist 2. ☐ Hydraulic Auxiliary Hoist 3. ☐ Hydraulic Swing and Brake 4. ☐ Main Hoist Clutch 5. ☐ Main Hoist Brake 6. ☐ Auxiliary Hoist Clutch 7. ☐ Auxiliary Hoist Brake 8. ☐ Third Drum Frictions 9. ☐ Boom Hoist Clutch and Brake 10. ☐ Boom Hoist Dog 11. ☐ Power-Down Drive and Operation 12. ☐ Gear and Drive Guards	1. ☐ Outrigger Operation and Controls 2. ☐ Outrigger Structure and Pads 3. ☐ Frame, Cracks, and Welds 4. ☐ Wheel Lug Nuts 5. ☐ Tire Condition and Pressure 6. ☐ Cab Seat, Gages, Horn 7. ☐ Engine Operation and Mounts 8. ☐ Radiator, Hoses, Belts 9. ☐ Air Cleaner 10. ☐ Alternator, Batteries 11. ☐ Service Brakes 12. ☐ Parking, Safety Brakes 13. ☐ Steering Apparatus 14. ☐ Check for Damaged or Blistered Brake Hoses
UPPER ENGINE, TRANSMISSION, AND TC	LOAD ENHANCEMENT DEVICE
1. ☐ Engine Operation 2. ☐ Belts, Radiator, Hoses 3. ☐ Air Cleaner 4. ☐ Air Compressor 5. ☐ Transmission or Converter 6. ☐ Electrical System, Batteries 7. ☐ Fluid Leaks	1. ☐ Ringer Type 2. ☐ Skyhorse Type 3. ☐ Linkbelt Heavy Lift Type 4. ☐ Configuration Complies with Manufactures Design 5. ☐ Integrity of Device 6. ☐ Other _____
CARBODY AND CRAWLERS	MISCELLANEOUS CHECKS
1. ☐ Check for Structural Cracks 2. ☐ Drive Chains 3. ☐ Drive Motors 4. ☐ Lower Jaw Clutch Operation 5. ☐ Travel Brakes and Dogs 6. ☐ Crawler Extension Mechanism	1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐

REMARKS:

INSPECTED BY: _____ **DATE:** _____

Repairs Completed By: _____ **DATE:** _____



Health, Safety and Environment
PERSONNEL PLATFORM LIFTING FORM

Attachment 038-9 NA

Issue Date: September 2001
Revision 7: February 2009

Project #: _____ **Date:** _____

1. Jobsite: _____

2. Job description (including estimated time required): _____

3. Basket needed: _____

4. Location and load

A. Height from ground in feet (approximate): _____

B. Crane needed (in tons): _____

C. Expected load in pounds:

i. People at 250 lbs (113 kg) each: _____

ii. Weight of tools and material: _____

iii. Subtotal weight: _____

iv. Weight of basket and rigging: _____

v. Total weight: _____

5. Pre-lift Meeting Signatures

A. Crane operator _____

B. Competent person _____

C. Craftsmen _____

6. Pre-Lift

A. Test load in pounds (1.5 times Item 4.C.iii [subtotal weight above]): _____

B. Crane operator to check boom angle and radius for capacity

i. Crane capacity _____

ii. Item 6.B.i divided by 2 _____

iii. Item 4.C.v (total weight) _____

iv. If Item 6.B.iii is larger than Item 6.B.ii, this crane may not be used.

C. Full-cycle test lift with test load (Item 6.A) completed

Competent Person signature: _____

7. If the crane must be relocated, then a new Personnel Platform Pre-Lift Form is required.

8. The crane operator will not leave the cab while a personnel platform is suspended, whether occupied or not occupied.

9. Approved: _____

Site Manager

Safety Supervisor

	Health, Safety and Environment	Attachment 038-10 NA
	BOOM TRUCK HAZARD CHECKLIST	Issue Date: September 2001 Revision 7: February 2009

Prior to the manipulation of any controls, operators are to ensure that all personnel are clear of all moving parts. Employees working with boom truck operators will review the boom truck hazard check list to heighten awareness while working on and around the boom truck. Access has been improved on boom trucks; these are the ONLY approved access and egress on/off the bed of the truck.

The operator is in control of ALL operations associated with this equipment. The Operator will ensure the following items have been performed and reviewed, and signed by all parties working with the boom truck PRIOR TO THE START OF OPERATIONS. The completed form will be returned to the safety department at the end of each shift.

Date:	Operator:	Location:
Activity A Job Hazard Analysis must be developed prior to any lifting activities being performed that involve the use of the boom truck.		Check Boxes
Operator's pre-shift inspection		☐
Complete the Crane Pre-Lift Checklist (attached to this form)		☐
Chock wheels when parking		☐
Ensure adequate lighting is provided for night operations		☐
The weight of the load to be lifted is within the load capacity of the boom truck		☐
Ensure that all rigging is adequate and within the rated capacity for the load to be lifted		☐
Verify workers, materials, and other equipment are clear of ALL boom truck devices and movement PRIOR to manipulation, operation, and/or movement of the equipment		☐
Alert coworkers before extending outriggers at the beginning of a task		☐
Complete survey to ensure the boom truck cannot contact overhead power lines		☐
Use pads under outriggers when necessary.		☐
Ensure ground is stable and free of underground utilities.		☐
Watch for swinging of headache ball when unlatching hook from D-ring		☐
Inspect shackles and chokers before attaching to hook		☐
Boom truck bed access is available and in good condition (permanent or temporary ladder)		☐
Review access/egress with personnel assigned to work on Boom Truck		☐
Never use outriggers for access or egress		☐
Have two people move boom cradle out of way		☐
When loading and unloading boom trucks, check that the following are observed:		
Always use tag lines		☐
Give clear hand signals		☐
Do not walk under a suspended load.		☐
Secure material transported on boom truck.		☐
Stay clear of boom's swing radius.		☐
After task, notify all personnel before retracting outriggers		☐
Return rigging, outrigger pads, tools, boom cradle, and hook to proper locations		☐

	Health, Safety and Environment BOOM TRUCK HAZARD CHECKLIST	Attachment 038-10 NA Issue Date: September 2001 Revision 7: February 2009

Attendees Signatures	
Print Name	Signature

URS SAFETY MANAGEMENT STANDARD

Fall Protection

1. Applicability

This standard applies to operations of URS Corporation and its subsidiary companies where personnel could be exposed to fall hazards of 6 feet (2 meters) or greater in the construction, mining, and demolition industry, and 4 feet (1.2 meters) or greater in other industries (General Industry). The standard also addresses steep slope work where the work surface angle is greater than 30 degrees from horizontal.

2. Purpose and Scope

The purpose of this standard is to provide criteria for the recognition and control of fall hazards.

3. Implementation

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

4. Requirements

A. Fall Protection – General

1. A Qualified Person has a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field that is capable of designing, analyzing, evaluating and specifying fall protection systems. A Qualified Person will:
 - a. Be properly trained by a competent authority and hold necessary credentials.
 - b. Approve fall arrest attachment points.
 - c. Approve fall arrest systems.
 - d. Fulfill rescue plan requirements if external entities (e.g., fire department) are not used.
2. A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as in their application and use with related equipment. A Competent Person will:
 - a. Be properly trained by a competent authority.

URS SAFETY MANAGEMENT STANDARD

Fall Protection

- b. Ensure that one or more fall protection or prevention systems outlined in this standard is provided at all locations where fall hazards exist.
 - c. Ensure that all personnel working with and around fall hazards and fall protection systems are properly trained.
 - d. Ensure that access controls to areas with fall hazards are effective.
 - e. Inspect fall protection equipment.
 - f. Approve fall protection plans.
 - g. Ensure that safety monitoring systems or warning line systems are properly implemented, with trained staff as monitors.
2. An Authorized User who will:
- a. Be properly trained by a competent authority.
 - b. Conduct pre-use inspections of equipment.
 - c. Understand and demonstrate proper use of the fall protection equipment.
 - d. Acknowledge identified fall hazards in the workplace.
3. Fall hazards generally fall into three categories for URS employees;
- a. General Industry – application where fall hazards greater than 4 feet (1.2 meters) exist, including:
 - i. Workers are conducting inspection of existing facilities not under construction
 - ii. Working in environmental remediation activities where no construction activities are occurring
 - iii. Working in manufacturing operations
 - iv. Working in vehicle and aircraft maintenance, and repair operations
 - v. Working in warehouses

URS SAFETY MANAGEMENT STANDARD

Fall Protection

- vi. Working on towers, poles, or other elevated structures.
- b. Construction/mining – These activities require fall protection when fall hazards exceed 6 feet (2 meters). Activities include maintenance, mining, demolition, renovation, and construction support inspections and surveying.
- c. Steep Slope – Fall protection measures must be used whenever the slope angle exceeds 30 degrees from horizontal (note that this excludes roofing applications, which are covered under Construction activities). Activities include the inspection of dams, environmental surveys of timbered slopes, or other applications where traditional fall protection systems are impractical.
- 4. Fall hazards include, but are not limited to, excavations, highwalls, unprotected elevations, ladders, scaffolds, floor holes, wall openings, formwork, rebar tying, inspection of dams, working on top of vehicles, equipment, or airframes, working over operating machinery, working above hazardous substances, and all other locations and operations where potential fall hazards exist.
- 5. Fall hazards must be addressed by one of five means (for additional information, see Attachment 040-1 NA – Fall Protection Checklist):
 - a. Elimination or substitution controls such as moving planned work to ground level or substitution of a process, sequence, or procedure so that employees are no longer exposed to a fall hazard;
 - b. Passive fall protection such as isolating or separating employees from the fall hazard through the use of guardrails or covered floor openings;
 - c. Fall restraint, which includes securing an employee to an anchor using a lanyard that is short enough to prevent the employee's center of mass from reaching the actual fall hazard;
 - d. Fall arrest, which includes systems to stop an employee's fall after it has begun (e.g., personal fall arrest systems, safety nets, etc.);

URS SAFETY MANAGEMENT STANDARD

Fall Protection

- e. Administrative controls, including safety observers, boundary markings (i.e., tape, cable, or barricades) located 6 feet (2 meters) or more from an exposed edge, and maintaining three-points of contact.
- 5. Note that in some places, the standards for fall protection are required at different elevations than specified in this standard. Where this is the case, the more conservative elevation will be used in defining when fall protection systems are required.
- 6. In each instance where employees are exposed to fall hazards and passive fall protection controls are impractical, a Fall Protection Plan must be developed to define a strategy to protect the employees. Attachment 040-3 – Fall Protection Plan Template may be used to develop a Fall Protection Plan. Fall Protection Plans must be approved by the Site/Location/Project Manager and Safety Manager prior to work commencing.
- 7. Where administrative controls are the only feasible method of fall protection, Attachment 040-3 NA - Fall Protection Plan Template and Attachment 040-4 NA – Alternative Fall Protection Permit should be used. Refer to Section I for additional information.

B. Training

- 1. Qualified Person training should include:
 - a. Selection of fall protection systems and compatibility of systems.
 - b. Designing anchorages or complex active fall protection systems.
 - c. Determining fall clearances and swing fall or other impact forces.
- 2. Competent Person training should include:
 - a. Background knowledge, including regulations and standards.
 - b. Recognition and identification of fall hazards.
 - c. Selection of abatement solutions, systems and compatibility of systems.
 - d. Inspection and approval of personal protective equipment.

URS SAFETY MANAGEMENT STANDARD
Fall Protection

- e. Development and application of system use and rescue procedures.
- 3. Authorized User training should be conducted by a Competent Person for each employee who may be exposed to falls. Training should include:
 - a. The nature and location of fall hazards in the work area.
 - b. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.
 - c. The correct procedure for conducting a pre-use inspection of fall protection equipment in accordance with manufacturer's recommendations.
 - d. The use and operation of guardrail, personal fall arrest, safety net, warning line, and safety monitoring systems, controlled access zones, and other protection to be used.
 - e. The role of each employee in the safety monitoring system, when used.
 - f. The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.
 - g. The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.
 - h. The role of employees in fall protection plans.
 - i. The standards contained in 29 Code of Federal Regulations (CFR) 1926 Subpart M or other applicable regulations/standards.
- 2. Prepare a written certification record that includes the name of the employee trained, the date(s) of training, and the signature of the person who conducted the training.
- 3. Provide re-training when one of the following situations occur:
 - a. Changes in the workplace render previous training obsolete.

URS SAFETY MANAGEMENT STANDARD

Fall Protection

- b. Changes in the types of fall protection systems or equipment to be used render previous training obsolete.
- c. Inadequacies in affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.

C. Guardrail Systems

1. Guardrail systems are used in Construction, Mining, and General Industry activities. The guardrail requirements apply in these settings at different heights: 6 feet (2 meters) in construction; and 4 feet (1.2 meters) in general industry:
 - a. Provide guardrail systems, when feasible, at all locations where a fall hazard exists. Where guardrail systems are impractical, an alternative form of fall protection must be provided, as outlined elsewhere in this Standard.
 - b. Require that guardrail systems meet the following criteria:
 - i. Install toprails 42 inches (1.1 meters) above the walking/working surface capable of withstanding, without failure, a minimum force of 200 pounds (91 kilograms) in any outward or downward direction with no more than 3 inches (7.6 centimeters) of deflection.
 - ii. Install midrails 21 inches (53 centimeters) above the walking/working surface capable of withstanding, without failure, a minimum force of 150 pounds (68 kilograms) in any outward or downward direction.
 - iii. Space posts not more than 8 feet (2.5 meters) apart on centers.
 - c. Require that there are no openings more than 19 inches (48 centimeters) wide in any guardrail system.
 - d. Do not use plastic or steel banding as toprail or midrail.
 - e. Provide toprails and midrails of at least one-quarter inch (6 millimeters) nominal thickness or diameter, and smoothly surfaced to prevent cuts and punctures.

URS SAFETY MANAGEMENT STANDARD

Fall Protection

- f. Erect guardrails on all sides when using guardrail systems around holes.
- g. When guardrails are used around holes that are used for access, such as ladderways, provide a gate or offset the guardrail so that a person cannot walk directly into the hole.
- h. When guardrails are used at hoisting areas, place a chain, gate, or removable guardrail section across the access point when hoisting operations are not taking place.
- i. Provide guardrail systems at *all* locations above dangerous equipment, regardless of height above the danger.
- j. Provide guardrails at all wall openings where the outside bottom edge of the opening is 6 feet (2 meters) or more above lower levels, and the inside bottom edge of the wall opening is less than 39 inches (1 meter) above the walking/working surface.
- k. Erect guardrail systems on all unprotected sides or edges of ramps and runways when such systems are used.
- l. Where wire rope is used for construction of guardrail systems:
 - i. Ensure the wire rope used for construction of the guardrail system is a minimum of ¼ inch (0.6 centimeters) in diameter.
 - ii. Flag the toprail with high-visibility material every 6 feet (2 meters).
 - iii. Attach wire rope to existing structures, equipment, or other wire ropes using Crosby clips of the U-Bolt and saddle type. Examples of this can be found in SMS 041 – Rigging, and Supplemental Information C to SMS 041.
 - iv. Never clip two straight lengths of wire rope together. Instead, form an eye in each length and connect the eyes together.
 - v. Never use fewer than the number of clips recommended.

URS SAFETY MANAGEMENT STANDARD

Fall Protection

- vi. Always use new clips; re-used clips will not develop the proper efficiency.
- vii. Use a thimble when creating an eye to prevent the rope from wearing the eye, and to provide a safer connection.
- viii. Check the tension of the rope an hour after installation. Retighten as necessary, and check for tightness at frequent intervals thereafter.

D. Personal Fall Arrest Systems (General Industry and Construction)

1. Provide and require the proper use of personal fall arrest systems on all unprotected elevations 6 feet (2 meters) or higher for Construction activities, and 4 feet (1.2 meters) or higher for General Industry applications. Where these systems are impractical, an alternative form of fall protection must be provided. Refer to Section I for additional information.
2. All aspects of personal fall protections systems must be designed, installed, and used under the supervision of a Competent Person.
3. Maintain a safety factor of at least 2 in all components of a personal fall protection system (i.e., the static strength of the system should be at least two times the maximum required arresting force).
4. *Safety belts (body belts) are prohibited as a means of fall protection, although they may have application as a positioning device.*
5. Use only full-body harnesses, shock-absorbing lanyards, lifelines, and anchorage points that meet the following criteria:
 - a. Body harness design and construction must meet the specifications set forth in 29 CFR 1926.500-.503 (or equivalent) and ANSI Z359.1.
 - b. All snaphooks must be of the locking type and must be able to withstand a force of 3,600 pounds (1,633 kilograms) in all directions of potential loading to the gate.
 - c. All hardware must be dropforged or pressed steel with a corrosion-resistant finish. Surfaces must be smooth and free of sharp edges. D-rings and snaphooks must have a minimum tensile strength of 5,000 pounds (2,270 kilograms).

URS SAFETY MANAGEMENT STANDARD

Fall Protection

- d. Ropes and webbing used in lanyards, lifelines, and body harnesses must be made of synthetic fibers.
- e. The attachment point (D-ring) of a body harness should be located in the center of the wearer's back near shoulder level, or above the wearer's head. *Note that front-mounted D-rings are allowed if the personal fall arrest system is designed to restrict free fall distances to 2 feet (60 centimeters) or less and limit the maximum fall arrest loads to 900 pounds (410 kilograms) of force or less.*
- f. Horizontal lifelines must be designed, installed, and used under the supervision of a Competent Person, and be capable of supporting at least 5,000 pounds (2,270 kilograms) of force per employee attached.
- g. Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 pounds (2,270 kilograms).
- h. Self-retracting lifelines and lanyards that limit free-fall to 2 feet (60 centimeters) or less must be capable of sustaining a minimum tensile load of 3,000 pounds (1,360 kilograms) in the fully extended position.
- i. Self-retracting lifelines and lanyards that do not limit free fall to 2 feet (60 centimeters) or less, ripstitch, and other shock-absorbing lanyards must be capable of sustaining a minimum tensile load of 5,000 pounds (2,270 kilograms) in the fully extended position.
- j. Protect lifelines against being cut or abraded.
- k. Anchorage points for personal fall protection systems must be independent of any anchorage point being used to support or suspend platforms and must have a static strength of at least 5,000 pounds (2,270 kilograms) per employee attached.
- l. Anchorage points for work positioning systems (systems designed to support a worker on a vertical system while working with hands free) and rescue systems must have a static strength of at least 3,000 pounds (1,365 kilograms).
- m. Anchorage points for worker restraint systems (systems designed to limit a worker's travel in such a manner that he/she cannot reach a fall hazard zone) must have a static

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Fall Protection

strength of at least 1,000 pounds (455 kilograms). Worker restraint systems are only to be used on walking or working surfaces with a slope of less than 18.4°.

- n. Personal fall arrest systems, when stopping a fall, must:
 - i. Limit arresting force on an employee to 1,800 pounds (820 kilograms) when used with a body harness;
 - ii. Be rigged such that an employee can neither free fall more than 6 feet (1.8 meters) nor contact any lower level;
 - iii. Bring an employee to a complete stop and limit maximum acceleration distance an employee travels to 3.5 feet (1.1 meters); and
 - iv. Have sufficient strength to withstand twice the potential impact energy of an employee free-falling a distance of 6 feet (1.8 meters), or the free-fall distance permitted by the system, whichever is less.
- 6. Fall protection equipment and anchorages must be inspected at the beginning of each shift by an authorized person and at least once per year (or more frequently if required by manufacturer) by a competent person. The annual inspections must be documented and remain on file for the life of the equipment. Inspections may be documented using SMS 040-2 NA or the manufacturer's inspection checklist.
- 7. Require employees to be familiar with the fitting and donning of body harnesses; proper tie-off techniques; and suitable anchorage points.
- 8. Where feasible, tie-off points should be above the employee's shoulders to limit potential fall length.
- 9. Never tie off to guardrail systems or hoists.
- 10. Require employees to remain tied off 100 percent of the time at or above 6 feet (2 meters) for Construction applications, or above 4 feet (1.2 meters) for General Industry applications, by means of horizontal lifelines, vertical lifelines, a double-lanyard system, or other suitable means.

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11. Remove from service any component of a personal fall protection system that has been subjected to impact loading, and do not use it again until it is inspected by a competent person, and determined to be undamaged and suitable for reuse.
12. Make provisions for the prompt rescue of personnel in the event of a fall, or require that employees are capable of self-rescuing team members. Prompt rescue means getting to the rescue subject within 6 minutes of the accidental fall. Methods of rescue will be addressed in the fall protection plan.
13. If an in-house rescue team is to be used, ensure team members are qualified, trained and equipped for the task. Develop action plans and instructions for the team, and provide them with the opportunity to simulate a rescue.
14. If an outside rescue team is to be used, ensure that a documented plan of approach is completed, and that written confirmation of the plan is provided by the rescue agency.
15. Provide separate vertical lifelines for each employee using a vertical lifeline. For lifeline use, 5/8-inch (16-millimeter) nylon rope is recommended.
16. Ensure each employee working from a swing scaffold, bosun's chair, or other suspended work platform is provided with a lifeline separate from the suspended work platform.
17. Protect lanyards and lifelines against cuts and abrasions. Where tools are used that have the potential to sever, abrade, or burn lanyards, lifelines, or safety straps, replace synthetic materials with wire rope or wire-cored manila rope of equal strength.
18. Use rope grabs to attach to vertical lifelines—never use knots.

E. Safety Net Systems (Construction Applications)

1. Provide safety net systems at locations where a fall hazard of 6 feet (2 meters) or greater exists, and other forms of fall protection are not feasible. Where safety net systems are impractical, an alternative form of fall protection as outlined elsewhere in this standard must be provided.
2. Require that safety net systems meet the criteria set forth in 29 CFR 1926.500 – 503.

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Fall Protection

3. Install safety nets as close as possible under the walking/working surface on which employees are working, but never more than 30 feet (9 meters) below this level.
4. Require that the potential fall area from the walking/working surface to the net is unobstructed.
5. Install safety nets with enough clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified below.
6. Extend the outer edge of the net 8 feet (2.5 meters) from the edge of the working surface when the vertical distance from the working level to the net is 5 feet (1.5 meters) or less.
7. Extend the outer edge of the net 10 feet (3 meters) from the edge of the working surface when the vertical distance from the working level to the net is 5 to 10 feet (1.5 to 3 meters).
8. Extend the outer edge of the net 13 feet (4 meters) from the edge of the working surface when the vertical distance from the working level to the net is greater than 10 feet (3 meters).
9. Conduct a drop test of the safety net after installation and before being used as a fall protection system; whenever relocated; after major repair; and at 6-month intervals if left in one place.
10. Conduct the drop test by dropping a 400 pound (180 kilograms) sandbag, 30 inches (76 centimeters) in diameter, into the net from at least 42 inches (107 centimeters) above the highest walking/working level at which employees are exposed to a fall.
11. Inspect safety nets at least once a week (and after any occurrence that could affect the integrity of the system) for wear, damage, and deterioration. Remove defective nets and components from service.
12. Remove all materials, scrap, equipment, and tools that have fallen into the net as soon as possible, but at least before the next work shift.

F. Hole Covers

1. Provide covers in roadways and vehicle aisles that are capable of supporting at least twice the maximum axle load of the largest vehicle expected to cross over the cover.

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2. Provide walking/working surface hole covers that are capable of supporting at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.
3. Secure covers at the time of installation to prevent displacement by the wind, equipment, or employees.
4. Color code or mark all hole covers with the word "HOLE" or "COVER" to provide warning of the hazard.

G. Safety Monitoring Systems, Warning Line Systems, and Controlled Access Zones

1. These control measures must be approved by the Competent Person prior to performing any roofing, overhand bricklaying, leading edge, or other elevated work that may require the use of one or more of these systems.

H. Protection from Falling Objects (Construction Applications)

1. Install toe-boards along the edge of the overhead walking/working surface.
2. Require that toe-boards are a minimum of 3½ inches (9 centimeters) in height; that they are capable of withstanding at least 50 pounds (22 kilograms) of force applied in any downward or outward direction; and that there is no more than a ¼-inch (6-millimeter) clearance between the toe-board and the walking/working surface.
3. Install paneling or screening from the top of the toe-board to the top rail or mid-rail when tools, equipment, or materials are piled higher than the top of the toe-board.
4. Provide sidewalk sheds or canopies as appropriate. For additional information, see SMS 011 – Demolition.

I. Alternative Fall Protection Plans

1. When traditional fall protection systems (e.g., guardrails, harnesses) are impractical, a Safety Manager may authorize an Alternative method of Fall Protection. Typically, this is intended to include steep slope (>30 degrees from horizontal) work along graded roads, on the face of dams, on top of an aircraft on the flight line, and in other remote or inaccessible steep work areas. This may include rope access systems on vertical or nearly vertical

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surfaces. This does not include roofing applications, because appropriate equipment and regulatory guidance exists in those cases.

2. A Fall Protection Plan must be developed using Attachment 040-3 NA – Fall Protection Plan Template. Fall Protection Plans must be approved by the appropriate the Site/Location/Project Manager and Safety Manager before work commences.
3. Fall Protection Plans involving administrative controls shall include an Alternative Fall Protection Permit (Attachment 040-4 NA), ensuring that the Authorized Users have identified all hazards (including environmental conditions), are accompanied by a safety observer, and are properly trained. Alternative Fall Protection Permits must be approved by a Competent Person. Alternative Fall Protection Permits shall not be authorized if environmental factors pose an increased risk (e.g., inclement weather/rain).
4. The Fall Protection Plan, must address the following areas thoroughly:
 - a. Fall protection strategy and application.
 - b. Protective system and equipment, in detail.
 - c. Methods and procedures, including limitations of the system, and the required numbers of trained workers.
 - d. Alternative Fall Protection Permit (Attachment 040-5 NA).
 - e. Explanation of why more effective fall protection controls are impractical. Cost and convenience are inadequate justifications.
 - f. Rescue capability and procedures.
 - g. Training required, in detail, for all workers.
 - h. Responsibilities of key personnel, including the supervisor.
 - i. Controlled access zones.
 - j. The use of motor vehicles as an anchoring point is prohibited.

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- k. The use of three-points of contact. Authorized users must be accompanied by a safety observer.

5. Documentation Summary

Place in the Project Safety Files:

- A. Qualified Person Qualifications (if used)
- B. Competent Person Qualifications
- C. Authorized User/Employee Training Records
- D. Fall Protection Plan
- E. Alternative Fall Protection Permits

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1926, Subpart M – [Fall Protection](#)
- B. U.S. OSHA Technical Links – [Fall Protection](#)
- C. U.S. Mine Safety and Health Administration, 30 CFR 56.15000
- D. U.K. – [Construction \(Health, Safety and Welfare\) Regulations 1996](#)
- E. ANSI Z359 2012– Fall Protection Code
- F. [ANSI A10.11-1989](#) – Safety Nets Used During Construction, Repair, and Demolition Operations
- G. [ANSI 1264.1-1995](#) – Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems
- H. [SMS 011](#) – Demolition
- I. [SMS 041](#) - Rigging
- J. [Attachment 040-1 NA](#) – Fall Protection Checklist
- K. [Attachment 040-2 NA](#) – Fall Protection PPE Checklist
- L. [Attachment 040-3 NA](#) – Fall Protection Plan Template
- M. [Attachment 040-4 NA](#) – Alternative Fall Protection Work Permit

	Health, Safety and Environment FALL PROTECTION CHECKLIST	Attachment 040-1 NA Issue Date: June 1999 Revision 7: March 2013

NOTE: Employees must review the requirements of this Fall Protection Checklist prior to starting work activities. This plan must be available at the work site during work activities.

JOB LOCATION/DESCRIPTION

1. Fall hazard identified:

Identify all areas where fall hazards of at least 6 feet (2 meters) or more exist in construction areas, and at least 4 feet (1.2 meters) or more exist in other industries:

☐ Unprotected edge	☐ Floor openings	☐ Scaffold
☐ Ladder	☐ Stairway	☐ Wall Openings
☐ Other (list): _____		

2. Method of all protection to be provided:

Each method of fall protection requires approval of the Site Safety Representative.

☐ Guardrails	☐ Fall Arrest	☐ Fall Restraint
☐ Safety Nets	☐ Hole Covers	☐ Monitoring Systems
☐ Other (list): _____		

3. Describe the method(s) for assembly, maintenance, inspection, and disassembly of the fall protection system used:

4. Describe method(s) for handling, storing, and securing tools and materials:

5. Describe the method(s) for prompt, safe removal of injured workers:

- ☐ Initiate fall rescue plan
- ☐ Initiate facility emergency response (911 or _____)
- ☐ Other (list) _____

Approved by: _____
Superintendent
Site Safety Representative

Date: _____



Health, Safety and Environment
FALL PROTECTION PPE CHECKLIST

Attachment 040-2 NA

Issue Date: June 1999
Revision 7: March 2013

Name of Inspector: _____ Date Inspected: _____

	Check if OK	Comments
Training – Is each worker exposed to fall hazards properly trained by a competent person in hazard recognition, fall protection processes and equipment, and site-specific conditions?	☐	
Harness – Inspect the entire surface of webbing for damage. Beginning at one end, bend the webbing in an inverted “U.” Holding the body-side of the belt toward you, grasp the belt with your hands 6 to 8 inches apart. This surface tension makes the damaged fibers or cuts easier to see. Watch for frayed edges, broken fibers, pulled stitches, cuts, burns, and chemical damage.	☐	
Buckles – Note any unusual wear, frayed or cut fiber, or distortion of the buckles. Inspect the buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment points of the center bar.	☐	
Straps – The tongue receives heavy wear from repeated buckling and unbuckling. Inspect for loose, distorted, or broken grommets. The webbing should not have any additional punched holes. Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. The roller should turn freely on the frame. Check for distortion or sharp edges.	☐	
Lanyards – General: Snaps – Inspect closely for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should seat into the nose without binding, and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper locks must prevent the keeper from opening when the keeper closes.	☐	
Thimbles – The thimble must be firmly seated in the eye of the splice, and the splice should have no loose or cut strands. The edges of the thimble must be free of sharp edges, distortion, or cracks.	☐	
Web Lanyard – While bending the webbing over a curved surface such as a pipe, observe each side of the webbed lanyard: this will reveal any cuts or breaks. Examine the webbing for swelling, discoloration, cracks, or burns. Observe closely for any breaks in the stitching.	☐	
Rope Lanyard – Rotation of the rope lanyard while inspecting from end to end will bring to light any fuzzy, worn, broken, or cut fibers. Weakened areas from extreme loads will appear as a noticeable change from the original diameter. The rope diameter should be uniform throughout, following a short break-in period. Make sure the rope has no knots tied in it. Knots can reduce the strength of the rope by up to 60 percent.	☐	
Shock-Absorbing Lanyard – Shock-absorbing lanyards should be examined as a web lanyard; however, also look for signs of deployment. If the lanyard shows signs of having been put under load (e.g., torn out stitching), remove it from service.	☐	
Hardware – Check “D” rings for distortion, cracks, breaks, and rough or sharp edges. The “D” ring should pivot freely. “D” ring back pads should also be inspected for damage.	☐	
Anchorage – Check that the anchor point is properly located above the work area; positioned to minimize swing in the event of a fall; and capable of supporting 5,000 pounds (2,270 kilograms) for each attached employee.	☐	



Safety Management Standard
FALL PROTECTION PLAN

Attachment 040-3NA
Issue Date: June 1999
Revision 7: March 2013

PURPOSE

This fall protection plan template may be used to meet industry standards and the requirements in SMS 040 NA where workers are exposed to fall hazards and passive fall protection systems (e.g., guardrails, safety nets, etc.) are impractical and/or only administrative controls are feasible for certain tasks. This plan must be approved by a regional/business unit Safety Manager, shall be readily available to all personnel, and shall be updated at least annually.

DESIGNATED PERSONNEL & DUTIES

Qualified Person(s)	
Qualified personnel may be necessary to: • Approve fall arrest attachment/anchorage points • Approve complex fall arrest systems • Fulfill rescue plan requirements if outside agencies are not used	
Names of Qualified Persons	Job Classification/Job Title
{If any, list the names of the Qualified Persons here.}	

Competent Person(s)	
• Supervises and ensures that all personnel working with and around fall hazards and fall protection systems are properly trained • Ensures that access to controls to areas with fall hazards are effective • Conducts documented inspections of fall protection equipment at least annually • Trained in accordance with SMS 040 NA	
Names of Competent Persons	Job Classification/Job Title
{List the names of Competent Persons here. These should include all Supervisors that oversee work that includes fall hazards and fall protection systems. These personnel should be adequately trained as Competent Persons per SMS 040 training requirements.}	

	Safety Management Standard FALL PROTECTION PLAN	Attachment 040-3NA Issue Date: June 1999 Revision 7: March 2013

Authorized User(s)	
- Utilize fall protection systems and inspect all fall protection equipment prior to use - Trained in accordance with SMS 040 NA to understand the fall protection system and equipment, including proper use, inspection, and storage	
Names of Authorized Users	Job Classification/Job Title
{List the names of all Authorized Users here. This includes all personnel that work around fall hazards and use fall protection equipment/systems. Authorized Users must be adequately trained as Authorized Users per SMS 040 training requirements.}	

FALL HAZARD SURVEY

Conducting a fall hazard survey of your work areas is a critical component of this fall protection plan. Each fall hazard should be documented and assigned a risk level. Risk levels shall be determined by identifying both the severity and probability of the potential falls using the tables below.

SEVERITY LEVEL OF FALL HAZARD

To determine the severity level of a fall hazard, estimate the distance of the potential fall and determine if any objects could be struck during the fall. Consider other hazards such as working over water, impalement, moving vehicles or operating equipment in fall zone, use of high energy tools in tasks (e.g., high pressure air or water hoses), potential for chemical contamination (e.g., chemical or fuel loading or unloading). Document these on the task hazard analysis and then use the table below as a final determination of severity level.

Severity	
1	Simple, immediate treatment, first aid, or evaluation only. Temporary shutdown of equipment or operation to repair or replace a safety control device.
2	Medical treatment to prevent deterioration or to stabilize an injury such as sprains, contusions or abrasions without significant blood loss. Emergency shutdown of equipment or operation requiring management of change.
3	Urgent medical treatment, any surgery or breaks of bones or possible neck/head injury. Any incident which would trigger a regulatory agency inspection.
4	Partial disability or life changing event, or intensive care, or amputation of limb(s). Any incident requiring high angle rescue of worker(s) or extended rescue time.
5	Fatality or total permanent disability or multiple severe injuries from an incident. An incident requiring site emergency evacuation or a site-wide shut down.

PROBABILITY LEVEL OF FALL HAZARD

To determine the probability level of a fall hazard, consider the frequency of exposure, length of exposure, and the number of workers' exposed during work activities. Also consider any environmental factors such as inclement weather and slippery conditions that could greatly increase the probability of a fall. Use the table below as a final determination of probability level.

Probability	
1	Remote likelihood to happen/controls or conditions would prevent this outcome
2	Unlikely to happen/the environment and situation could not support this outcome
3	Likely to happen/it has been reported for similar activities
4	Very likely to happen/it has happened before

FALL PROTECTION SYSTEMS/CONTROLS

Passive and/or active fall protection systems (e.g., guardrails, personal fall arrest systems, warning line systems, etc.) shall be used whenever possible. In all instances where fall protection systems are impractical, alternative fall protection controls are required. Additional administrative controls may include, but are not limited to:

- Limiting or restricting work activities when other hazards create additional risk (e.g., inclement weather including lightning, ice/snow, high winds, or tripping hazards, or structurally unsound or unstable surfaces, or slippery surfaces or other structural hazards).
- Using a safety observer
- Maintaining three points of contact
- Providing adequate lighting

FALL HAZARD SURVEY REPORT

The table below should include all fall hazards in the work areas under this plan. Severity, probability, and total risk level should be determined for each.

Description of Task Involving Fall Hazard	Location	Severity (1-5)	Probability (1-4)	Risk Level Severity + Probability 2	Fall Protection System/Controls Use Red Text or Highlight use of Administrative Controls Only

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Description of Task Involving Fall Hazard	Location	Severity (1-5)	Probability (1-4)	Risk Level Severity + Probability 2	Fall Protection System/Controls Use Red Text or Highlight use of Administrative Controls Only

PROCEDURES

Alternative Fall Protection Work Permit

When work must be performed using administrative controls only as described in SMS 040 NA, a permit must be completed by the Authorized Users who will perform the work and approved by a Competent Person that is a Manager or Supervisor. Attachment 040-5 NA - Alternative Fall Protection Permit may be used for this purpose.

Permit Approval:

Written approval for permits must be from a Manager or Supervisor who is a fall protection Competent Person. All authorized permit approvers must be listed in the table below:

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List of Authorized Permit Approvers		
Names	Job Classification/Job Title	Trained as a Competent Person?
		Yes ☐
		Yes ☐
		Yes ☐
		Yes ☐

Posting of Permits:

Permits must be posted where the work is taking place. If that is not feasible, the permit should be posted in the closest possible area to where the work is taking place.

Permit Duration & Expiration:

Permits expire at the end of the shift on which it was issued and a new permit must be issued and approved for work that continues into the next shift.

System Use and Design Limitations Procedures

Each fall protection system used must have system-specific procedures developed and made readily available to the user, preferably near the point of use. These procedures should include:

- The assembly, maintenance, pre-use inspection (including manufacturer's recommendations), and disassembly of the fall protection system.
- Handling, storing, and securing tools and materials.
- Method for prompt, safe removal, of injured workers.

METHOD AND PROVISIONS FOR RESCUE WHEN WORKING AT HEIGHTS

Self-Rescue

A reliable method for self-rescue shall be developed and deployed which shall include the use of the "buddy system" when personnel are working in conditions where fall protection systems (other than standard guard rail systems) are employed. The "buddy" or assigned safety person shall remain within visual/verbal range to initiate rescue of the fallen worker if required and shall have a reliable method of communication (cell phone, radio, etc.) to summon rescue. The site specific methods used for self-rescue shall be identified in the following section.

Self-Rescue Method/Process

Assisted Rescue

Assisted rescue may be provided either by a professional rescue agency or by qualified company personnel. Select the appropriate choice below (professional rescue agency or qualified company

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personnel) and complete the information contained in the tables below the selection. If both in-house and professional rescue are used complete both sections and add additional information as necessary to clearly define the processes used.

- ☐ A Professional Rescue Agency shall be used to assure prompt rescue of fallen workers (check box and document additional information required for rescue agency option).

Professional Rescue Agency Option

If a professional rescue agency is going to be used they shall be contacted to review the potential rescue requirements. This review shall include a discussion of the types of fall protection used by company personnel and the environment where the agency may be called upon to perform a rescue. The rescue agency shall advise (in writing) the types of rescue it can perform and provide detailed instructions regarding how they are to be called and if they need to be advised when certain activities are planned or certain conditions exist so they may ensure the fastest possible response.

If a professional rescue agency will be used to provided assisted rescue document the required information in the following table.

PROFESSIONAL RESCUE AGENCY OPTION	
Rescue Agency (Name/Location)	
Contact Person (Name/Phone):	
Coordination Requirements Before Work:	
Method To Summon Help:	

- ☐ Qualified Company Personnel shall be used to assure prompt rescue of fallen workers (check box and document additional information required for company option).

Qualified Company Personnel Option

If outside professional rescue agencies cannot be relied upon to promptly rescue fallen personnel, then company personnel shall be identified and trained to serve as rescue personnel. Training shall be conducted by a qualified training agency or company and shall include specific training on the methods and equipment which may be required during site-specific rescue scenarios. It shall include hands on training and certification to demonstrate proficiency in rescue and shall be of the duration recommended by the training agency/company. Equipment procured for use as well as practice requirements and recurring formal training requirements for the company rescue personnel shall conform to the recommendations and requirements set forth by the training agency/company.

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If qualified company personnel are to be used to provide assisted rescue, document the required information in the following tables.

QUALIFIED PERSONNEL RESCUE OPTION	
Qualified Training Agency/Company:	
Coordination Requirements Before Work:	
Method To Summon Help:	
NAMES OF RESCUE PERSONS	JOB CLASSIFICATION/JOB TITLE
QUALIFIED AGENCY PROVIDING TRAINING AND CERTIFICATION	

Approved: _____ Date _____
 {Enter Name}
 URS Site/Location/Project Manager

Approved: _____ Date _____
 {Enter Name}
 URS Safety Manager

**Safety Management Standard**

Attachment 040-4 NA

ALTERNATIVE FALL PROTECTION PERMITIssue Date: June 1999
Revision 7: March 2013**Location & Time Information**

Location & description of fall hazard:

Job/Work Order:

Description of work to be done:

Requestor(s) Name

Requestor(s) Title

Justification for Using Administrative Controls

State why more effective controls are impractical.

Hazard Identification

Potential maximum fall distance:

List any exposed hazards or objects that could be struck during a fall that would cause greater harm.

Are there factors that could make this work more hazardous?

Fall Protection Controls

Describe the fall protection strategy and what limitations this strategy has:

Rescue Information & Contact

Phone number used to for rescue services:

**ALTERNATIVE FALL PROTECTION PERMIT**Issue Date: June 1999
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I/we agree to, and certify the following:

- A pre-task briefing has been held which included all personnel involved with this work.
- An on-site hazard assessment has been conducted and documented on this permit.
- Work described on this permit can be done safely.
- If work conditions or work requirements change, or hazards not previously identified are encountered, work will stop until a new permit is issued or the new hazards have been eliminated.
- This work will **not** be performed during inclement weather/rain.

Name (printed)

Signature(s)

Date / Time

Permit Authorization

- All personnel performing work or designated as observers are trained as Authorized Users in accordance with SMS 040 NA.
- More effective fall protection controls are impractical for reasons other than cost or convenience and the justification for working with only administrative controls is acceptable.
- Verbal approval has been secured from the Site/Location/Project Manager or Safety Manager.

Authorized Start Date/Time for Permit:**Expiration Date/Time for Permit****(Not to exceed work shift)**

Date:

Time:

Date:

Time:

Name & Title of approving authority (Manager/Supervisor that is a Fall Protection Competent Person)_____
Name_____
Title____ / ____
Date / Time**THIS PERMIT MUST BE POSTED WHERE THE WORK IS BEING PERFORMED.****THIS PERMIT EXPIRES AT THE END OF THE SHIFT ON WHICH IT WAS ISSUED.****A NEW PERMIT MUST BE ISSUED FOR WORK THAT CONTINUES INTO THE NEXT SHIFT.****IN THE EVENT OF AN EMERGENCY CONTACT:**

URS SAFETY MANAGEMENT STANDARD

Respiratory Protection

1. Applicability

This standard applies to URS Corporation and its subsidiary companies that may require the use of respiratory protection, including Immediately Dangerous to Life and Health (IDLH) and emergency conditions. This program also addresses the voluntary use of respirators.

2. Purpose and Scope

The purpose of this standard is to protect those employees performing operations for which exposures cannot be controlled by use of conventional engineering or administrative controls, and prior to establishing a negative air exposure assessment, and to require that respiratory protective equipment is selected, used, maintained, and stored in accordance with acceptable practices. This procedure establishes the minimum standard for respirator training, selection, and use during the performance of all work requiring such protection.

3. Implementation

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

4. Requirements

- A. Before assigning hazardous jobs to employees, determine if respirators are required.
 - 1. Assign a project-specific Respiratory Protection Program administrator. This position shall be manned by a competent industrial hygienist or other technically qualified person who knowledgeable of the requirements of the URS and project-specific programs, have appropriate training in the principles and application of respiratory protection, and have the authority to conduct program evaluations.
 - 2. If the potential for respiratory hazards exists for any portion of a job, complete Attachment 042-1 NA – Identifying When A Respirator Is Needed.
 - 3. Contact a local Health, Safety, and Environment (HSE) Manager, Regional or Strategic Business Unit (RBU/SBU) HSE Manager, or URS Certified Industrial Hygienist (CIH) for assistance, as needed, if any of the questions in Attachment 042-1 are checked "yes."

URS SAFETY MANAGEMENT STANDARD

Respiratory Protection

4. Follow instructions in Attachment 042-2 NA – Voluntary Use or Respirators – for employees who wish to wear respirators on a voluntary basis when not required to by URS or a regulatory agency.
 5. Follow all the requirements of this standard for employees who wish to voluntarily use tight-fitting (e.g., air purifying) respirators.
 6. Required respirators will be paid for by URS and will be provided without cost to the employee.
 7. Control worker's exposure to air contaminants, where practicable, by engineering or administrative controls, or by substitution of process materials with less-toxic substances. Use respirators only when engineering or administrative controls are not feasible or completely effective.
- B. Select the proper respirator for the job.
1. Contact the appropriate HSE Manager or CIH for assistance in respirator selection for those jobs identified in Attachment 042-1 NA.
 2. Contact the appropriate HSE Manager for follow up if there are any problems implementing the recommendations made.
- C. Require employees who will use respirators to be medically qualified by a project medical consultant (PMC) before fit-testing and assigning them a respirator. The PMC should preferably be an occupational physician; however, the Occupational Safety and Health Administration (OSHA) allows any physician or licensed health care professional (PLHCP) to conduct evaluations of respiratory protection medical forms. The PMC, where required, will determine the physiological and psychological status that is relevant to wearing different types of respirators. The PMC will review all questionnaires and test results and verify in writing that workers are physically and psychologically able to perform work while using respiratory protective devices. These determinations will be made using guidelines established by the PMC.
1. For program details, refer to SMS 024 – Medical Screening and Surveillance.
 2. Require that employees have a current and accurate Medical Surveillance form (Attachment 024-2).
 3. Obtain a copy of the employee's Health Status Medical Report from the Office Health and Safety Representative. The consulting occupational

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Respiratory Protection

physician of the medical service provider following each work-related examination issues the Health Status Medical Report. Employees cannot be assigned respirators unless they are medically cleared for respirator use.

- D. Require respirator users to receive appropriate training.
 - 1. All respirator users must be trained:
 - a. Before they are assigned a respirator.
 - b. Annually thereafter.
 - c. Whenever a new hazard or job is introduced.
 - d. Whenever employees fail to demonstrate proper use or knowledge.
 - 2. Document training in accordance with the requirements of SMS 055 – Training.
 - 3. Training must address, at a minimum, the following:
 - a. Why the respirator is necessary, and what conditions can make the respirator ineffective.
 - b. What the limitations and capabilities of the respirators are.
 - c. How to inspect, put on and remove, and check the seals of the respirator.
 - d. What the respirator maintenance and storage procedures are.
 - e. How to recognize medical signs and symptoms that may limit or prevent effective use of the respirator.
 - f. The engineering and administrative controls being used and the need for respirators.
 - g. The hazards and consequences of improper respirator use.
 - h. How to recognize and handle emergency situations.
- E. Require respirator users to be fit tested.

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Respiratory Protection

1. Any employee who has been assigned a reusable respirator must be fit tested on an annual basis (no more than 1 year may elapse between fit tests), or when the employee is assigned a respirator of a different make, type, or size from that previously tested.
2. Qualitative or quantitative fit testing can be performed by contract or in-house personnel.
3. Obtain a signed, written copy of the fit-test results. The fit-test results should include:
 - a. Employee's name and employee identification number.
 - b. Respirator brand, model, and size fitted for.
 - c. Date fit tested.
 - d. Method of fit testing used.
 - e. Name and signature of fit tester.
 - f. Manufacturer and serial number of fit-testing apparatus (if used).

A fit test results form is available as Attachment 042-3 NA.

- F. The project-specific Respiratory Protection Program administrator will issue respirators to persons who must wear respirators for protection against harmful atmospheres should be given adequate training to ensure that the correct respirator is issued for each application. This training should include, but not necessarily be limited to, the following:
 1. Establishment of a working knowledge of the specific types of respirators to be issued, their limitations, and the importance of issuing only the respirators for which each user is specifically approved.
 2. Familiarization with the respirator maintenance and repair program in order to be able to identify any respirator that is improperly cleaned or needs repair.
 3. Familiarization with the procedures for respirator issue. Only persons trained to ensure that proper respirators are issued will be permitted to issue respirators to persons needing them.
- G. Where required by Section 2.C of SMS 043 – Personal Monitoring, conduct initial exposure assessments for contaminants of concern. Record collected air-monitoring data. Respiratory protection must be worn until such

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Respiratory Protection

assessments have been conducted, and it is determined that respiratory protection is not warranted.

- H. Provide qualified employees with respirator(s) and adequate amounts of parts and cartridges.
 - 1. Assign employees whose duties require respirators their own respirator for which they have been fit tested.
 - 2. Provide special eyeglass inserts designed for the respirator if an employee must wear eyeglasses with a full-facepiece respirator. Contact lenses may be worn when wearing a full-facepiece respirator.
 - 3. Respirators and cartridges must be approved by the National Institute for Occupational Safety and Health (NIOSH). Military-issue respirators are approved under Military Standard AR 11-34.
- I. Require respirators to be used properly.
 - 1. Prohibit facial hair where the respirator-sealing surface meets the wearer's face.
 - 2. Require employees to perform a positive and negative fit check every time the respirator is put on.
 - 3. Employees will leave the area where respirators are being used:
 - a. Before removing the facepiece for any reason.
 - b. To correct any respirator malfunction.
 - c. To change the respirator and/or respirator cartridges.
 - d. The employee becomes ill (dizziness, nausea, etc.).
 - e. If any of the following is detected:
 - 1. Vapor or gas breakthrough
 - 2. Leakage around the facepiece
 - 3. Increased breathing resistance.
 - 4. Use cartridges with End-of-Service-Life indicators, or determine the respirator cartridge change-out schedule. See Supplemental Information A for guidance.

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Respiratory Protection

- J. Require respirators to be cleaned and stored properly.
 - 1. Clean and disinfect respirators after each use.
 - 2. Store respirators in a plastic bag or case and in a clean location.
 - 3. Inspect respirators before use and after each cleaning.
- K. Address issues associated with special-use respirators (self-contained breathing apparatus; air-supply respirators; emergency escape respirators).

- 1. Self-Contained Breathing Apparatus

Inspect self-contained breathing apparatus monthly and after each use in accordance with manufacturer's instructions.

- 2. Air-Supplied Respirators

- a. Air used for atmosphere-supplying respirators must meet or exceed the requirements for Type 1 – Grade D breathing air. Never use oxygen.

- 1. A certificate of analysis must accompany bottled air.

- 2. Compressors used to supply breathing air must:

- i. Prevent entry of contaminated air into the air supply.

- ii. Minimize moisture content.

- iii. Have suitable in-line sorbent beds and filter to provide appropriate air quality.

- iv. Have a high-carbon-monoxide alarm that sounds at 10 part per million (ppm).

- b. Couplings on air-hose lines must be incompatible with other gas system.

- 3. Emergency Escape Respirators

- a. Emergency escape respirators intended to be used only for emergency exit. This may include situations where IDLH atmospheres and oxygen-deficient conditions exist. These respirators may be used as stand-alone protection or in conjunction with air-supplied respirators.

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- L. Require follow-up training and medical surveillance to be provided as directed.
 - 1. Provide follow-up physical examinations as directed by the SMS 024-3 NA – Medical Screening and Surveillance Exam Protocol table.
 - 2. Provide follow-up physicals as directed by the Occupational Health Manager.
 - 3. Provide annual refresher training.
 - 4. Provide annual fit testing.
 - 5. Conduct regular evaluations to determine the effectiveness of the program's implementation. This should include interviews with employees regarding such topics as respirator selection, fit, and maintenance.
- M. Where required, implement procedures for dealing with entry into areas with IDLH conditions.
 - 1. Ensure at least one employee or attendant is located outside the area with the IDLH atmosphere. This person must be equipped with:
 - a. Pressure demand or other positive pressure self-contained breathing apparatus (SCBA), or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either
 - b. Appropriate retrieval equipment to removing the employee within the IDLH atmosphere, or
 - c. Equivalent means of rescue.
 - 2. Maintain communication between the employee(s) in the area with the IDLH environment and the employee(s) or attendant(s) outside the area. Communication may include visual, voice, or signal lines.
 - 3. In an emergency situation, the manager overseeing operations must be notified before employee(s) outside the area with the IDLH atmosphere enter the space.

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Respiratory Protection

5. Documentation Summary

All Respiratory Protection Program documentation must be protected by the Privacy Act of 1974 (PL-93-579), and confidential medical information not required by OSHA may be protected under the Health Insurance Portability Accountability Act of 2003 (HIPAA).

The following information will be maintained in the office/project file by the Project Manager:

1. Identifying When A Respirator Is Needed – Attachment 042-1 NA.
2. Voluntary Use of Respirators – Attachment 042-2 NA.
3. Fit Test Record – Attachment 042-3 NA.
4. Employee Health Status Medical Report, including clearance for respirator use.
5. Employee Respirator Training Records.

6. Resources

- A. U.S. OSHA Standard - [Respiratory Protection](#) – 29 Code of Federal Regulations (CFR) 1910.134
- B. U.S OSHA Technical Links – [Respiratory Protection](#)
- C. [ANSI](#) Z88.6-2006 – Respirator Use – Physical Qualifications for Personnel
- D. [AIHA](#), The Occupational Environment – Its Evaluation and Control
- E. [NIOSH Respirator Decision Logic](#)
- F. [NIOSH Guide to Industrial Respiratory Protection](#)
- G. [SMS 024](#) – Medical Screening and Surveillance Program
- H. [SMS 055](#) – Health and Safety Training
- I. [Attachment 042-1 NA](#) – Identifying When a Respirator is Needed
- J. [Attachment 042-2 NA](#) – Voluntary Use of Respirators
- K. [Attachment 042-3 NA](#) – Fit Test Record

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- L. [Attachment 042-4 NA](#) – Respirator Standard Operating Procedure

7. Supplemental Information

- A. [Respirator Cartridge Change Schedule](#)
- B. [Hazard Analysis for Respirator Use](#)
- C. [Fit Testing Guidance](#)
- D. [Respirator Selection Guidance](#)
- E. [Inspection, Cleaning, and Storage Guidance](#)



Health, Safety and Environment
IDENTIFYING WHEN A RESPIRATOR
IS NEEDED

Attachment 042-1 NA

Issue Date: July 2000
Revision 6: March 2012

Site Location: _____ Date: _____

Name of Person Performing Evaluation: _____

Project: _____

Answer the questions below for the jobs you are to perform on site. If a 'Yes' response is checked, consult with an HSE Manager or a URS Certified Industrial Hygienist (CIH) to determine if a respirator is truly needed for the job; and if so, the type of respirator needed.

It is important to be aware of the respiratory protection requirements for any chemicals you are exposed to; these can be found on the Material Safety Data Sheets or chemical labels.

Material Used or Process to be Performed	Notes
Abrasive Blasting - Abrasive blasting (with any type of grit or material) will be performed ☐ Yes ☐ No _____ - Employee will fill abrasive blasting pots or perform clean-up activities ☐ Yes ☐ No _____ - Employee will be in a contained area where abrasive blasting is taking place ☐ Yes ☐ No _____	
Acids Liquid or powder acids will be used in a situation where acid vapors, mists, or dust may be breathed ☐ Yes ☐ No _____	
Adhesives - Aerosols-propelled adhesives are to be used in areas where there is insufficient or no local exhaust ventilation ☐ Yes ☐ No _____ - Two-part adhesives (mix part one with two, let set, then use) are to be used in areas where there is limited ventilation ☐ Yes ☐ No _____	
Alkalis/Bases/Caustics Powdered alkalis will be used in a situation where an airborne dust may be breathed ☐ Yes ☐ No _____	
Asbestos Abatement - Asbestos will be removed, repaired, or sampled ☐ Yes ☐ No _____ - Employees will be inspecting or overseeing areas where asbestos will be removed or disturbed ☐ Yes ☐ No _____	
Cleaning Compounds - Degreasers or carbon removers will be used in areas where local exhaust ventilation is not provided ☐ Yes ☐ No _____ - Aerosol-propelled cleaning compounds will be used in areas where there is no local exhaust ventilation ☐ Yes ☐ No _____ - Entry into a vault, tank, silo, sewer, or other confined space that has been used for chemical storage, recently painted, or where inert gases may have been used without ventilation ☐ Yes ☐ No _____ - Degreasers or carbon removers will be used in voids, tanks, or other confined spaces ☐ Yes ☐ No _____	
Corrosion-Preventive Compounds Corrosion-prevention compounds, including chemical conversion compounds and corrosion inhibitors, will be used in areas where there is no local exhaust ventilation ☐ Yes ☐ No _____	
Detergents/Soaps Ammonia-based detergents will be used in large quantities (more than 5 gallons) in areas where local exhaust ventilation cannot be provided ☐ Yes ☐ No _____	



Health, Safety and Environment
IDENTIFYING WHEN A RESPIRATOR
IS NEEDED

Attachment 042-1 NA

Issue Date: July 2000
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Material Used or Process to be Performed	Notes
Large quantities (5- or 55-gallon containers) of high pH powder detergent/soap will be used in a situation where dust may be breathed	☐ Yes ☐ No _____
Fuels (including regular or unleaded gasoline, kerosene, diesel fuel, JP-5) Employees will be inside unventilated fuel cells or other confined spaces containing fuels	☐ Yes ☐ No _____
Grinding, Cutting, Sanding - Cutting, grinding, or sanding surfaces that have coatings containing beryllium, cadmium, chromium, lead, or zinc - Cutting, grinding, or sanding surfaces that are concrete or glass without use of ventilation or water	☐ Yes ☐ No _____ ☐ Yes ☐ No _____
Hazardous Waste Sites - Employees will be performing tasks on a hazardous waste site that requires the use of respirator (as indicated in the site health and safety plan) - Employees will be performing site assessments on potential hazardous waste sites	☐ Yes ☐ No _____ ☐ Yes ☐ No _____
Hydraulic Fluids (including petroleum-based fluids, synthetic fire-resistant fluids, and water-based fire-resistant fluids) - Hydraulic fluids and the vapors generated will not be exhausted using local exhaust ventilation - Synthetic fire-resistant fluids or water-based fire-resistant fluids will be used in an area where the air is contaminated with visible mist or spray from hydraulic fluids	☐ Yes ☐ No _____ ☐ Yes ☐ No _____
Inspection Penetrants (including Fluoro-finder, water-indicating pastes, and penetrant removers) An aerosol-propelled inspection penetrant will be used in an area where local exhaust ventilation cannot be provided, or in a situation where the solvent vapors can be breathed	☐ Yes ☐ No _____
Lead Abatement Activities - Lead-containing materials will be disturbed, removed, or sampled - Employees will be inspecting or overseeing areas where lead will be removed or disturbed	☐ Yes ☐ No _____ ☐ Yes ☐ No _____
Lubricants/Oils Aerosol lubricants or oils will be sprayed with no immediate exhaust ventilation	☐ Yes ☐ No _____
Oxidizers (materials that give off oxygen, including chlorine laundry bleach, calcium hypochlorite, calcium oxide, oxygen candles, lithium hydroxide, hydrogen peroxide, and sodium dichromate) - Oxidizers containing organic chlorine will be used in a situation where the dusts or vapors may be breathed - Powdered oxidizers will be used in a situation where airborne dust may be breathed	☐ Yes ☐ No _____ ☐ Yes ☐ No _____
Paint Materials (including paints, primers, thinners, enamels, lacquers, strippers, coatings, and varnishes) - Paint materials will be spray-applied in areas where there is no local exhaust ventilation - Two-part (mix part a with part b, let set, then apply) polyurethane or epoxy polyamide paints will be brush- or spray-applied - Paints containing beryllium, cadmium, chromium, lead, or zinc (refer to the MSDS)	☐ Yes ☐ No _____ ☐ Yes ☐ No _____ ☐ Yes ☐ No _____



Health, Safety and Environment
IDENTIFYING WHEN A RESPIRATOR
IS NEEDED

Attachment 042-1 NA

Issue Date: July 2000
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Material Used or Process to be Performed	Notes
• Paint materials will be applied in confined spaces ☐ Yes ☐ No _____	
Solvents (including hydrocarbon solvents such as acetone, methyl ethyl ketone, toluene, xylene, and alcohols, as well as mixed solutions like antifreeze, heat-transfer fluid, turpentine, pipe-dope, and naphtha thinner) • Local exhaust ventilation will not be provided and work will involve breathing solvent vapors ☐ Yes ☐ No _____ • Solvents will be used within confined spaces ☐ Yes ☐ No _____ • Solvents will be applied using aerosols ☐ Yes ☐ No _____	
Thermal Insulation (including asbestos and non-asbestos materials like pipe lagging, fiberglass insulation, boiler insulation, packing materials, and floor or ceiling tiles) • Insulation will be disturbed, removed, or sampled ☐ Yes ☐ No _____	
Water-Treatment Chemicals (includes corrosive chemicals such as tri-sodium phosphate, hardness buffer, titrating solution, morpholine, caustic soda, citric acid, and nitric acid, as well as toxic chemicals such as mercuric nitrate, hydrazine, EDTA, and sodium nitrate) • Morpholine, EDTA, or harness buffer/titrating solution is to be used in poorly ventilated spaces ☐ Yes ☐ No _____ • Powdered water-treatment chemicals will be used in a situation where chemical dusts may be breathed ☐ Yes ☐ No _____	
Welding/Brazing/Cutting • Welding will be performed in confined spaces ☐ Yes ☐ No _____ • Welding galvanized metal or stainless steel ☐ Yes ☐ No _____ • Brazing with cadmium or lead ☐ Yes ☐ No _____ • Torch-cutting on coated/painted materials ☐ Yes ☐ No _____	
For Any of the Above-Listed Activities • An employee will be in the immediate area – within 10 feet of the job or operation; or ☐ Yes ☐ No _____ • Employee will be inside confined space where activities are taking place; or ☐ Yes ☐ No _____ • Employee will be inside a “controlled area” such as found in asbestos abatement, lead abatement, radiation control area, or a hazardous waste site ☐ Yes ☐ No _____	
Other • A chemical process procedure (e.g., hydrogen sulfide in refineries, ammonia as a refrigerant, chlorine in water disinfection, inert gas systems) required the use of a respirator or emergency escape respirator ☐ Yes ☐ No _____ • Mine operations require issuance of an emergency escape respirator ☐ Yes ☐ No _____ • Emergency response plan requires issuance of respirators to first responders ☐ Yes ☐ No _____ • Radiological controls require use of a respirator ☐ Yes ☐ No _____ • Laboratory Chemical Hygiene plan requires issuance of respirators ☐ Yes ☐ No _____ • Exposure to airborne mold ☐ Yes ☐ No _____	

	Health, Safety and Environment VOLUNTARY USE OF RESPIRATORS	Attachment 042-2 NA Issue Date: July 2000 Revision 6: March 2012

Instructions: Have the employee that is opting to use a respirator for non-overexposure conditions read this page, and then sign on the bottom of the page. Maintain a copy in the employee's training file.

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for employees. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee.

Sometimes employees may wear respirators to avoid exposures to hazards, even if the amount of the hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your own voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not pose a hazard.

1. Read and follow all instructions provided by the manufacture on use, maintenance, cleaning, and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH (the National Institute for Occupational Safety and Health) certifies respirators in the U.S. A label or statement of certification should appear on the respirator or respirator packaging; it will tell you what the respirator is designed for and how it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants against which your respirator is not designed to protect. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, fumes, smoke, or very small solid particles.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
5. If you have any health conditions (asthma; high blood pressure; emphysema; heart disease) that could be aggravated by using a respirator, you should check with your doctor before using one.

I have read and understand this information: Date: _____

Employee's Name (Please Print):

Employee's Signature:

**Health, Safety and Environment**

Attachment 042-3 NA

FIT TEST RECORDIssue Date: July 2000
Revision 6: March 2012

Employee Name _____ Employee Number _____

Office/Project _____ Last Medical Exam _____

Fit Test Date _____ Corrective Lenses Needed Yes ☐ No ☐Medically qualified to wear respirator? Yes ☐ No ☐Briefed on fundamental principles of respiratory protection, use, selection,
inspection, cleaning, maintenance, and storage of equipment? Yes ☐ No ☐Test agent recognition: Yes ☐ No ☐ N/A ☐**RESPIRATOR 1****RESPIRATOR 2****RESPIRATOR 3**

Equipment Type _____

Manufacturer's Name _____

Model _____

Size _____

Facepiece Composition
(Rubber/Silicone) _____**TEST PERFORMED****RESPIRATOR 1****RESPIRATOR 2****RESPIRATOR 3**Negative Pressure Test: Pass ☐ Fail ☐Pass ☐ Fail ☐Pass ☐ Fail ☐Positive Pressure Test: Pass ☐ Fail ☐Pass ☐ Fail ☐Pass ☐ Fail ☐Isoamyl Acetate Test: Pass ☐ Fail ☐Pass ☐ Fail ☐Pass ☐ Fail ☐Irritant Smoke Test: Pass ☐ Fail ☐Pass ☐ Fail ☐Pass ☐ Fail ☐Bitrex: Pass ☐ Fail ☐Pass ☐ Fail ☐Pass ☐ Fail ☐Saccharin: Pass ☐ Fail ☐Pass ☐ Fail ☐Pass ☐ Fail ☐Generated Aerosol
Quantitative Fit: P ☐ F ☐ Fit Factor _____P ☐ F ☐ Fit Factor _____P ☐ F ☐ Fit Factor _____Ambient Aerosol
Quantitative Fit: P ☐ F ☐ Fit Factor _____P ☐ F ☐ Fit Factor _____P ☐ F ☐ Fit Factor _____Controlled Negative
Pressure Quantitative Fit: P ☐ F ☐ Fit Factor _____P ☐ F ☐ Fit Factor _____P ☐ F ☐ Fit Factor __________
Examiner's Name (Please Print)_____
Examiner's Signature_____
Date_____
Employee's Signature_____
Date

	Health, Safety and Environment RESPIRATOR STANDARD OPERATING PROCEDURE	Attachment 042-4 NA Issue Date: July 2000 Revision 6: March 2012

Job Task Reviewed: _____

Date Reviewed: _____

Task Review by: _____

ADMINISTRATIVE PROCEDURES

1. All respirator users must be medically qualified to use respirators.
2. Respirator users must be trained annually in respirator use, and must be fit-tested annually.
3. The respirator will be used only by the person to whom it was issued.
4. Persons using glasses who are required to use a full-face respirator may use contact lenses or eyeglass inserts designed for the respirator.

GUIDANCE FOR SELECTION OF RESPIRATOR AND CARTRIDGES/FILTERS

1. Respirators are currently being issued and used for the following job activities:

2. The respirator will be equipped with the following cartridges/filters:

3. Filters are to be changed when the breathing resistance increases.

4. Cartridges are to be changed _____ (frequency), or when the contaminant you are protecting yourself from can be smelled or tasted.

FIT TESTING & FIT CHECKING

1. Fit testing is required annually. To arrange for fit testing, call your local, project, or regional safety representative or qualified industrial hygienist.
2. Respirator users will "fit check" the respirator every time the respirator is put on:
 - **Negative Check** – Cover filters/cartridges with palms of hands and breathe in: leakage should not be detected around the face seal of the respirator. Do not use if leakage is detected.
 - **Positive Check** – Cover the exhalation valve cover with palm of hand and blow out slightly: leakage should not be detected around the respirator seal.
 - **For Air Supply Respirators** – Kink or close off air supply hose and breathe in: leakage should not be detected around the face seal of the respirator.

CLEANING AND MAINTENANCE OF RESPIRATOR

1. Clean and disinfect respirator after every use.
2. Inspect respirator at the end of work every day in use to ensure parts are not missing. Replace missing parts from stock supply.
3. Store clean respirator in labeled plastic bag out of direct sunlight.
4. Do not alter respirator in any way.

	Health, Safety and Environment RESPIRATOR CARTRIDGE CHANGE SCHEDULE	SMS 042 NA Supplemental Information A Issue Date: February 2009 Revision 2: August 2010

A cartridge change schedule must be developed for cartridges or canisters used with air purifying respirators that do not have an End of Service Life Indicator (ESLI). The purpose of this is to prevent contaminants from breaking through the respirator's sorbent cartridge(s), and thereby over-exposing employees. NIOSH has approved ESLIs for only four cartridges or canisters (mercury vapor, carbon monoxide, ethylene oxide, and hydrogen sulfide). Historically we have relied on the warning properties (odor, irritation) of a contaminant to dictate cartridge change. OSHA no longer allows this as the sole basis for changing respirator cartridges. In developing a change schedule the following factors should be considered:

- Contaminants
- Concentration
- Frequency of use (continuously or intermittently throughout the shift)
- Temperature and humidity
- Work rate
- The presence of potentially interfering chemicals.

The worst-case conditions should be assumed to avoid early breakthrough. This must be documented in the project health and safety plan or, in the cases of office or labs, in the site specific Respiratory Protection Program.

Sources of Help

OSHA provides assistance in developing respirator cartridge change schedules on its website at http://www.osha.gov/SLTC/etools/respiratory/change_schedule.html.

Most cartridge manufacturers maintain on-line interactive cartridge service life programs that can be used to evaluate the service life against many contaminants. Typically, these do not evaluate the service life against mixtures (multiple contaminants).

Because of the complexity in evaluating mixtures, OSHA offers the following guidance:

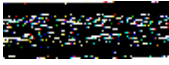
- When the individual compounds in the mixture have similar breakthrough times (i.e., within one order of magnitude), service life of the cartridge should be established assuming the mixture stream behaves as a pure system of the most rapidly migrating component with the shortest breakthrough time (i.e., sum up the concentration of the components).
- Where the individual compounds in the mixture vary by 2 orders of magnitude or greater, the service life may be based on the contaminant with the shortest breakthrough time.

Rule of Thumb (*"The Occupational Environment" - Its Evaluation and Control*)

- If the chemical's boiling point is $>70^{\circ}\text{C}$ and the concentration is less than 200 ppm, you can expect a service life of 8 hours at a normal work rate.
- Service life is inversely proportional to work rate.
- Reducing concentration by a factor of 10 will increase service life by a factor of 5.
- Humidity above 85% will reduce service life by 50%.

OSHA Interpretation

The OSHA inspection procedures for the respiratory protection standard specifies that where contaminant migration is possible, respirator cartridges/canisters should be changed after each work shift where exposure occurs unless there is objective data to the contrary (description studies) showing the performance in the conditions and schedule of use/non-use found in the workplace.

	Health, Safety and Environment HAZARD ANALYSIS FOR RESPIRATOR USE	SMS 042 NA Supplemental Information B Issue Date: February 2009 Revision 2: August 2010

- A. A hazard analysis of the workplace must be performed before selecting respirators. The analysis must consider inhalation hazards under routine and foreseeable emergency conditions. Other factors to consider when choosing respirators include skin and eye exposure, the effects of heat or cold, use of protective clothing, employee conditioning, and workload.
- B. Respiratory hazards that must be identified include:
1. Oxygen Deficiency
 2. Air Contaminants
 3. Particulates
 4. Toxic Gases

C. Evaluating Exposures

There are several options on how to evaluate exposures:

1. One option is to rely on personal monitoring data of employees. Representative exposure data provided by industry or laboratory studies is acceptable as long as it applies to similar tasks and conditions at the worksite.
2. The professional judgment provided by the Business, RBU, SBU, Office, or Project HSE Manager and/or as recommended by a qualified industrial hygienist or safety professional may be employed for the task.
3. If the exposure cannot be identified or estimated, then the atmosphere is considered immediately dangerous to life or health (IDLH). Atmospheres with levels of oxygen below 19.5% are also defined as IDLH.
4. Trained and qualified technical personnel shall perform assessment of the degree of respiratory hazard through sampling and testing of the work environment. Problems requiring special respiratory protection should be discussed with the Business or Regional HSE Manager or qualified industrial hygienist.
5. The Project HSE Manager shall establish procedures to control respiratory hazards through engineering or administrative controls, product/material substitution, respiratory protective devices, or a combination of these methods.
6. He/she shall also perform annual evaluations of the effectiveness of the project's respiratory protection program. These evaluations shall be documented.
7. The Project HSE Manager shall select and provide adequate respiratory protective devices for use on the project. This selection shall be based upon the specific type of air contaminant(s), the concentration of the contaminants(s) or oxygen deficiency in the work environment.
8. Establish a change schedule for air-purifying respirators based upon objective information or data that will ensure that cartridges are changed before the end of their useful life. OSHA has mandated that reliance on warning properties is no longer valid

	Health, Safety and Environment FIT TESTING GUIDANCE	SMS 042 NA Supplemental Information C Issue Date: February 2009 Revision 2: August 2010

- A. A quantitative fit-test provides the most accurate information; qualitative fit testing depends on the respirator wearer's sense of smell and taste (subjective response). OSHA's standard requires fit-testing for any face mask (full or half) designed to have a tight seal along the face, whether it is used in a positive or negative pressure mode, and whether it is disposable or not. If the required fit factor is greater than 100, then a quantitative fit-test must be performed.
- B. Each person will have a qualitative or quantitative fit test when first required to wear a respirator, every 12 months when respirators will be worn thereafter, or as hazards or respiratory needs change.
- C. Each person will have a qualitative or quantitative fit test for each specific make(s) and model(s) of respirator(s) for which the worker may wear.
- D. Under no circumstances shall a worker be allowed to use any respirator if the results of the qualitative fit test indicate that the worker is unable to obtain a satisfactory seal.
- E. The eight exercises required by OSHA under the respiratory protection standard, 29 CFR 1910.134, Appendix A, are as follows (note that these are not required controlled negative pressure (CNP) quantitative fit testing):
 1. normal breathing
 2. deep breathing
 3. head side to side
 4. head up and down
 5. talking out loud
 6. grimacing (quantitative only)
 7. bending
 8. normal breathing
- F. Qualitative and quantitative fit testing must be performed in negative pressure mode for all tight fitting respirators, whether the respirator is positive or negative pressure demand.
- G. Qualitative and quantitative fit testing must be conducted according to one of the protocols found in 29 CFR 1910.134, Appendix A.
- H. Employees using respirators when not required under the standard (i.e., dust masks or comfort masks for nuisance type dust without a specified exposure level) must be aware of the potential hazards of using a respirator. See Attachment 042-2 of this standard or Appendix D of 29 CRF 1910.134 for information program requirement.

	Health, Safety and Environment RESPIRATOR SELECTION GUIDANCE	SMS 042 NA Supplemental Information D Issue Date: February 2009 Revision 2: August 2010

- A. Physical characteristics, functional capabilities, and performance limitations of various types of respirators shall be considered in the selection process.
- B. Specifics regarding hazard classification, descriptions of respirator types and modes of operation, and the capabilities and limitations of respirators are listed in ANSIZ88.2-1992.
- C. To select the correct respirator, the hazards must first be identified in the workplace and then follow these steps:
 1. Determine if the environment is IDLH.
 - a. All oxygen deficient atmospheres shall be considered IDLH.
 - b. If the employee exposure cannot be reasonably estimated, the atmosphere must be considered IDLH.
 2. Identify the contaminant(s) present in the atmosphere and answer the following questions:
 - a. What is the concentration?
 - b. Are they gaseous or particulate?
 - c. Are the contaminants IDLH?
 3. After completing the above steps select the appropriate respirator for the particular hazard(s).
 - a. IDLH – Provide a full facepiece NIOSH certified pressure demand SCBA with a minimum service life of 30 minutes or a full facepiece pressure demand airline respirator with an auxiliary self-contained air supply.
 - b. Non-IDLH – A respirator must be provided that is appropriate for the contaminant(s) identified.
 4. For protection against gases and vapors, either an atmosphere-supplying respirator or an air-purifying respirator equipped with a NIOSH certified end-of-service-life indicator (ESLI) for the contaminant must be used. In lieu of an ESLI, a change schedule for cartridges based on objective information or data may be used to ensure cartridges are changed before the end of their service life occurs (see Supplemental Information A). In most cases, respirator cartridge manufacturers provide a product specific on-line or CD-ROM based “Service Life Calculator” that allows determination of useful service life of a cartridge based on expected concentration and environmental and work conditions. If neither an ESLI or change schedule is available, a supplied air respirator must be used.
 5. For protection against particulates, an atmosphere-supplying respirator or an air-purifying respirator equipped with a NIOSH-certified high-efficiency particulate air (HEPA) filter under 30 CFR 11 or an air-purifying respirator equipped with a NIOSH certified filter for particulates under 42 CFR 84 must be used.

	Health, Safety and Environment RESPIRATOR SELECTION GUIDANCE	SMS 042 NA Supplemental Information D Issue Date: February 2009 Revision 2: August 2010

6. There are three classes of filters under NIOSH (N, R, and P series) with three levels of filter efficiency in each class – 95%, 99%, and 99.97% (classified as 100). All filters can be used regardless of aerosol size. The new filters are classified as follows:
 - a. N – For solid particulates and non-oil aerosols that do not degrade filter performance.
 - b. R – For solid particulates and degrading oil-based aerosols. R filters have “use limitations.”
 - c. P – For solid particulates and degrading oil-based aerosols. P filters generally have no “use limitations” other than those normally associated with particulate filters. The P100 filter is the replacement for the HEPA filter.
- E. Particulate filters are tested with 200 mg of loading but in many cases, these filters may exceed this capacity. Filtration efficiency may actually increase as the filter cake develops on the filter. Increased resistance to breathing or obvious taste or odor in the respirator would be cause to examine, re-evaluate and replace the filter cartridge

	Health, Safety and Environment INSPECTION, CLEANING, AND STORAGE GUIDANCE	SMS 042 NA Supplemental Information E Issue Date: February 2009 Revision 2: August 2010

A. Inspection

Routinely used air-purifying and airline respirators should be checked as follows before and after each use:

1. Examine the facepiece for:
 - a. Excessive dirt.
 - b. Cracks, tears, holes or physical distortions of shape from improper storage.
 - c. Inflexibility of rubber facepiece (stretch and knead to restore flexibility).
 - d. Cracked or badly scratched lenses in full facepieces.
 - e. Incorrectly mounted full facepiece lenses, or broken or missing mounting clips.
 - f. Cracked or broken air-purifying element holder(s), badly worn threads or missing gasket(s) if required.
2. Examine the head straps or head harness for:
 - a. Breaks.
 - b. Loss of elasticity.
 - c. Broken or malfunctioning buckles and attachments.
 - d. Excessively worn serrations on head harness, which might permit slippage (full facepieces only).
3. Examine the exhalation valve for the following after removing its cover:
 - a. Foreign material, such as detergent residue, dust particles or human hair under the valve seat.
 - b. Cracks, tears or distortion in the valve material.
 - c. Improper insertion of the valve body in the facepieces.
 - d. Cracks, breaks or chips in the valve body, particularly in the sealing surface.
 - e. Missing or defective valve cover.
 - f. Improper installation of the valve in the valve body.
4. Examine the air-purifying element for:
 - a. Incorrect cartridge, canister, or filter for the hazard.
 - b. Incorrect installation, loose connections, missing or worn gasket or cross threading in the holder.
 - c. Expired shelf-life date on the cartridge or canister.
 - d. Cracks or dents in the outside case of the filter, cartridge or canister, indicated by the absence of sealing material, tape, foil, etc., over the inlet.
5. If the device has a corrugated breathing tube, examine it for:

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- a. Broken or missing and connectors.
 - b. Missing or loose hose clamps.
 - c. Deterioration, determined by stretching the tube and looking for cracks.
6. Examine the harness of a front-or back-mounted gas mask for:
 - a. Damage or wear to the canister holder, which may prevent its being held in place.
 - b. Broken harness straps for fastening.

B. Self Contained Breathing Apparatus (SCBA)

Follow manufacturer specifications for storage, maintenance and cleaning of SCBA systems.

C. Manual Cleaning

A generalized cleaning procedure is typically found in the manufacturer's manual. Read the respirator manual and follow the manufacturer's recommendations.

1. Remove canisters, filters, valves, straps and speaking diaphragms from the facepiece.
2. Wash facepiece and accessories in warm soapy water or a commercially available cleaner, following the manufacturer's instructions. Gently scrub the respirator.
3. Rinse parts thoroughly in clean water.
4. Air dry in a clean place or wipe dry with a lint less cloth.

D. Machine Cleaning

Machines may be used to expedite the cleaning, sanitizing, rinsing, and drying of large numbers of respirators. Read the machine-cleaning manual and follow manufacturer's recommendations.

1. Extreme care must be taken to ensure against excessive tumbling and agitation, or exposure to temperatures above those recommended by the manufacturer (normally 120°F maximum), as these conditions are likely to result in damage to the respirators.
2. Ultrasonic cleaners, clothes-washing machines, dishwashers, and clothes dryers have been specially adapted and successfully used for cleaning and drying respirators.

E. Disinfection

1. Disinfection is required when more than one person uses the respirator. Recommended NIOSH disinfection procedures include immersion of the respirator body for two minutes in a 50 ppm chlorine solution (about 2 ml bleach to 1 liter of water). Rinse thoroughly in clean water and dry.
 - a. Immersion times have to be limited to minimize damage to respirators. The solutions can age rubber and rust metal parts. Caution must be

	Health, Safety and Environment INSPECTION, CLEANING, AND STORAGE GUIDANCE	SMS 042 NA Supplemental Information E Issue Date: February 2009 Revision 2: August 2010

taken to thoroughly rinse the respirator after cleaning and disinfection to prevent dermatitis.

- b. An alternate method is to purchase a commercially prepared solution for disinfection/decontamination and follow the directions recommended by the manufacturer.
2. Each person wearing a respirator shall examine the respirator before use in accordance with the training and instruction provided during fit testing.
3. After cleaning and sanitizing, each respirator shall be examined to determine if it is in proper working condition, if it needs replacement of parts or repairs, or if it should be discarded. Respirator inspection shall include, when applicable, a check for tightness of connections; for the condition of the respiratory inlet covering, head harness, valves, connecting tubes, harness assemblies, filters, cartridges, canisters, end-of-service life indicator, and shelf life date(s), and for the proper function of regulators, alarms, and other warning systems.
4. Each rubber or other elastomeric part shall be inspected for pliability and signs of deterioration. Each air and oxygen cylinder shall be inspected to ensure that it is fully charged according to the manufacturer's instructions.

F. Repair

Only persons trained in proper respirator assembly and correction of possible respirator malfunctions and defects shall do replacement of parts or repairs. Replacement parts shall be only those designed for the specific respirator being repaired. Reducing or admission valves, regulators, and alarms shall be returned to the manufacturer for repair or adjustment. The valve, regulator, or alarm manufacturer must approve instrumentation for valve, regulator, and alarm adjustments and tests.

G. Storage

Respirators shall be stored in a convenient, clean and sanitary location. The purpose of good respirator storage is to ensure that the respirators will function properly when used. Respirators shall be stored in a manner that will protect them against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. Respirators shall be stored to prevent distortion of rubber or other elastomeric parts. This can be done by storing the respirators in hermetically sealed plastic bags, or plastic bags capable of being sealed. Emergency and rescue use respirators that are placed in work areas shall be quickly accessible at all times, and the storage cabinet or container in which they are stored shall be clearly marked.

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

1. Applicability

This standard is applicable to subcontractors retained by the Infrastructure & Environment and Federal Services businesses of URS Corporation and its subsidiary companies that perform:

- Intrinsically higher-risk construction-related activities (e.g., drilling, excavation, surveying, demolition, electrical contracting, steel erection etc.).
- Significant building or infrastructure alteration, demolition, and/or repair activities using their own workforce or equipment.
- Activities on hazardous waste sites.
- Activities in government services operations (e.g., aviation repair, vehicle repair, warehousing, facility operations, and maintenance) where the annual cost of the subcontract exceeds \$1,000,000.
- An activity where URS Corporation does not supervise the day-to-day activities and work efforts of subcontractor workers, **and** the subcontractor has a designated Supervisor on the work site.

This procedure is applicable to the operations of subcontractors and sub-subcontractors of any tier.

This procedure does not apply to third-party contractor operations where there is no subcontract relationship between the contractor and URS. Health, Safety, and Environment issues regarding third-party contractor operations are governed by project-specific contracts, and are not covered by this standard.

2. Purpose and Scope

This procedure provides requirements on the pre-evaluation of subcontractor safety and environmental programs; contractual risk management; subcontractor safety performance on the job site; and the responsibilities of the Project Manager with respect to subcontractor jobsite HSE performance.

Each URS subcontractor must be evaluated at least annually using Attachment 046-1 NA, "Subcontractor HSE Evaluation Form," or equivalent client or URS International Operations form, in order to perform work on any new URS projects.

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

3. Implementation

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

4. Requirements

A. Pre-qualification of Subcontractor – The Project Manager will complete the following procedures for all subcontractors retained on projects covered by this standard (the PM should also require subcontractors to follow these procedures with respect to pre-qualification of sub-subcontractors of any tier):

1. Request all subcontractor candidates to complete the attached Subcontractor HSE Evaluation Form (Attachment 046-1 NA).
2. Conduct an assessment of each subcontractor's qualifications with respect to the subcontractor HSE evaluation criteria contained in Attachment 046-2 NA.
3. If the subcontractor does not meet the criteria established in Attachment 046-2 NA, and URS must retain the contractor, the Subcontractor Variance Form (Attachment 046-3 NA) must be completed and approved by a Regional, or Strategic Business Unit (SBU) Health, Safety, and Environment (HSE) Manager.
4. Verify that subcontractors meet the insurance requirements as stated in URS' agreement with the subcontractor, or as approved by URS Legal Counsel or Contracting Manager/Officer.
5. If the subcontractor has been successfully evaluated within the last 12 months, that evaluation may be substituted.
6. For long-term operations, update this evaluation within 12 months of the previous evaluation.

B. Contractual and Risk Management Requirements of Subcontractors

1. Ensure that the subcontractor is contractually bound to comply with applicable client and URS HSE Program requirements.
2. Ensure that subcontractor is contractually bound to develop additional safety procedures for work that is exclusive to their activities on the site, and for which they may have superior knowledge.

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

3. Assess compliance of subcontractor's insurance with the URS Corporation subcontract requirements (including, but not limited to, necessary types and amounts of coverage, URS Corporation additional insured endorsement, etc.).
4. Ensure that URS has the right in its subcontract, without liability to URS, to stop the subcontractor's work in the event of any violations of the applicable Health and Safety Plan.

C. Subcontractor Safety Representative

1. Require each subcontractor to appoint a Subcontractor Safety Representative (SSR) who:
 - a. Is knowledgeable of the subcontractor's activities.
 - b. Understands the safety requirements of the subcontractor's activities.
 - c. Has the ability to recognize and the authority to correct safety deficiencies and execute a stop work order should an imminent danger arise.
 - d. Has the responsibility for the administration of the subcontractor Health and Safety Program.
 - e. Will serve as the direct contact with URS Corporation regarding resolution of health and safety issues.

D. Communication

1. Provide the SSR with information regarding Site Safety Program including but not limited to:
 - a. Client Requirements
 - b. URS HSE Program
 - c. Site Hazard Communication Program
 - d. Site Emergency Action Plan
 - e. Any additional safety information from other contractors or subcontractors working on the site.

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

2. Provide the SSR with the name of the URS project or site contact and alternate for addressing site health and safety issues.
3. Require the participation of subcontractors in all Site Safety Briefings.
4. Require subcontractor compliance with all safety directives and/or stop work orders issued by the URS site representatives.
5. Require the subcontractor to notify the URS project or site manager when they will utilize short service employees (SSE) (i.e., employees with less than six months of experience) to perform on-site activities. The URS project or site manager must approve the use of any SSE by the subcontractor prior to mobilization. Site management will interact with the short service employee to verify their level of competency and manage the SSE in accordance with SMS 078 – Short Service Employees.

E. Subcontractor HSE Performance

1. To the extent reasonable in light of URS' scope of work under the client contract, visit the site and periodically observe subcontractor's operations (i.e., conduct spot checks) to assess whether subcontractor appears to be conducting their operations in accordance with applicable HSE requirements. Periodically review any required subcontractor health and safety written documentation for compliance with applicable requirements.
2. In the event that unsafe acts or unsafe conditions are observed, immediately stop work, and bring them to the attention of the SSR for resolution.
3. Investigate all incidents related to subcontractor operations to identify causes and effect corrective actions.
4. In the event of serious and/or continuing subcontractor breaches of applicable HSE requirements, contact legal counsel to assess whether formal contractual action is appropriate under the subcontract.
5. Once a job is completed, a subcontractor's HSE performance should be reviewed and feedback provided to subcontractor management.

F. Subcontractor Database (Infrastructure & Environment only)

1. A database is available to store Attachment 046-1 NA completed by subcontractors. The database can be accessed at:

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

<http://thesource.urscorp.com/TheSoURSe/Corporate/HSE/SubcontractorSafetyPreQualification.NSF/mainSplash>

2. A Regional HSE Manager or designee can upload completed Attachment 046-1 NA. Contact your Office HSE Representative or Regional HSE Manager for information on how to access the database.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Subcontractor HSE Evaluation Form (Attachment 046-1 NA)
- B. Applicable and current Insurance Certificates
- C. Names and telephone numbers of SSR for each subcontractor
- D. Verification of HSE documents transmitted to subcontractors and received from subcontractors
- E. Identified safety deficiencies as applicable for subcontractors and verification of correction of conditions
- F. All other safety related documentation between URS and subcontractor such as training certifications, etc.
- G. Subcontractor safety plan, incident reports, and resolution reports.

6. Resources

- A. "Occupational Injury and Illness Rates by SIC," Bureau of Labor Statistics, U. S. Department of Labor (<http://www.bls.gov/iif/oshsum.htm>)
- B. Managing Subcontractor Safety, Prepared by The Construction Industry Institute, Safety Task Force, Publication 13-1, The University of Texas at Austin, Austin, Texas, 1991 (<http://www.construction-institute.org/>)
- C. American National Standard Construction and Demolition Operations—Safety and Health Program Requirements for Multi-Employer Projects, ANSI A10.33-1992, National Safety Council, Itasca, Illinois 60143-3201 (<http://www.nsc.org>)
- D. "Liability, OSHA, and the Safety of Outside Contractors," Professional Safety, American Society of Safety Engineers, January 1993 (<http://www.asse.org>)

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

- E. "Proactive Construction Management; Dealing With the Problem of Subcontractor Safety," Professional Safety, American Society of Safety Engineers, January 1990 (<http://www.asse.org>)
- F. [Attachment 046-1 NA](#) – Subcontractor HSE Evaluation Form
- G. [Attachment 046-2 NA](#) – Subcontractor Evaluation Criteria
- H. [Attachment 046-3 NA](#) – Subcontractor Variance Form

	Health, Safety and Environment	Attachment 046-1 NA
	SUBCONTRACTOR HSE EVALUATION FORM	Issue Date: July 1999 Revision 9: September 2012

It is the policy of URS to provide a safe and healthful environment for all of its employees through the prevention of incidents. As such, URS considers safety as paramount and requests the following information of all subcontractors.

Company Name: _____	Date: _____
Address: _____	Contact Name: _____
_____	Title: _____
City: _____	Telephone: _____
State/Province: _____	Fax: _____
Zip/Postal Code: _____	Email: _____

Type of services performed: _____

Has your company previously performed work as a subcontractor to URS? ☐ Yes ☐ No

If "Yes" explain the nature of the work, project location, and project date, and URS Project Manager and telephone number.

How many years has your organization been in business under your firm's name? _____

If applicable, what was your organization's previous name(s)? _____

1. WORKERS' COMPENSATION EXPERIENCE INFORMATION

(United States Only)

Insurance Carrier(s): _____

Contact for Insurance Information: _____

Title: _____ Telephone: _____ Fax: _____

- A. For U.S. operations - List your firm's Interstate Worker Compensation Experience Modification Rate (EMR) for the three most recent years: (Information is available from your workers compensation insurance carrier.)

For international operations - List the applicable performance rating (e.g., NEER Performance Index in Canada) for your company.

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<u>Year</u>	<u>EMR Interstate (or international equivalent)</u>
_____	_____
_____	_____
_____	_____

B. We require verification of your EMR (or international equivalent). Please attach the endorsement page from your policy listing your rating, or have your insurance carrier or broker provide this information on their letterhead.

C. If your rating exceeds 1.0 for any one or more years above, please explain:

Comments: _____

2. SAFETY PERFORMANCE

A. Please consolidate your firm's injury and illness data for the last 3 years and complete the table below. The information provided must be for your company as a whole, not an individual office location. **For U.S. operations, provide copies of your OSHA 300 and 300A logs for the last 3 years.**

	YEAR	YEAR	YEAR
A. Average Number of Employees			
B. Number of Fatalities			
C. Number of cases that involved days away from work, or cases with job transfer or restriction, or both			
D. Other Recordable Cases – Medical Only (Number of cases without lost or restricted workdays)			
E. Total Recordable Cases			
F. Total hours worked			
G. Total Recordable Incident Rate (E above) x 200,000 Employee Hours Worked (Given Year)			
H. Lost Workday Case Incident Rate (C above) x 200,000 Employee Hours Worked (Given Year)			

B. For each fatality, please attach a description of the accident, including cause, lessons learned, actions taken resulting from that fatality, actions taken to prevent future fatalities, and corporate management summary of their actions and attitudes.

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- C. Has your company been issued any health and safety related citations/orders from any federal, state, province, or local regulatory agency during the past 3 years? ☐ Yes ☐ No

If "Yes", please explain the nature of the citation/order, classification, and final fine (if applicable) in an attachment to your evaluation form submittal.

3. RISK MANAGEMENT / INSURANCE DATA

- A. Are you able to provide URS with insurance certificates naming URS, and if requested, URS' client as an additional insured? ☐ Yes ☐ No
- B. Please provide proof of current Workers' Compensation and Employer's Liability Insurance coverage or proof of exemption. (For U.S. operations, *attach certificate naming URS as Additional Insured*).

4. HEALTH AND SAFETY PROGRAM

- A. Does your company maintain a written Health and Safety program? ☐ Yes ☐ No
If "Yes," please include a copy of the Table of Contents.
- B. Is your company capable of preparing safety procedures specific to the work proposed for this project? ☐ Yes ☐ No
- C. Does your firm have a safety officer? ☐ Yes ☐ No
If "Yes," please provide name and telephone number.

Name: _____ Telephone: _____

- D. Do you hold jobsite safety meetings?

1. How Often?

Daily ☐ Weekly ☐ Bi-Weekly ☐ Monthly ☐ Less Often, As needed ☐

2. Are the health and safety meetings documented? ☐ Yes ☐ No

- E. Does your firm have the following policies/procedures? *If "Yes," please provide copies of the policies/procedures.*

1. Stop Work? ☐ Yes ☐ No
2. Short Service Employee? ☐ Yes ☐ No
3. Fitness for Duty? ☐ Yes ☐ No

F. Is a program in place for the reporting and correction of workplace hazards? ☐ Yes ☐ No

G. Are workers encouraged to intervene when unsafe conditions are observed? ☐ Yes ☐ No

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	SUBCONTRACTOR HSE EVALUATION FORM	Issue Date: July 1999 Revision 9: September 2012

H. Have the safety and health hazards associated with your job activities been identified? ☐ Yes ☐ No

1. Has a risk assessment been performed on these hazards? ☐ Yes ☐ No

5. ACCIDENT/INCIDENT REPORTING, INVESTIGATION, AND INJURY MANAGEMENT

A. Does your company have a process in place for immediate reporting, investigation, and follow-up of incidents, near-misses and occupational injuries? ☐ Yes ☐ No

If "Yes," who receives copies of the report? (Job Title) _____

(Job Title) _____

(Job Title) _____

B. Who is responsible for investigation and completion of your incident report forms? (Job Title) _____

Please provide your company's incident reporting procedures.

Please provide a copy of an investigation report conducted within the last year.

C. Does your company have an injury management procedure? ☐ Yes ☐ No
If "Yes," provide a copy of the injury management procedure.

D. Does your injury management procedure include the use of occupational clinics (for non-critical injuries) as a preferred method of medical care? ☐ Yes ☐ No

E. Does your company have a nurse or doctor on staff? ☐ Yes ☐ No

F. Does your company use a third party to provide medical advice to injured employees? ☐ Yes ☐ No

If "Yes," which third-party company is used? _____

6. HEALTH AND SAFETY TRAINING

A. Do you have or provide company paid safety/health training to your employees? ☐ Yes ☐ No

B. Does your company have a formal safety orientation program for new employees? *If "Yes," submit an outline for evaluation.* ☐ Yes ☐ No

Are records kept? ☐ Yes ☐ No

If "Yes," who conducts the orientation? (Job Title) _____

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If "No," how are new employees informed of safety policies and procedures and expectations?

C. Do you have additional safety and health training for newly hired or promoted foremen/superintendents? ☐ Yes ☐ No

Topics Covered:

D. Do you maintain a record of all employees' training? ☐ Yes ☐ No

E. Are your employees enrolled in a Defensive Driving Training Program? ☐ Yes ☐ No

If "Yes," describe the training, including the training provider, who receives the training, and course length.

Please provide a copy of training records from a recent HSE training course.

7. MEDICAL / DRUG TESTING

A. Does your company have a Drug/Alcohol policy or program? ☐ Yes ☐ No

If "Yes," does your drug and alcohol program include the following:

Pre-employment testing ☐ Yes ☐ No

Testing for Cause ☐ Yes ☐ No

Post-accident testing ☐ Yes ☐ No

Random testing ☐ Yes ☐ No

B. Does your company have an ongoing medical surveillance program as required by applicable governmental regulations? ☐ Yes ☐ No

Do you conduct medical examinations for:

Pre-employment ☐ Yes ☐ No

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Pre-placement Job Capability
 Hearing Function (Audiograms)
 Pulmonary
 Respiratory

☐ Yes ☐ No
☐ Yes ☐ No
☐ Yes ☐ No
☐ Yes ☐ No

8. COMPLIANCE ASSURANCE

A. Does your company conduct job site HSE inspections? ☐ Yes ☐ No

1. How often? _____
2. Who conducts the inspection? (Job Title) _____
3. Who receives the reports? (Job Title) _____
4. Are inspections documented? *If "Yes," provide an example.* ☐ Yes ☐ No

Comment on any other areas of your company's safety program and policies that you think will be appropriate in our evaluation.

9. ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY

A. Has your company been issued any environmental related citations/orders from any federal/state/province, or local regulatory agency during the past 3 years? ☐ Yes ☐ No

If "Yes", please explain the nature of the citation/order, classification, and final fine (if applicable) in an attachment to your evaluation form submittal.

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- B. Does your company have an Environmental Management and/or Sustainability Policy Statement (can be incorporated into an HSE policy statement)? ☐ Yes ☐ No
- C. Does your company have any of the following:
- i. Process to assess environmental compliance requirements? ☐ Yes ☐ No
 - ii. Process to identify environmental impacts? ☐ Yes ☐ No
 - iii. Waste Management Program (including recycling)? ☐ Yes ☐ No
 - iv. Procurement policies requiring purchase of recycled materials? ☐ Yes ☐ No
 - v. Energy use tracking and management policies? ☐ Yes ☐ No
 - vi. GHG emissions reduction program? ☐ Yes ☐ No
 - vii. Tracking of "Carbon Footprint"? ☐ Yes ☐ No
 - viii. Environmental Certifications (e.g., ISO)? ☐ Yes ☐ No
 - ix. Water Management/Conservation? ☐ Yes ☐ No
 - x. Environmental Performance Metrics? ☐ Yes ☐ No

VERIFICATION OF DATA

Please have an officer of the Company sign below certifying that the information provided in this document is current and correct. Misrepresentation of data requested is grounds for immediate termination of contracts and disqualification from future consideration.

_____ Name	_____ Title
_____ Signature	_____ Date

	Health, Safety and Environment SUBCONTRACTOR HSE EVALUATION FORM	Attachment 046-1 NA Issue Date: July 1999 Revision 9: September 2012

REQUIRED INFORMATION SUBMITTAL
Please provide copies of the following documents with the completed evaluation form. If the following information is not included, provide a written reason for the failure to do so. ☐ EMR documentation, or international equivalent, from your insurance carrier ☐ U.S. Only - OSHA 300 and 300A Logs (Past 3 Years) – <i>Employee names must be removed.</i> ☐ Description for any fatalities (if applicable) ☐ Insurance Certificate(s) – <i>Naming URS as Additional Insured</i> ☐ Explanation of any health and safety related order/citation (if applicable) ☐ Safety, Health, and Environmental Program (Table of Contents) ☐ Stop Work, Short Service Employee, Fitness for Duty Policies/Procedures ☐ Accident/Incident Reporting Procedure ☐ Example of an Investigation Report conducted within the past year ☐ Injury Management Procedure ☐ Safety, Health & Environmental Orientation for New Hires (Outline) ☐ Example of Safety, Health and Environmental Training Records ☐ Example of Job Site HSE Inspection conducted within the past year ☐ Explanation of any environmental related order/citations (if applicable)

	Health, Safety and Environment SUBCONTRACTOR HSE EVALUATION FORM	Attachment 046-1 NA Issue Date: July 1999 Revision 9: September 2012

THIS PAGE IS TO BE COMPLETED BY URS CORPORATION.

Subcontractor Name: _____

Project or Site Manager Evaluation:

- Pass ☐ Subcontractor meets the criteria established in Attachment 046-2 NA, and no further action is required.
- Fail ☐ Subcontractor does not meet the criteria established in Attachment 046-2 NA. If a unique business need exists, then a subcontractor variance must be initiated using Attachment 046-3 NA. The variance must be submitted to a Regional or Strategic Business Unit HSE Manager for evaluation.

Project or Site Manager Name: _____

Signature: _____

Date: _____

	Health, Safety and Environment SUBCONTRACTOR EVALUATION CRITERIA	Attachment 046-2 NA Issue Date: July 1999 Revision 9: September 2012

Prior to engaging a subcontractor on a project, Project Managers are required to ensure that the contractor has an effective safety program, is capable of conducting its operations in a safe manner, and has appropriate insurance coverage. The following criteria shall be followed in determining whether the subcontractor may be used on a URS Corporation project.

Note: Some questions/answers (Sections 4 through 9) from Attachment 046-1 NA are not discussed in the evaluation criteria below. These questions are asked and the answers are intended to help the Project Manager understand the HSE culture and/or safety priority of the subcontractor.

GENERAL INFORMATION

If subcontractor has performed work for URS previously, check safety performance history with previous URS Corporation Project Manager.

The numbers in this section directly correspond to the questions in Attachment 046-1 NA.

WORKERS' COMPENSATION EXPERIENCE INFORMATION

- 1.A. For any EMR, or international equivalent, listed as greater than 1.0, the contractor has failed the sub-evaluation. Further consideration may not occur without referral to a URS Regional, or Strategic Business Unit (SBU) Health, Safety, and Environment (HSE) Manager in your Region for further assessment.

If all EMRs listed are 1.0 or below, continue with the evaluation.

SAFETY PERFORMANCE

2. For any Total Recordable Incident Rate (line G in table) listed as greater than 4.0, the subcontractor has failed the evaluation. Further considerations may not occur without referral to a URS Regional or SBU HSE Manager in your Region for further assessment.

If the Total Recordable Incident Rates are at or below 4.0, continue with the assessment.

- 2.B. If the contractor has had a fatality, further consideration may not occur without referral to a URS Regional or SBU HSE Manager in your Region.
- 2.C. In the U.S., determine the subcontractor's citation history at <http://osha.gov/pls/imis/establishment.html>. Query Case Status Open and Closed. Compare the published data to the subcontractor questionnaire. The subcontractor must explain any discrepancies.

For international operations, consult a URS Regional or SBU Manager to evaluate citations/orders a subcontractor has disclosed.

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Look for willful, serious, and repeat violations. If they suggest a problem, request information and refer to a URS Regional or SBU HSE Manager in your Region for further assessment.

RISK MANAGEMENT/INSURANCE DATA

- 3.A. The ability to provide Insurance Certificates naming URS Corporation as an additional insured is required. Refer any questions to the URS Legal Department.
- 3.B. Proof of Workers' Compensation Insurance (or proof of exemption) is required. Refer any questions to the URS Legal Department.

HEALTH AND SAFETY PROGRAM

For Sections 4 through 8, if a subcontractor answers 'No' to any of the questions, the Project Manager needs to consider the type of work the subcontractor will be performing (e.g. HAZWOPER work required medical surveillance exams) to determine if the answer is acceptable.

- 4.A. A "No" answer should be referred to a URS Regional or SBU HSE Manager in your Region for further assessment. For small subcontractors, a 'No' answer may be acceptable with good incident and insurance rate statistics. Generally, some minimal program is expected depending on the breadth and complexity of the work. Contact a URS Regional or SBU HSE Manager in your Region for further assessment if you have any questions or doubts.
- 4.B. It is expected that a subcontractor being hired to perform services on the project site should be the best prepared to address safety issues for their operations, especially when specialty work is being conducted, or for work in which the subcontractor possesses superior knowledge of their operations.

A "No" answer should be referred to a URS Regional or SBU HSE Manager in your Region for further assessment.

Exception:

If the subcontractor does not meet the other requirements outlined above, the decision will be that the subcontractor will not be used. However, if a unique business need exists (e.g., subcontractor is a specialty subcontractor), the Project Manager should initiate a Subcontractor Variance (Attachment 046-3 NA). The Subcontractor Variance must be approved by a Regional or SBU HSE Manager.



Health, Safety and Environment
SUBCONTRACTOR VARIANCE FORM

Attachment 046-3 NA
Issue Date: July 1999
Revision 9: September 2012

Subcontractor Name: _____

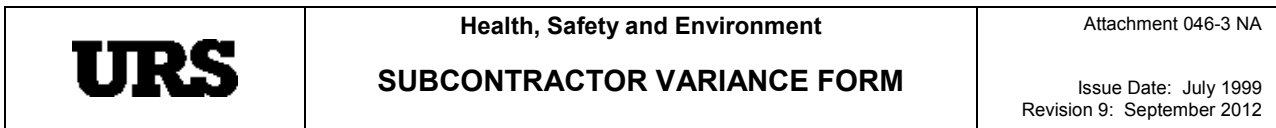
Project or Site Location: _____

Description of Work to be Performed:

Explain any of the following conditions that apply to the subcontractor:

- EMR greater than 1.0
- TRIR greater than 4.0
- Fatalities within the past 3 years
- Willful, serious, or repeat OSHA citations

Why should we use this subcontractor?



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Have other similar subcontractors been evaluated? If so, please explain.

Mitigations by URS to manage the risks.

[illegible]

Review:

Project or Site Manager Requesting Variance

HSE Manager Approval

Name: _____

Date: _____

Signature: _____

URS SAFETY MANAGEMENT STANDARD

Biological Hazards

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where job activities are performed primarily in outdoor environments.

2. Purpose and Scope

The purpose of this standard is to provide information that will help eliminate or reduce illnesses and injuries transmitted by plants, insects, animals, and pathogenic agents. Although there are many animals and insects that are potentially harmful to humans (e.g., bees, spiders, bears, and rodents), this standard focuses on six common biological hazards: ticks, poison plants, mosquitoes, snakes, Valley Fever, and water-borne pathogenic agents. Refer to SMS 051 – Bloodborne Pathogens for additional information.

3. Implementation

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

4. Requirements

A. Ticks

1. Precautionary Measures

- a. Background information: Ticks do not jump, crawl, or fall onto a person. They are picked up when clothing or hair brushes a leaf or other object the tick is on. Ticks are generally found within 3 feet of the ground. Once picked up, they will crawl until they find a likely site to feed. Often they will find a spot at the back of the knee, near the hairline, behind the ears, or at pressure points where clothing presses against the skin (underwear elastic, belts, neckline). The best way to prevent tick-borne diseases is not to be bitten by a tick. Ticks can carry a number of diseases, including the following:
 - i. *Lyme Disease* is an infection caused by the corkscrew-shaped bacteria *Borrelia burgdorferi* that is transmitted by the bite of deer tick (ixodes) and western black-legged ticks. The disease occurs in the forested areas of North America, Europe, and Asia. Symptoms that occur within 3 to 30 days following a tick bite include: a spreading ‘bulls-eye’ rash, fever, fatigue, headache, and joint and muscle aches. Prompt treatment with antibiotics is essential in order to prevent more serious complications that may occur if left untreated.

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- ii. *Rocky Mountain Spotted Fever* is an infection caused by the bacteria *Rickettsia rickettsii*. The disease occurs in North, Central, and South America. Other *Rickettsia* organisms cause disease worldwide (Mediterranean, Japan, Africa, North Asia). Symptoms which occur 2-6 days following a tick bite include: fever, nausea, vomiting, diarrhea, rash, muscle and joint pain. The disease is treated with antibiotics.
- iii. *Babesiosis* is caused by hemoprotozoan parasites of the genus *Babesia*. It is transmitted by the ixodid tick. The geographic distribution is worldwide. Symptoms include fever, chills, fatigue, muscle aches, and an enlarged spleen and liver. The disease is treated with anti-protozoan drugs.
- iv. *Ehrlichiosis* is caused by several bacteria of the genus *Ehrlichiae*. The geographic distribution is global, primarily in temperate regions. Symptoms which occur 5-10 days following a tick bite include fever, headache, fatigue, muscle aches, nausea, vomiting, diarrhea, confusion, and occasionally a rash. The disease is treated with antibiotics.

b. Avoidance of tick habitats

Whenever possible, persons should avoid entering areas that are likely to be infested with ticks, particularly in spring and summer when nymphal ticks feed. Ticks favor a moist, shaded environment, especially which provided by leaf litter and low-lying vegetation in wooded, brushy, or overgrown grassy habitat. Both deer and rodent hosts must be abundant to maintain the life cycle of the tick.

c. Personal Protective Equipment

- i. Wear light colored clothing or white Tyvek® to allow you to see ticks that are crawling on your clothing.
- ii. Tuck your pant legs into your socks or boots, wear high rubber boots, or use tape to close the opening where they meet so that ticks cannot crawl up the inside of your pant legs.
- iii. Wear a hat, and tie back long hair.
- iv. Apply repellents to discourage tick attachment. Repellents containing permethrin can be sprayed on boots and clothing, and will last for several days. Repellents containing DEET (n,n-diethyl-m-toluamide) can be applied to the skin, but will last only a few

URS SAFETY MANAGEMENT STANDARD

Biological Hazards

hours before reapplication is necessary. Apply according to Environmental Protection Agency guidelines to reduce the possibility of toxicity.

d. Tick Check

- i. Change clothes when you return from an area where ticks may be located.
- ii. Shower to wash off any loose ticks.
- iii. Check your entire body for ticks. Use a hand held or full-length mirror to view all parts of your body.
- iv. Place clothing worn in tick infested areas into the dryer for at least 30 minutes in order to kill any ticks.

2. Tick Removal

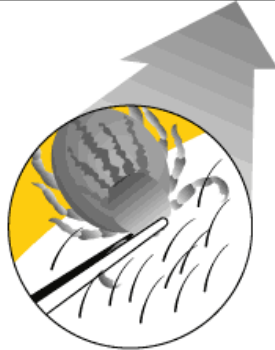
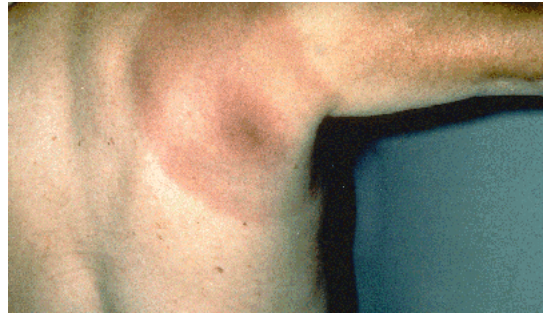
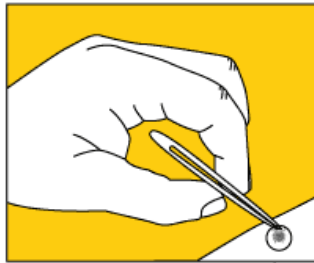
Because it takes several hours of attachment before microorganisms are transmitted from the tick to the host, prompt removal of attached or crawling ticks is an important method of preventing disease. Remember, folklore remedies of tick removal to do not work! Methods such as the use of petroleum jelly or hot matches may actually make matters worse by irritating the tick and stimulating it to release additional saliva or regurgitate gut contents, increasing the chances of transmitting disease.

The best method to remove an attached tick is with a set of fine tipped tweezers.



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- a. Use fine-tipped tweezers. When possible, avoid removing ticks with bare hands.
- b. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. If this happens, remove mouthparts with the tweezers.
- c. Do not squeeze, crush, or puncture the body of the tick because its fluids (saliva and gut contents) may contain infectious organisms.
- d. After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
- e. Disinfect the tweezers.
- f. Save the tick for identification in case you become ill. This may help the doctor make an accurate diagnosis. Place the tick in a vial or plastic zip lock bag and put it in the freezer. Write the date of the bite on a piece of paper with a pencil and place it in the bag.

3. Reporting and Medical Follow-Up

Tick bites must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management. In most circumstances, medical treatment of persons who only have a tick bite is not recommended. However, individuals who are

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Biological Hazards

bitten by a tick should seek medical attention if any signs and symptoms of tick-borne disease develop over the weeks following the tick bite.

B. Poisonous Plants

1. Background Information

Poison ivy and poison oak plants are the most common cause of allergic contact dermatitis in North America. These poisonous plants can be a hazard for many various outdoor activities at work, home, and play. Skin contact with the oleoresins (urushiol) from these plants can cause an itchy, red, oozing, blistered rash in sensitive individuals. Oil content in the plants is highest in the spring and summer; however, the plants are even hazardous in the winter when they have dropped their leaves. There are three types of exposure:

- a. Direct contact: An initial skin exposure is necessary to “sensitize” the individual. Subsequent contact in a sensitized person will result in a rash appearing within 4 to 48 hours. Approximately 50 to 70 percent of the population is sensitized. Poison plant dermatitis is usually characterized by areas of linear or streaked patches where branches of the plant brushed the skin.
- b. Indirect contact: Skin exposure can happen indirectly. Clothing, shoes, tools, personal protective equipment, and other items can be contaminated with the oils and maintain potency for months.
- c. Airborne smoke contact: Never burn poison plants. Droplets of oil can be carried by smoke and enter the respiratory system, causing a severe internal outbreak.

Poison plant rash is not contagious. Skin contact with blister fluid from an affected individual will not cause dermatitis in another sensitized person. Scratching the rash can only spread it to other parts of your body if the oil is still on your skin. After the oil has been washed off or absorbed by the skin, scratching will not spread the rash.

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each and are green in the summer and red in the fall. Both plants also have greenish-white flowers and berries that grow in clusters. All parts of these plants are toxic.

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Poison Ivy grows as a small plant, vine, and as a shrub. Leaves always consist of three glossy leaflets.



Poison Oak grows as a shrub or vine. It has three leaflets that resemble oak leaves.



Poison Sumac grows as a woody shrub or small tree from 5 to 25 feet tall. It has 7 to 13 leaves that grow opposite each other with a leaflet at the tip. Poison sumac grows in wet soils, typically in swamps and bogs.



Poison Sumac

2. Precautionary Measures

- a. The best approach is to learn to identify the plants and avoid them.
- b. Wear long pants and long sleeves, boots, and gloves.
- c. Barrier skin creams may offer some protection if applied before contact.

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- d. Avoid indirect contact with tools, clothing, or other objects that have come into contact with a crushed or broken plant. Don't forget to wash contaminated clothing and clean up contaminated equipment.
- e. If you can wash exposed skin areas within 3 to 5 minutes with cold running water, you may keep the urushiol from penetrating your skin. Proper washing may not be practical in remote areas, but a small wash-up kit with pre-packaged alcohol-based cleansing tissues can be effective.

3. Reporting and Medical Follow-Up

Exposure to poisonous plants must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management.

Home treatment: Calamine lotion and an oatmeal (1 cup to a tub full of water) bath can help relieve itching. To prevent secondary skin infection, scratching is not helpful, and the finger nails should be cut to avoid damage to the skin. Over-the-counter hydrocortisone cream can decrease inflammation and itching; however, read the label and use according to directions.

When to see the doctor: Severe cases may require further treatment. A physician should be seen if the rash appears infected, is on the face or other sensitive body areas, or is too extensive to be easily treated at home.

C. Mosquito-Borne Diseases

1. Background Information

- a. Arboviral encephalitis is a viral illness causing inflammation of the brain, and is transmitted to humans by the bite of infected mosquitoes. Globally, there are several strains, including: Eastern equine, Japanese, La Crosse, St. Louis, West Nile, and Western equine encephalitis. Some of the strains have a vaccine. Symptoms of infection are nonspecific and flu-like: fever, headache, and tiredness. Fortunately, only a small proportion of infected people progress to encephalitis. Treatment is supportive, antibiotics are not effective.
- b. Malaria is a serious but preventable disease spread by the bite of an infected anopheline mosquito. It is caused by four species of the parasite *Plasmodium* (*P. falciparum*, *P. vivax*, *P. ovale*, and *P. malariae*). Malaria-risk areas include primarily tropical areas of Central

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and South America, Africa, India, Southeast Asia, and the Middle East. Symptoms of malaria, which occur 8 days to 1 year after infection, include fever, shaking, chills, headache, muscle ache, tiredness, jaundice, nausea, vomiting, and diarrhea. Malaria can be cured with prescription drugs.

- c. Dengue Fever is a potentially life-threatening viral illness transmitted by the bite of the Aedes mosquito, found primarily in urban areas. The disease is found in most of tropical Asia, the Pacific Islands, Central and South America, and Africa. There are four dengue virus serotypes. Symptoms include sudden onset, high fever, severe headache, joint and muscle pain, rash, nausea, and vomiting. There is no specific treatment and no vaccine.
- d. Yellow Fever is a viral disease transmitted between humans by mosquitoes. It occurs only in Africa and South America. There is a vaccine that confers immunity lasting 10 years or more. Symptoms begin 3 to 6 days after the mosquito bite, and include fever, nausea, vomiting, headache, slow pulse, muscle aches, and restlessness. Treatment is symptomatic.
- e. West Nile virus is a viral disease transmitted by mosquitoes. It occurs in North America, Europe, Africa, west and central Asia, and the Middle East. There is no vaccine for West Nile virus. Symptoms include nausea, vomiting, and diarrhea.

2. Precautionary Measures

- a. Insect Repellent: Use insect repellants that contain DEET. The effect should last about 4 hours. Always use according to label directions. Use only when outdoors and wash skin after coming indoors. Do not breathe in, swallow, or get into the eyes. Do not put on wounds or broken skin.
- b. Protective Clothing: Wear long-sleeved shirts and long pants, especially from dusk to dawn. Avoid going outdoors during these hours.
- c. Mosquito netting: Travelers who will not be staying in well-screened or air conditioned rooms should use a pyrethroid-containing flying insect spray in living and sleeping areas during evening and nighttime hours. Sleep under mosquito netting (bed nets) that has been sprayed with permethrin.

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- d. Malaria prophylaxis medications may be prescribed; however, they do not provide complete protection. The type of medication given depends on the area of travel.

D. Poisonous Snakes

1. Background Information

No single characteristic distinguishes a poisonous snake from a harmless one except the presence of poison fangs and glands. Only in dead specimens can you determine the presence of these fangs and glands without danger. Most poisonous snakes have both neurotoxic and hemotoxic venom; however, one type is dominant and the other is weak.

- a. Hemotoxic venom. The folded-fang snakes (fangs can raise to an erect position) have venoms that affect the circulatory system, destroying blood cells, damaging skin tissues, and causing internal hemorrhaging.
- b. Neurotoxic venom. The fixed-fang snakes (permanently erect fangs) have venoms that affect the nervous system, making the victim unable to breathe.
- c. Poisonous snakes in the Americas: copperhead, coral snake, cottonmouth, and rattlesnake.
- d. Poisonous snakes in Europe: adder, viper.
- e. Poisonous snakes in Africa and Asia: viper, cobra, adder, green mamba.
- f. Poisonous snakes in Australia: copperhead, adder, taipan, tiger snake.

2. Precautionary Measures

Bites occur when you don't hear or see the snake, when you step on them, or when you walk too close to them. Follow these simple rules to reduce the chance of accidental snakebite:

- a. Don't put your hands into dark places, such as rock crevices, heavy brush, or hollow logs, without first investigating.
- b. Don't step over a fallen tree. Step on the log and look to see if there is a snake resting on the other side.
- c. Don't walk through heavy brush or tall grass without looking down. Look where you are walking.

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- d. Do not pick up any live snake. If you encounter a snake, walk around the snake, giving it plenty of room. A snake can strike half its length.
- e. Don't pick up freshly killed snakes without first severing the head. The nervous system may still be active and a dead snake can deliver a bite.

3. Reporting and Medical Follow-Up

Snake bites must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management.

If you are bitten by a snake, the primary goal is to get to a hospital as soon as possible to receive professional medical evaluation, and possible treatment with anti-venom if warranted. Initial first aid should include: Washing the bite with soap and water; immobilizing the bitten area and keeping it lower than the heart. Try to remain calm. If you are unable to reach a hospital within 30 minutes, a bandage, wrapped 2 to 4 inches above the bite, may help slow the venom. The bandage should not cut off blood flow from a vein or artery; make sure the bandage is loose enough that a finger can slip under it.

Research has shown the following to be potentially harmful: DO NOT apply ice, use a tourniquet, or make incisions into the wound.

E. Valley Fever

1. Background Information

Valley Fever is an illness that results from exposure to a fungal spore (*Coccidioides immitis*). It is endemic to the San Joaquin Valley in California, as well as areas of the Southwestern U.S., Mexico, and Central and South America, although it has been found in many other areas. It is particularly associated with arid soils that are not cultivated. Exposure is generally by inhalation of spores, though it may also enter through broken skin. Approximately 2 weeks after inhalation exposure, severe weakness and flu-like symptoms develop; severe pneumonia may occur. It may also affect the brain, bones, and joints causing disability, spinal meningitis, or death. Dermal forms of the infection can form disfiguring fungal lesions.

2. Precautionary Measures

Because it is associated with arid soils, personnel should avoid locations and activities that create dust. Persons at risk of exposure include

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Biological Hazards

geologists, surveyors, excavators, archaeologists, etc. Dust suppression methods should be employed and the use of particulate respirators should be considered for areas known to harbor the fungus. At one phase of the fungus' life cycle, cottony, spider-web-like growths may be seen on the soil surface. If observed, these growths must not be disturbed, and work should be relocated if possible.

3. Reporting and Medical Follow-up

Exposure to fungal spores must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management.

Approximately 60 percent of exposed persons will not have symptoms. Persons that have been in areas associated with Valley Fever should be alert to the development of flu-like symptoms, fatigue, or skin rashes 2 to 4 weeks later. Valley Fever can be treated with anti-fungal medication. Early treatment is critical, as disseminated forms of the disease can result in chronic disease or death.

F. Pathogenic organisms

1. Background Information

Employees who perform certain activities, such as disaster response, may be in areas where water-borne pathogens may be present. A partial list of agents includes: E. coli, Hepatitis A, typhoid, and cholera. Chemical hazards and molds and fungus may also be present. Refer to SMS 051– Bloodborne Pathogens for additional information.

2. Precautionary Measures

All work must be performed within the scope of either a Health and Safety Plan or Safe Work Plan that identifies the task hazards, and specifies appropriate controls. A medical exam and/or inoculations may be required. See SMS 024 – Medical Screening and Surveillance, or contact the Occupational Health Manager for assistance.

Where contact with water or wet materials may occur, personnel must use protection such as impervious coveralls, boots/waders, faceshields, etc, as specified in the project Health and Safety Plan or Safe Work Plan. Personnel must protect any areas of broken skin, eyes, nose, and mouth from contact with potentially infectious materials, and practice good personal hygiene before eating, drinking, etc.

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Biological Hazards

3. Reporting and Medical Follow-up

Exposure to pathogenic organisms must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management.

Medical evaluation and/or an inoculation schedule may be required prior to beginning work. Because early evaluation and treatment is more successful, personnel should be alert to signs and symptoms of possible pathogenic organisms and seek prompt medical evaluation if illness develops or is suspected.

G. Natural disaster relief efforts

1. Natural disaster relief efforts present a variety of hazards, including biological hazards. Biological hazards potentially encountered during relief efforts include mold, sewage-contaminated water, various building materials that may puncture the skin and create various types of infections, and displaced animals and insects. Before work begins, each disaster relief site should be evaluated for the various types of biological hazards that may be encountered. Control measures must be developed to address the biological hazards.

5. Documentation Summary

Complete and distribute a URS Incident Report form 049-1 for all work-related biological exposure incidents.

6. Resources

- A. Centers for Disease Control <http://www.cdc.gov>
- B. U. S. Occupational Safety and Health Administration <http://www.osha.gov>
- C. U.S. Food and Drug Administration - Treating and Preventing Venomous Snake Bites
http://www.fda.gov/fdac/features/995_snakes.html
- D. ENature – Identify plant and animals hazards in a specific area.
<http://enature.com/zipguides/index.asp?choice=poisonous>
- E. [SMS 051](#) – Bloodborne Pathogens
- F. [SMS 024](#) – Medical Screening and Surveillance

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- G. [SMS 049](#) – Injury / Illness / Incident Reporting & Notifications
- H. [SMS 065](#) – Injury and Claims Management
- I. [ORC Pandemic Planning Guide](#)

URS SAFETY MANAGEMENT STANDARD

Injury / Illness / Incident Reporting & Notifications

1. Applicability

This standard applies to the operations of the Infrastructure & Environment and Federal Services businesses of URS Corporation (URS) and its subsidiary companies.

2. Purpose and Scope

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

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

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

3. Implementation

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

4. Requirements

- A. Reporting: All employees must immediately notify their appropriate level of management (line, project, and/or office) of a reportable incident. A reportable incident includes the following:
1. An injury or illness to any URS employee or subcontractor, even if the injury does not require medical attention.
 2. An injury to a member of the public, or clients, occurring on a URS-controlled work site.
 3. Illness resulting from suspected chemical exposure.
 4. Chronic or re-occurring conditions such as back pain or cumulative trauma disorders (e.g., carpal tunnel syndrome).
 5. Fire, explosion, or flash.

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Injury / Illness / Incident Reporting & Notifications

6. Any vehicle accidents occurring on site, while traveling to or from client locations, or with any company-owned, rented, or leased vehicle (including personal vehicles used for company business). If the vehicle accident involves injury, complete both 049-1 NA and 057-1 NA. If the vehicle accident does not involve injuries, complete 057-1 NA.
7. Property damage resulting from any URS or subcontractor activity.
8. Structural collapse or potential structural hazards.
9. Unexpected release or imminent release of a hazardous material.
10. Unexpected chemical exposures to workers or the public.
11. A safety-related complaint from the public regarding URS activities.
12. Incidents that could result in adverse public media interest concerning URS or a URS project.
13. Any incident that could or does result in an actual investigation by state, federal, provincial, or local regulatory or law enforcement agencies.
14. Any other significant occurrence that could impact safety, including a near-miss.

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

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

B. Actions: The following actions will be taken following a reportable incident:

1. Employees:

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

- a. If necessary, suspend operations and secure and/or evacuate the area.
 - b. Immediately notify your supervisor and/or project manager.
 - c. Contact appropriate emergency services and obtain appropriate medical attention, as required or directed by your supervisor. For additional information, refer to SMS 065 – Injury and Claims Management.
 - d. Record information pertaining to the incident (e.g., time, date, location, name and company of person(s) involved, witnesses, description of event, and actions taken) and initiate Attachment 049-1 NA – Incident Report Form for the appropriate business (i.e., Infrastructure & Environment or Federal Services). (Note: The international operations of the Infrastructure & Environment business will complete an on-line Incident Report instead, using the appropriate Health, Safety, and Environment (HSE) and Quality Improvement database. Federal Services will submit the report in G-SMART.)
 - e. Infrastructure & Environment employees shall submit 049-1 NA to the URS Occupational Health Manager (OHM) within 24 hours of the incident. Federal Services shall enter the incident into G-SMART within 24 hours of the incident.
 - f. Assist with incident investigation as directed by management. Investigations shall be completed within 7 days of an incident.
 - g. Implement corrective actions as directed by management.
 - h. *Do not* discuss the incident with members of the news media or legal representatives (except URS legal counsel or your personal legal advisor) unless directed to do so by URS management.
 - i. *Do not* make statements pertaining to guilt, fault, or liability.
2. Line/Project Management Responsibilities (U.S. and Mexico Operations)
- a. For instances involving employee or subcontractor death or hospitalization, or equipment damage to Company or

URS SAFETY MANAGEMENT STANDARD
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customer equipment valued at more than \$100,000 (USD), immediately notify by telephone or other direct means URS Operations and the HSE team in the order listed below. If any level of contact is unsuccessful, continue down the list in sequence. After notification has been made, a detailed follow-up, via email, is required.

- i. Appropriate corporate leadership for the affected program up to the Regional Business Unit (RBU) or Strategic Business Unit (SBU) Vice President for the affected Operations.
- ii. The URS OHM.
- iii. Appropriate RBU and SBU HSE Manager for the affected Operation.

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

Business Vice President/Director of HSE (or designee) will make notification to federal and state authorities as appropriate.

- b. For minor incidents involving only first aid treatment, minor damage to vehicle or equipment, etc., make notifications to a supervisor and OHM immediately and submit Attachment 049-1 NA. See Attachment 049-1 NA for methods of distribution. Also, assure copies of the report are distributed as outlined on the form.
- c. For a near-miss incident, complete an on-line near miss report, using the appropriate Health, Safety, and Environment (HSE) database. If needed, contact the Regional/SBE/SBU HSE Manager to determine which database is appropriate.
- d. Within 7 days of an incident, review circumstances (i.e., who, what, when, where, and how) of the incident with applicable employee(s) to determine apparent causes and to develop recommended corrective actions.

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

3. Line/Project Management Responsibilities (Canadian Operations)

- a. If notified of an incident that is a critical injury (see Supplemental Information A for definition), serious accident, or other significant consequence:
 - i. Immediately contact URS Canada Human Resources at (905) 882-4401.
 - ii. Review circumstances (i.e., who, what, when, where, and how) of the incident with applicable employee(s) to determine apparent causes and to develop recommended corrective actions.
 - iii. Follow up notification by completing, signing, and delivering/faxing Attachment 049-1 NA to URS Canada Human Resources within 24 hours.
 - iv. URS Canada Human Resources will make notification to provincial authorities as appropriate.
- b. If notified of an incident that is not a critical injury, nor a serious accident or other significant consequence:
 - i. Review circumstances (i.e., who, what, when, where, and how) of the incident with applicable employee(s) to determine apparent causes and to develop recommended corrective actions.
 - ii. Complete, sign, and deliver/fax Attachment 049-1 NA to URS Canada Human Resources within 24 hours.
 - iii. URS Canada Human Resources will make notification to provincial authorities as appropriate.
- c. If notified of a near-miss incident:
 - i. Review circumstances (i.e., who, what, when, where, and how) of the incident with applicable employee(s) to determine apparent causes and to develop recommended corrective actions.

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- ii. Complete an on-line near miss report, using the appropriate Health, Safety, and Environment (HSE) database. If needed, contact the Regional/SBE/SBU HSE Manager to determine which database is appropriate.
 - d. Discuss with department or project staff the circumstances surrounding the incident and corrective actions taken.
- 4. Local Office, Project, and/or Certified HSE Representative
 - a. Assist with incident evaluation.
 - b. With management, identify cause(s) of incident and identify corrective actions needed to avoid recurrence.
 - c. Review injury/incident report or the near-miss report for completeness and accuracy. Ensure the reports are distributed properly.
 - d. Ensure notifications are made in a timely manner.
 - e. Ensure that the injured employee is properly counseled/advised as directed by SMS 065 – Injury and Claims Management. Communicate with the OHM.
 - f. Note that “Certified” HSE Representatives are those who have received special training in occupational safety and health and have been certified by the Ontario Workplace Safety and Insurance Board. Certified HSE Representatives should be used at larger Canadian project sites where joint worker/employer safety committees are developed.
- 5. Occupational Health Manager
 - a. Report work-related injuries and illness to workers’ compensation carrier.
 - b. Ensure that the employee’s injury is managed in accordance with SMS 065 – Injury and Claims Management. Provide guidance for the affected office, project, and/or Certified HSE Representative.
- 6. URS Human Resources (Canadian Operations Only)
 - a. Receive incident notifications from staff.

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Injury / Illness / Incident Reporting & Notifications

- b. For incidents involving critical injuries, serious accidents, or other significant consequences:
 - i. Verbally notify the Office Manager immediately, via cell phone if necessary.
 - ii. Notify the Certified HSE Representatives (management and worker) as soon as possible (where necessary).
 - iii. Notify the OHM as soon as possible. Notification to the OHM should in no case occur later than the end of the work shift.
 - iv. Follow up notification by receiving from staff and forwarding Attachment 049-1 NA to the OHM within 24 hours. Also, assure copies of the report are distributed as outlined on the form.
 - c. For minor incidents involving only first aid treatment, minor damage to vehicle or equipment, etc.:
 - i. Notify the OHM as soon as reasonable during normal business hours.
 - ii. Receive from staff and forward Attachment 049-1 NA to the OHM within 24 hours.
- Ensure copies of the report are distributed as outlined on the form.
- d. Report work-related injuries and illness to the Workplace Safety and Insurance Board or appropriate workers' compensation carrier and other provincial or federal authorities as appropriate.
 - e. Ensure, in conjunction with the Office HSE Representative, that the employee's injury is managed in accordance with SMS 065 – Injury and Claims Management. Provide guidance for the affected Certified or Project HSE Representative.

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Injury / Illness / Incident Reporting & Notifications

7. Business HSE Management

- a. Notify URS management of any significant occurrence, including lost-time injuries, deaths, or other serious result or circumstance.
 - b. The OHM will review all reported incidents to determine OSHA reporting and recording requirements with input from the appropriate Business HSE Manager. For a determination of recordability in those infrequent instances where there is not a clear answer, the Business Vice President/Director HSE will make the final determination. All decisions will be based strictly on current U.S. Occupational Safety and Health Administration (OSHA) regulations.
 - c. Official records (including required reports and logs for all reported incidents) will be maintained at one central location by the OHM.
 - d. Where an incident has resulted in an injury or illness and that injury or illness is determined to be recordable in accordance with OSHA recordkeeping requirements, the OHM shall enter pertinent information related to the case into URS' recordkeeping documents no later than seven days after the event.
 - e. Each January, the OHM will prepare and distribute the appropriate government injury/illness reports to each URS establishment. These reports will summarize all required government information for incidents that occurred during the preceding calendar year. Reports, where required by regulation, will be signed by an officer of the company.
8. If an incident occurs on a client-controlled site, Project Management will ensure that appropriate client notifications are made within the required time frames. These notification requirements will be documented in project-specific planning documents.
9. All notifications to external agencies (e.g., OSHA) will be made by the Business Vice President/Director HSE (or designee) in accordance with regulatory requirements.

URS SAFETY MANAGEMENT STANDARD

Injury / Illness / Incident Reporting & Notifications

5. Documentation Summary

File Attachment 049-1 NA in the appropriate safety files. Note: The international operations of Infrastructure & Environment will use the appropriate HSE and Quality Improvement database.

6. Resources

A. Occupational Health Managers (OHMs)

Infrastructure & Environment	Federal Services
Jeanette Schrimsher, RN COHN-S (866) 326-7321 (Toll Free-U.S.) (512) 656-0203 (Cell) (512) 419-6413 (Confidential Fax)	BJ Heinrich, RN, COHN-S/CM, STS (877) 878-9525 (Toll Free) (512) 656-8502 (Cell) (512) 419-5252 (Confidential Fax)

B. [SMS 057](#) – Vehicle Safety Program

C. [SMS 065](#) – Injury and Claims Management

D. [SMS 066](#) – Incident Investigation

E. [Attachment 049-1 NA IE](#) – Infrastructure & Environment Incident Report Form

F. [Attachment 049-1 NA FS](#) – Federal Services Incident Report Form



INCIDENT REPORT FORM

Issue Date: May 2001
Revision 12: April 2013

GENERAL DETAILS

Project Name (If applicable):

Client (If applicable):

Incident Occurred While On: ☐ URS Premises ☐ Client Site ☐ Travel ☐ Other:

Address:

Event Type: ☐ Injury/Illness ☐ Fire ☐ Property Damage ☐ Spill/ReleaseInjury Type: ☐ Injury ☐ Illness ☐ First Aid ☐ Information Only (no treatment)

Office Employee Assigned To:

Date of Incident:

Time of Incident:

Date Reported to Supervisor:

Time Reported to Supervisor:

Specific On-Site Location of Incident (e.g., loading dock):

Brief Description of Incident (what happened, severity of injury, and status of injured people including levels of medical treatment, work status):

Employee Description of Incident – Has the Employee completed Statement Form (page 2)?

☐ Yes ☐ No, state reason:

What was the employee doing just before the incident occurred? (Name tools, equipment, material and what the employee was doing with them):

How did the incident occur? (What and how details, name object(s), substance(s) involved):

What object(s) or substance(s) directly harmed the employee?

What was the injury or illness (Provide a brief description of the body part/nature of injury):

EMPLOYEE DETAILS

Employee Name:

Employee ID/Number:

☐ URS ☐ Contractor

Employee Phone #:

Time Employee Started Work:

Supervisor Managing
Work (PM if applicable):

Supervisor Phone #:

Days Worked Weekly: ☐ Mon - Fri ☐ Other Than Mon - Fri Describe if Other: _____



Health, Safety and Environment

Attachment 049-1 NA

INCIDENT REPORT FORM

Issue Date: May 2001
Revision 12: April 2013

STATEMENT FORM

Name of Injured
Employee:

Name of Individual Providing
Statement:

This is a statement from: ☐ Injured Employee ☐ Supervisor ☐ Witness

Describe the incident in as much detail as possible (attach additional pages if needed).

Signature of
Individual Providing
Statement:

Date:

Contact Phone Number:



INCIDENT REPORT FORM

Issue Date: May 2001
Revision 12: April 2013

ACCIDENT TYPE	PRIMARY BODY PART	NATURE OF INJURY	
☐ Body reaction / systemic	☐ Abdomen	☐ Amputation	☐ Frost bite
☐ Caught in, under, or between	☐ Ankle	☐ Asphyxia	☐ Ganglion cyst
☐ Contact with (e.g., biological)	☐ Back, lower / upper	☐ Blister	☐ Heat exhaustion /stroke
☐ Contact with chemicals	☐ Buttocks	☐ Burn, chemical	☐ Hernia
☐ Contact with electrical	☐ Chest	☐ Burn, electrical	☐ Infection
☐ Contact with temperature extremes	☐ Chin	☐ Burn, fire / thermal	☐ Inflammation
☐ Fall from elevation	☐ Circulatory system	☐ Carpal tunnel syndrome	☐ Injection
☐ Fall on same level	☐ Digestive system	☐ Conjunctivitis	☐ Pneumoconiosis
☐ Foreign body in eye	☐ Ear(s)	☐ Contusion / bruise	☐ Poisoning
☐ Inhalation	☐ Elbow	☐ Cut / laceration	☐ Puncture
☐ Lifting, pushing, pulling	☐ Eye(s)	☐ Dermatitis, allergic	☐ Repetitive stress
☐ Mobile equipment / component failure	☐ Face	☐ Dermatitis, direct	☐ Respiratory
☐ Mobile equipment incident	☐ Finger/thumb	☐ Dislocation	☐ Splinter
☐ Motor vehicle incident	☐ Foot	☐ Foreign body	☐ Sprain
☐ Overexertion	☐ Forearm	☐ Fracture	☐ Strain
☐ Repetitive motion, cumulative trauma	☐ Hand		
☐ Rubbed or abraded	☐ Head		
☐ Slip or overexertion resulting in strain, hernia, etc.			
☐ Struck against			
☐ Struck by			
☐ Surface contacted with irritating substances			

PRIMARY BODY PART SIDE
☐ Left ☐ Right ☐ Both

MEDICAL TREATMENT	
What level of medical treatment was received?	☐ First Aid ☐ Clinic/Physician ☐ Emergency Room ☐ Refused/None
Was injured hospitalized overnight as an inpatient?	☐ Yes ☐ No
Was treatment provided on site?	☐ Yes ☐ No
Describe:	
Hospital/Occupational Clinic Name:	Physician Name:



INCIDENT REPORT FORM

Issue Date: May 2001
Revision 12: April 2013

CONTRIBUTING CAUSES

Contributing Causes:

ROOT CAUSE DETERMINATION

Root Cause(s):

CORRECTIVE ACTIONS

List methods of preventing/avoiding this type of incident in the future. There must be one or more corrective actions for each root cause.

Corrective Action	Responsible Party	Due Date

DISTRIBUTION

Energy & Construction

Incident data must be entered into G-SMART and a copy of the report sent to the respective Operating Group (OG) Safety Director per OG procedures.

Federal Services

Incident data must be entered into G-SMART within 24 hours of the incident.

Infrastructure & EnvironmentE-mail incident report to incidentreport@urs.com or fax to 512.419.6413.

URS	Health, Safety, and Environment	Attachment 049-2 NA
	PHOTO EVIDENCE SHEET	Issue Date: May 2001 Revision 12: April 2013

Incident/Facility: _____

Instructions:

Pertinent information such as photo number, time and date photos were taken, direction camera was pointing (e.g., north, south, east, or west), and relationship to the incident must be recorded below each photo.

Date of Incident: _____

Photos Taken By: _____
(Last) (First) (M.I.)

Job Title: _____

Evidence Sheet Prepared By: _____
(Last) (First) (M.I.)

Job Title: _____

	Health, Safety, and Environment PHOTO EVIDENCE SHEET	Attachment 049-2 NA Issue Date: May 2001 Revision 12: April 2013

Investigation Name: _____

Attach Photo Here

Attach Photo Here

Print Number: _____

Print Number: _____

Time/Date Taken: _____

Time/Date Taken: _____

Direction: _____

Direction: _____

Notes:

Notes:



	Health, Safety, and Environment VISITOR LOG	Attachment 049-3 NA Issue Date: May 2001 Revision 12: April 2013

	Health, Safety, and Environment VISITOR LOG	Attachment 049-3 NA Issue Date: May 2001 Revision 12: April 2013

	Health, Safety, and Environment VISITOR LOG	Attachment 049-3 NA Issue Date: May 2001 Revision 12: April 2013

	Health, Safety, and Environment VISITOR LOG	Attachment 049-3 NA Issue Date: May 2001 Revision 12: April 2013

Incident/Facility: _____

Instructions:

It is important to note the name and purpose of each visitor during the incident investigation. Items such as persons interviewed, evidence taken, meetings, and request for information should be noted on this form. Duplicate this form if additional sheets are needed.

[illegible]



	Health, Safety, and Environment INCIDENT INVESTIGATION SUMMARY	Attachment 049-4 NA Issue Date: May 2001 Revision 12: April 2013

	Health, Safety, and Environment INCIDENT INVESTIGATION SUMMARY	Attachment 049-4 NA Issue Date: May 2001 Revision 12: April 2013

	Health, Safety, and Environment INCIDENT INVESTIGATION SUMMARY	Attachment 049-4 NA Issue Date: May 2001 Revision 12: April 2013

[illegible]

	Health, Safety and Environment INCIDENT INVESTIGATION REPORT	Attachment 049-5 NA Issue Date: May 2001 Revision 12: April 2013

Investigation Title

Incident Location

Date Prepared

Investigation Participants:

{Name, Title}

{Name, Title}

{Name, Title}

{Name, Title}

Report Prepared by:

Name

Signature

Date

This report is for internal use only.

Company Proprietary

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5.0 ROOT CAUSES	#
6.0 RECOMMENDED CORRECTIVE ACTIONS.....	#
7.0 ATTACHMENTS.....	#

	Health, Safety and Environment INCIDENT INVESTIGATION REPORT	Attachment 049-5 NA Issue Date: May 2001 Revision 12: April 2013

1.0 Executive Summary

Describe in two or three paragraphs what happened, root causes, and corrective actions.

2.0 Description of Event

Describe in detail what happened, sequence of events, and the extent of injuries or damage. Describe the findings related to Physical, System and Human/Behavior causes. Note times of events, the names of personnel involved, injured or as witnesses.

Reference picture(s) as (see **Figure 1**)

{Insert Image
Here}

Figure 1, Brief Description

3.0 Immediate Actions Taken

Describe the events immediately following the incident. Note responder first aid actions, emergency transport, hospital information, and resolution.

4.0 Contributing Causes

Describe completely each Physical, System and Human/Behavior cause.

5.0 Root Causes

Describe completely the root cause(s).

6.0 Recommended Corrective Actions

Describe the corrective action, responsible party and due date for completion. Use the following format.

CORRECTIVE ACTIONS		
Corrective Action	Responsible Party	Due Date

7.0 Attachments

Witness statements, figures, documents, pictures, etc.

Safety Lessons Learned



Attachment 049-6 NA
Issue Date: May 2001
Revision 12: April 2013

Title of Lesson Learned – Tahoma 20pt

Incident Summary

The Lessons Learned shall contain only basic facts; will be without reference to a site, location, or employee; and will be developed solely for the purpose of conveying lessons learned to prevent a similar incident, illness, or injury.

Use this column to describe the incident. Include photos within the column.

Heading text is Arial 12pt, bold, 3 pt after. Column text is Arial 10pt, paragraph 0pt before, 3pt after, line spacing 1.0, justified. Cell has default 0.19cm margins left and right. There is a central column to provide a gap between the left hand summary text and the right hand findings text.

You can fill this column with as much text as you wish, but the whole page, including the date at right below must still fit on one page.

The page is now laid out as a table, not as columns so the text in this column will now not flow into the adjacent column.

Insert photo if room is available. Do not include pictures that could identify the employee(s) involved.

Attempt to limit the document to one page when possible.

What Went Wrong?

- Use this section of this column to describe what went wrong.
- Text is Arial 10pt, paragraph 0pt before, 3pt after, line spacing 1.0, justified. Cell has default 0.19cm margins left and right.
- Keep the bulleting.

What Went Right?

- Use this section of this column to describe what went right.
- Text is Arial 10pt, paragraph 0pt before, 3pt after, line spacing 1.0, justified.
- Keep the bulleting.

Lessons Learned

- Use this section of this column to describe lessons learned.
- Text is Arial 10pt, paragraph 0pt before, 3pt after, line spacing 1.0, justified.
- Keep the bulleting.

If the text does not fill the column, you should insert additional line spaces before What Went Right and before Lessons Learned.

Do not allow the text to overwrite the date.

Insert Month Year

	Health, Safety and Environment DEFINITIONS	SMS 049NA Supplemental Information A Issue Date: February 2009 Revision 3: April 2013

Contributing Cause: A cause that contributed to an occurrence but, by itself, would not have caused the occurrence.

Days-Away Case (DAC): Injuries that result in time lost from the job in excess of the day of the injury.

Fatality: Injuries or illnesses that result in death.

First Aid: Cases that require minor treatment administered on the job site. First Aid cases include treatments and subsequent observation of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care even though a physician, or registered professional personnel, may provide the care. Repeated use of non-prescription medication at non-prescription dosage, other than antiseptic, is a first aid case.

Incident Rate: The injury frequency expressed in terms of the number of incidence per 100 employees worked in a given year (200,000 hours). The incident rate is calculated for lost time, medical, total Occupational Safety and Health Administration (OSHA) recordable injuries, and total lost workdays.

Medical Injury: Injuries, which require treatment beyond first aid and are not, lost time or restricted duty injuries. Medical injuries include (but are not limited to) stitches, fractures, loss of consciousness, surgery, prescription medicines, etc. Medical injuries are OSHA recordable.

Mine Accident, Injury and Illness Reporting: Reporting for projects covered by MSHA and 30 CFR shall follow reporting procedures specified in 30 CFR 50.20 using Form 7000-1. This form has four sections and definitions for data required are included in Part 50 of the regulation.

OSHA Recordable: Those injuries and illnesses that are required to be recorded on the OSHA 300 Log. These injuries include lost time injuries, restricted duty injuries, medical injuries, and all occupational illnesses as defined by 29 CFR 1904 Subpart C and entered on the OSHA 300 Log plus all work related non-first aid occupational illnesses or work related illnesses as listed in 29 CFR 1904, Appendix B regardless of treatment.

Recordable Injury/Illness: Those injury or illnesses that are work-related and results in one or more of the following:

1. Death.
2. Days away from work.
3. Restricted work or transfer to another job.

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4. Medical treatment beyond first aid.
5. Loss of consciousness.
6. A significant injury or illness diagnosed by a physician or other licensed health care professional.

Restricted Work Injury: Injuries that result in the individual being assigned to transitional duty and/or temporary job assignment.

Root Cause: The cause that, if corrected, would prevent recurrence of this and similar occurrences. The root cause does not apply to this occurrence only, but has generic implications to a broad group of possible occurrences, and it is the most fundamental aspect of the cause that can logically be identified and corrected.

Critical Injury (Canada):

Per the Ontario Occupational Health and Safety Act, R.R.O. 1990, Regulation 834, a Critical Injury is defined as an injury of a serious nature that:

- a. Places life in jeopardy;
- b. Produces unconsciousness;
- c. Results in substantial loss of blood;
- d. Involves the fracture of a leg or arm but not a finger or toe;
- e. Involves the amputation of a leg, arm, hand or foot, but not a finger or toe;
- f. Consists of burns to a major portion of the body; or
- g. Causes the loss of sight in an eye.

Per the British Columbia Workers Compensation Act, RSBC 1996, Chapter 492, a Critical Injury is defined as injury of a serious nature that includes the following:

- a. Any incident that kills, causes risk of death, or seriously injures a worker;
- b. Any blasting accident that results in injury, or unusual event involving explosives;
- c. A diving incident that causes death, injury, or decompression sickness requiring treatment;
- d. A major leak or release of a dangerous substance;
- e. A major structural failure or collapse of a structure, equipment, construction support system or excavation; and any serious mishap.

URS SAFETY MANAGEMENT STANDARD

Health, Safety, and Environment Training

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies. These are the minimum Health, Safety, and Environment (HSE) compliance training requirements and tracking procedures. Specific geographic entities, business units, and projects may require additional training. These requirements may be dictated by federal/national, state/provincial, or local agencies or by the activities of a specific work group or project team.

2. Purpose and Scope

This standard was developed to assist employees and managers in the identification of training requirements and to define the URS procedures for tracking/documenting this training. It covers environmental, hazardous materials, and health and safety training only. The goals of this standard are to ensure regulatory compliance and to provide employees with the information/training they need to accomplish their work assignments safely; prevent injuries to themselves, coworkers, surrounding communities, and customers; and protect company and/or customer property and the environment.

3. Implementation

- A. The assigned Site/Office Manager is responsible for ensuring compliance with this standard and any additional requirements necessary because of the physical location of the facility and/or the business units in operation at that facility (e.g., laboratories).
- B. The Program/Project Manager is responsible for ensuring project or program-related compliance (e.g., compliance of project/program staff members) with this standard and any additional training necessary because of specific project/program activities.
- C. The HSE Training Coordinator (HTC) is responsible for maintaining a training calendar, filing original records/tests, issuing certificates for business-sponsored training, maintaining and issuing training materials, adding approved courses and course information to the training database, and updating the URS HSE intranet site with course information.

4. Requirements

- A. Employee training requirements are dictated by the work each employee performs (or is expected to perform) and the geographic area(s) where the

URS SAFETY MANAGEMENT STANDARD

Health, Safety, and Environment Training

employee performs these activities. In most cases, there is a regulatory driver for specific training.

- B. All new URS employees must be provided an orientation on the URS HSE Program. Details on orientation requirements are provided in SMS 025 – New Employee Health, Safety and Environment Orientation and SMS 078 – Short Service Employee.
- C. HSE Training Evaluation – Attachment 055-1 NA is a list of the most common courses that may be required, their frequency, and expected participants. This table will be updated as regulatory and company requirements change. These requirements may be necessary due to the individual's project, site, or office activities, or the location of the facility. The responses to this simple questionnaire dictate what training an individual needs in addition to the basic URS courses. Once these requirements have been identified, each employee is expected to complete the required training as soon as possible and to track his/her progress.
- D. Training requirements should be re-evaluated at least annually and more frequently if an employee's assigned duties change significantly.
- E. To ensure consistency in content and duration and in meeting regulatory and company requirements, URS training materials should be used as the basis for training whenever they are available. Trainers may always elect to supplement the base training materials for these courses with specifics for the program, project, customer, office, or geographic unit.
- F. For training requiring certification (regulatory or URS-driven), trainers must be Business, Country, Group, Regional Business Unit (RBU), or Strategic Business Unit (SBU) HSE Managers or approved by the Business, Country, Group, RBU, or SBU HSE Manager.
- G. Training is offered in a variety of formats, including classroom instruction, computer based training (CBT), and on-the-job (OTJ) training. To ensure that training is consistent and that all requirements are being met, external courses (e.g., 40-Hour HAZOPWER), including classroom instruction and CBT, should be evaluated and approved by the Business, Country, Group, RBU, or SBU HSE Manager. Local HSE staff will be able to assist in identifying qualified external vendors as necessary.
- H. URS staff is expected to be familiar with applicable training requirements. Staff members are expected to track their own progress toward meeting those requirements.

URS SAFETY MANAGEMENT STANDARD

Health, Safety, and Environment Training

- I. Supervisors and office/location managers are expected to be familiar with the training requirements of staff that report to them.
- J. A sample safety training flow chart is available in Supplemental Information A.

5. Documentation Summary

- A. Those courses so denoted in Attachment 055-1 NA or Commonly Required Training will be tracked in a training database.
- B. All training must be documented using a training Attendance Record – Attachment 055-2 NA and Course Agenda. This attendance form requires participants to acknowledge by their signature that they received the training.
- C. Minimum course agenda requirements are as follows:
 - Type of course.
 - Course date.
 - Course location.
 - Topics covered.
 - Length of time covered for each topic.
 - Course duration (start/end times).
 - Instructor(s) name.
- D. For training provided by customers/vendors, training documentation must include the following:
 - Copy of the attendee's course certificate.
 - Course agenda.

In some cases, objective evidence of comprehension is required. This information must be tracked in addition to the course certificate and agenda.

- E. Group, RBU, and SBU HSE Managers will ensure that the course agenda meets regulatory/company requirements. Attendance records will be entered into the HSE training database.

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- F. For corporately tracked courses, original attendance sheets, agendas, course evaluations, and any completed tests will be sent to the HTC. These should be filed by course then by date for easy access/auditing.
- G. Locations/projects/programs will maintain records on any project, program, or location- or site-specific training requirements such as fire extinguisher training, project health and safety plan training, and chemical hygiene program (laboratory safety) training. HSE Representatives will also maintain copies of attendance records for courses being tracked corporately.
- H. For courses requiring Business certification, the Vice President of HSE (or designee) or customer/vendor will issue certificates. A copy of the certificate must be provided to the HTC, along with course content information and sign-in sheets (see Item 5.D). For Federal Services employees, a copy of the certificate is to be provided to the appropriate Human Resources Manager for inclusion into the personnel record (Human Resources Management System or HRMS).

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA), [Training Requirements in OSHA Standards and Training Guidelines](#)
- B. [SMS 025](#) – New Employee Health, Safety and Environment Orientation
- C. [SMS 078](#) – Short Service Employee
- D. [Attachment 055-1 NA](#) – HSE Training Evaluation
- E. [Attachment 055-2 NA](#) – Attendance Record



Health, Safety and Environment
HSE TRAINING EVALUATION

Attachment 055-1 NA

Issue Date: November 2000
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Name _____ Location _____ Date _____

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required ☒	Comments
Asbestos Inspector	Y	Annual	You perform asbestos sampling tasks.	☐	
Asbestos Planner	Y	Annual	You serve as the project asbestos planner.	☐	
Automated External Defibrillator (AED)	Y	As established by the training provider	You are designated to be an AED user in a URS office or project site.	☐	
Behavior Based Safety	N	Annual	Required for all Infrastructure & Environment employees.	☐	Concepts of behavior based safety, including the observation process (how to do one, who does one, the purpose). Available online through the URS Learning Management System (LMS).
Bloodborne Pathogens	Y	Annual	Required for employees designated as a first aid responder or others who have a potential bloodborne pathogen exposure.	☐	
Cardiac Pulmonary Resuscitation (CPR)	Y	As established by the training provider	Required for 1) employees who are designated as first aid responders, 2) employees who are performing high hazard activities (e.g., potential for falls, suffocation, electrocution, amputation) and medical attention is more than 4 minutes away, or 3) required by client contract.	☐	Acquire training from recognized source (e.g., Red Cross, American Heart).
Confined Space Entry	Y	Once	You perform confined space entry/authorizer/attendant duties (including anyone performing non-entry rescue activities).	☐	
Confined Space Refresher	N	As needed	Recommended if you perform entry activities.	☐	
Confined Space Rescuer	Y	Once	You may have to enter a confined space to perform a rescue.	☐	
Confined Space Entry Awareness	N	As needed	You work with and around confined spaces that may require entry; however, you are not responsible for performing entry/authorizer/attendant duties.	☐	30-minute CSE Awareness module offered online through URS LMS.
Construction Safety (10-hour OSHA Outreach Training)	N	Once	Recommended if you are a Supervisor and/or Safety Officer at Construction Sites	☐	
Construction Safety (30-hour OSHA Outreach Training)	N	Once	Required if you serve as a site safety and health officer on US Army Corps of Engineers (USACE) projects, or other DoD projects which follow the provisions of EM 385-1-1 (USACE Safety and Health Requirements Manual)	☐	



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Course Title	Regulatory	Frequency	Should You Attend?	Check if Required ☒	Comments
Defensive Driving	N	Once, followed by refresher as needed	Required for all URS IE employees who drive on behalf of URS. Recommended for other staff that drive on behalf of URS.	☐	National Safety Council, Smith System or equivalent.
Emergency Preparedness Plan	Y	Once	Required for all URS employees.	☐	For office personnel, this information is covered in employee orientation. For field/site personnel, this is covered in project/site safety training.
Ergonomics	N	Once	Recommended for staff who are primarily office employees.	☐	Available online through the URS LMS.
Excavations/Trenching Awareness	Y	Once	You work at sites where excavation/trenching tasks are performed.	☐	Available online through URS LMS.
Excavations/Trenching Competent Person	Y	Once	You are or may be designated as a competent person (educational background and experience may allow for grandfathering).	☐	
Experienced Miner Training	Y	Once, followed by annual refreshers	You meet the US Mine Safety and Health Administration (MSHA) definition of an "Experienced Miner."	☐	See Surface Miner and Underground Miner training for information on annual refreshers.
Fall Prevention/Protection	Y	Once	You supervise tasks or perform tasks at heights (on roofs, scaffolding, ladders, unfinished flooring).	☐	
Field Safety Training (4 hours)	N	Biennial	Required for all Infrastructure & Environment (IE) non-craft employees performing field work who are not in the hazardous waste training program. This training is also required for any IE Project Manager that manage projects where field work is performed.	☐	Specific content will depend on the office and the employees' expected work. When offered as a combination of online modules and classroom instruction, online modules must be completed prior to the classroom portion for participants to receive credit. Both portions (online and classroom) need to be completed within the same calendar year.
Fire Extinguisher	Y	Annual	You may be expected to use fire extinguishers (fixed facilities and project sites).	☐	
First Aid	Y	As established by the training provider	Required for 1) employees who are designated as first aid responders, 2) employees who are performing high hazard activities (e.g., potential for falls, suffocation, electrocution, amputation) and medical attention is more than 4 minutes away, or 3) required by client contract.	☐	Acquire training from recognized source (e.g., Red Cross, American Heart).



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Course Title	Regulatory	Frequency	Should You Attend?	Check if Required ☒	Comments
H&S Issues for Project Managers	N	Once	Required if you manage projects involving field work.	☐	Offered as part of PM Training. Online courses available through URS LMS include Handling Specific Health and Safety Issues, Planning for Health and Safety, and Project Delivery Aspects of Health and Safety.
Hazard Communication	Y	Initially and if hazards change	Required for anyone who is potentially exposed to/works with hazardous chemicals.	☐	Training must occur before any work with hazardous chemicals. Included (as needed) in HSE Orientation. After the initial training, required updates will typically be handled as part of project-specific HSE training. Refresher training is also available online through the URS LMS.
Hazardous Materials Shipping	Y	Biennial	Required for anyone who packages, labels, transports, completes paperwork for, or offers for shipment, hazardous materials/dangerous goods.	☐	Initial training is approximately 16 hours. 30-minute Hazmat Shipping Awareness class is available online through the URS LMS.
Hazardous Waste Operations (40-hours – U.S.) (24-hours – non U.S.)	Y	Once	Anyone performing work or expected to perform at hazardous waste sites or treatment, storage, and disposal facilities.	☐	See SMS 017. Training must have a 'hands-on' component (i.e., donning/doffing PPE). Any exceptions must be approved by a Regional HSE Manager/Group HSE Director.
Hazardous Waste Operations – Refresher (8 hours)	Y	Annual	(See Hazardous Waste Operations.)	☐	When offered as a combination of online modules and classroom instruction, online modules must be completed prior to the classroom portion for participants to receive credit. Both portions (online and classroom) need to be completed within the same calendar year.
Hazardous Waste Operations – Supervisor (8 hours)	Y	Once	Required for anyone serving as the site supervisor at a hazardous waste site.	☐	When offered as a combination of online modules and classroom instruction, online modules must be completed prior to the classroom portion for participants to receive credit. Both portions (online and classroom) need to be completed within the same calendar year.



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Attachment 055-1 NA

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Course Title	Regulatory	Frequency	Should You Attend?	Check if Required ☒	Comments
Health, Safety, and Environment (HSE) Orientation	Y	Once	Required for all URS employees.	☐	Specific content will depend on the office and the employees' expected work. See SMS 025.
Hearing Conservation	Y	Annual	Employees exposed to noise at or above 85 decibels averaged over an 8-hour day.	☐	Available online through URS LMS.
HSE Representative Training	N	Once; follow-up as needed	Required for anyone assigned to the role of URS HSE Representative.	☐	URS company metrics, training programs, and technical topics to support the HSE Representative position. HSE training for non-HAZWOPER trained personnel, describing OSHA and EPA regulatory requirements.
Injury/Illness Prevention	Y	Once	You are assigned to California offices.	☐	Covered in California office HSE Orientation.
Laboratory Safety	Y	Once	You work in a fixed or mobile wet chemistry lab.	☐	Completed as part of site or project orientation.
Lead Project Designer	Y	Every 3 years	You are a lead project designer.	☐	
Lead Risk Assessor	Y	Every 3 years	You are a project lead risk assessor inspector.	☐	
Lockout/Tagout Awareness – Affected Person	Y	Once; follow-up as required by regulations	You work with and around equipment that may need to be locked out/tagged out. (You are not responsible for applying tags/locks).	☐	Available online through the URS LMS.
Lockout/Tagout – Authorized Person	Y	Once; follow-up as required by regulations	You lock out or tag out machines or equipment in order to perform servicing or maintenance on that machine or equipment.	☐	Specific to individual machines.
Marine Trash and Debris Awareness and Limitation	Y	Annual	You work on contract operations for lessees and/or operators of oil and gas operations in the Gulf of Mexico.	☐	Provided by lessee or operator.
Nuclear Density Gauge Operator	Y	Once	You <u>operate</u> nuclear density gauges.	☐	Troxler or equivalent training.
Nuclear Density Gauge Transporter	Y	Every 3 years	You <u>transport</u> nuclear density gauges.	☐	Hazardous Materials shipping.
Powered Industrial Trucks (Forklifts)	Y	Once	Your job assignments include operating a powered industrial truck (forklift).	☐	Required more frequently if assessments indicate the need.
Radiation Safety Officer	Y	Once	You are designated as a Radiation Safety Officer.	☐	
Respiratory Protection	Y	Annual	Required for any employee who may be required to wear a respirator.	☐	Initial training is approximately 1 hour. Annual refresher training is approximately 0.5 hour. Annual refresher training is available online through the URS LMS.
Self Contained Breathing Apparatus (SCBA)/Cascade Systems	Y	Once	Required for any employee required to wear SCBAs or to operate a supplied air system.	☐	Part of Project HSE training as needed.

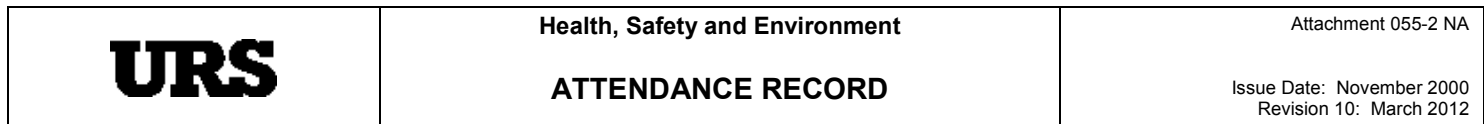


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Attachment 055-1 NA

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Course Title	Regulatory	Frequency	Should You Attend?	Check if Required ☒	Comments
Shipping Specialist	Y	Once	You are designated as a Shipping Specialist and/or are a Regional/SBU HSE Manager.	☐	Updates are required as regulations change.
Site Safety Training (4 hours)	N	Biennial	Required primarily for Federal Services employees performing tasks at fixed locations (e.g., warehouses, laboratories, vehicle maintenance, aircraft maintenance).	☐	Specific content will depend on the site and the employees' expected work.
Site Supervisor Training	N	Once	Required for all Federal Services Supervisors who are responsible for a site.	☐	
Substance Specific	Y	Once	Any employee potentially exposed to a substance covered by the 29 CFR substance specific regulations. See SMS 050.	☐	Includes lead, asbestos, benzene, etc. Offered as part of project-specific training.
Surface Miner Training – New (24 hours)	Y	Once	You perform work at surface mine sites regulated by MSHA.	☐	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.
Surface Miner Training – Annual Refresher (8 hours)	Y	Annual	You perform work at surface mine sites regulated by MSHA.	☐	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.
Underground Miner Training – New (40 hours)	Y	Once	You perform work in underground mine sites regulated by MSHA.	☐	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.
Underground Miner Training – Annual Refresher (8 hours)	Y	Annual	You perform work in underground mine sites regulated by MSHA.	☐	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.
Vehicle Safety	N	Once	Required for employees who drive on company business.	☐	Authorized Drivers are those individuals permitted to drive URS-owned, -leased, or -rented vehicles, and employees who drive a personal vehicle for work purposes and are reimbursed for mileage. See SMS 057.
Waste Awareness	Y	Annual	You generate, handle, or manage hazardous waste at a fixed facility or field project.	☐	Available online through the URS LMS.
Waste Specialist	Y	Once with Annual Refresher	You are responsible for waste management at a small or large quantity generator facility.	☐	
Welding/Brazing/Cutting	Y		You job duties include these activities.	☐	
Workplace Hazardous Materials Information System (WHMIS)	Y	Annual	You are assigned to a Canadian facility and work with or around hazardous materials.	☐	Canadian Hazard Communications.



Attachment 055-2 NA

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INSTRUCTOR SIGNATURE (required): _____

[illegible]

(Employee Number requested for training database use only, will be kept confidential.)

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This supplement defines and lists the areas within the OSHA Construction Standards where a competent person is required to be part of a particular project activity

A. Definition

A **competent person** is “one who is capable of identifying existing and predictable hazards in the surrounding or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them (Subpart C; 29 CFR 1926.32(f)).”

B. Accident Prevention

“(Accident prevention) programs shall provide for frequent and regular inspections of the job sites, materials, and equipment to be made by **competent persons** designated by the employers (Subpart C: 29 CFR 1926.20(b)(2)).”

C. Ionizing Radiation

“Any activity which involves the use of radioactive materials or X-rays, whether or not under license from the Nuclear Regulatory Commission, shall be performed by **competent persons** specially trained in the proper and safe operation of such equipment. In the case of materials used under Commission license, only persons actually licensed, or **competent persons** under direction and supervision of the licensee, shall perform such work (Subpart D; 29 CFR 1926.53(b)).”

D. Respiratory Protection

“Administrative or engineering controls must first be implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. Any equipment and technical measures used for this purpose must first be approved for each particular use by a **competent** industrial hygienist or other technically qualified person (Subpart D; 29 CFR 1926.55(b)).”

E. Lead

“The compliance program shall provide for frequent and regular inspections of job sites, materials, and equipment to be made by a **competent person** (Subpart D; 29 CFR 1926.62(e)(2)(iii)).”

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F. Hearing Protection

“Ear protective devices inserted in the ear shall be fitted or determined individually by **competent persons** (Subpart E; 29 CFR 1926.101(b)).”

G. Material Handling

“Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a **competent person** designated by the employer (Subpart H; 29 CFR 1926.251(a)(6)).”

H. Welding, Cutting, and Heating

“Before welding, cutting, or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a **competent person** to determine its flammability (Subpart J; 29 CFR 1926.354(a)).”

I. Assured Equipment Grounding Conductor Program

“The employer shall designate one or more **competent persons** to implement the program (Subpart K; 29 CFR 1926.404(b)(1)(iii)(B)).”

J. Scaffolding

1. “Before the scaffold is used, direct connections shall be evaluated by a **competent person** who shall confirm, based on the evaluation, that the supporting surfaces are capable of supporting the loads to be imposed. In addition, an engineer experienced in such scaffold design shall design masons’ multi-point adjustable suspension scaffold connections (Subpart L; 29 CFR 1926.451(d)(3)(i)).” Note that this passage applies to suspension scaffolds only.
2. “The employer shall have each employee who is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold trained by a **competent person** to recognize any hazards associated with the work in question (Subpart L; 29 CFR 1926.454(b)).” Per the standard, the training should include the following topics, as applicable:
 - a. The nature of scaffold hazards;
 - b. The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold in question;

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- c. The design criteria, maximum intended load-carrying capacity and intended use of the scaffold; and
- d. Any other pertinent requirements of 1926 Subpart L.

K. Fall Protection

1. "Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a **competent person** to be undamaged and suitable for reuse (Subpart M; 29 CFR 1926.502(d)(19))."
2. Where safety monitoring systems are employed, "the employer shall designate a **competent person** to monitor the safety of other employees and the employer shall ensure that the safety monitor complies with the following requirements (Subpart M: 29 CFR 1926.502(h)(1))":
 - a. The safety monitor shall be competent to recognize fall hazards;
 - b. The safety monitor shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner;
 - c. The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored;
 - d. The safety monitor shall be close enough to communicate orally with the employee; and
 - e. The safety monitor shall not have other responsibilities which could take the monitor's attention from the monitoring function."
3. "The implementation of the fall protection plan shall be under the supervision of a **competent person** (Subpart M; 29 CFR 1926.502(k)(4))." This section specifically refers to the implementation of fall protection plans on projects where it is infeasible or it creates a greater hazard to use conventional fall protection equipment.
4. "The employer shall assure that a **competent person** qualified in the following areas has trained each employee, as necessary (Subpart M; 29 CFR 1926.503(a)(2))":

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- a. The nature of fall hazards in the work area;
- b. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
- c. The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used;
- d. The role of each employee in the safety monitoring system when this system is used;
- e. The limitations on the use of mechanical equipment during the performance of elevated work;
- f. The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection;
- g. The role of employees in fall protection plans, and
- h. The standards contained in 1926 Subpart M.

L. Cranes and Derricks

- 1. "The employer shall designate a **competent person** who shall inspect all machinery and equipment prior to each use, and during use, to make sure it is in safe operating condition. Any deficiencies shall be repaired, or defective parts replaced, before continued use (Subpart N; 29 CFR 1926.550(a)(5))."
- 2. "A thorough annual inspection of the hoisting machinery shall be made by a **competent person**, or by a government or private agency recognized by the U.S. Department of Labor. The employer shall maintain a record of the dates and results of inspections for each hoisting machine and piece of equipment (Subpart N; 29 CFR 1926.550(a)(6))."
- 3. "The personnel platform and suspension system shall be designed by a qualified engineer or a **qualified person competent** in structural design (Subpart N; 29 CFR 1926.550(g)(4)(i)(A))."
- 4. "A visual inspection of the crane or derrick, rigging, personnel platform, and the crane or derrick base support or ground shall be conducted by

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a **competent person** immediately after the trial lift to determine whether the testing has exposed any defect or produced any adverse effect upon any component or structure (Subpart N; 29 CFR 1926.550(g)(5)(iv)).”

5. “At each job site, prior to hoisting employees on the personnel platform, and after any repair or modification, the platform and rigging shall be proof tested to 125 percent of the platform’s rated capacity by holding it in a suspended position for five minutes with the test load evenly distributed on the platform (this may be done concurrently with the trial lift). After proof testing, a **competent person** shall inspect the platform and rigging. Any deficiencies found shall be corrected and another proof test shall be conducted. Personnel hoisting shall not be conducted until the proof testing requirements are satisfied (Subpart N; 29 CFR 1926.550(g)(5)(vi)).”

M. Material Hoists, Personnel Hoists and Elevators

“Following assembly and erection of hoists, and before being put in service, an inspection and test of all functions and safety devices shall be made under the supervision of a **competent person**. A similar inspection and test is required following major alteration of an existing installation. All hoists shall be inspected and tested at not more than 3-month intervals. The employer shall prepare a certification record which includes the date the inspection and test of all functions and safety devices was performed; the signature of the person who performed the inspection and test; and a serial number, or other identifier, for the hoist that was inspected and tested. The most recent certification record shall be maintained on file (Subpart N; 29 CFR 1926.552(c)(15)).”

N. Excavations

1. “Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a **competent person**. Structural ramps used for access or egress of equipment shall be designed by a **competent person** qualified in structural design, and shall be constructed in accordance with the design (Subpart P; 29 CFR 1926.651(c)(1)(i)).”
2. “If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a **competent person** to ensure proper operation (Subpart P; 29 CFR 1926.651(h)(2)).”

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3. "If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a **competent person** and compliance with paragraphs (h)(1) and (h)(2) of 1926.651 (Subpart P; 29 CFR 1926.651(h)(3))."
4. "Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a **competent person** for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the **competent person** prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated (Subpart P; 29 CFR 1926.651(k)(1))."
5. "Where the **competent person** finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety (Subpart P; 29 CFR 1926.651(k)(2))."
6. Employees shall be protected from cave-ins except where "excavations are less than 5 feet (1.52 m) in depth and examination of the ground by a **competent person** provides no indication of a potential cave-in (Subpart P; 29 CFR 1926.652(a)(1)(ii))."
7. "When material or equipment that is used for protective systems is damaged, a **competent person** shall examine the material or equipment and evaluate its suitability for continued use. If the **competent person** cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service (Subpart P; 29 CFR 1926.652(d)(3))."
8. "Each soil and rock deposit shall be classified by a **competent person** as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix (1926 Subpart P, Appendix A, (a)(2)(C)(1))."

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9. "The classification of the deposits shall be made based on the result of at least one visual and at least one manual analysis. Such analyses shall be conducted by a **competent person** using tests described in paragraph (d) of this appendix, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system (1926 Subpart P, Appendix A, (a)(2)(C)(2))."
10. "If after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a **competent person**. The deposit shall be reclassified as necessary to reflect the changed circumstances (1926 Subpart P, Appendix A, (a)(2)(C)(5))."
11. "When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a **competent person** shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved (1926 Subpart P, Appendix B, (c)(3)(iii))."

O. Lift-Slab Operations

"If leveling is maintained by manual controls, such controls shall be located in a central location and attended by a **competent person** while lifting is in progress. In addition to meeting the definition in 1926.32(f), the **competent person** must be experienced in the lifting operation and with the lifting equipment being used (Subpart Q, 29 CFR 1926.705(i))."

P. Steel Erection - Cranes

1. "Cranes being used in steel erection activities shall be visually inspected prior to each shift by a **competent person**; the inspection shall include observation for deficiencies during operation. At a minimum this inspection shall include the following (Subpart R: 29 CFR 1926.753(c)(1)(i)):
 - a. All control mechanisms for maladjustments;
 - b. Control and drive mechanism for excessive wear of components and contamination by lubricants, water or other foreign matter;
 - c. Safety devices, including but not limited to boom angle indicators, boom stops, boom kick out devices, anti-two block devices, and load moment indicators where required;

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- d. Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those which flex in normal operation;
- e. Hooks and latches for deformation, chemical damage, cracks, or wear;
- f. Wire rope reeving for compliance with hoisting equipment manufacturer's specifications;
- g. Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, or moisture accumulation;
- h. Hydraulic system for proper fluid level;
- i. Tires for proper inflation and condition;
- j. Ground conditions around the hoisting equipment for proper support, including ground settling under and around outriggers, ground water accumulation, or similar conditions;
- k. The hoisting equipment for level position; and
- l. The hoisting equipment for level position after each move and setup."

- 2. "If any deficiency is identified, an immediate determination shall be made by the **competent person** as to whether the deficiency constitutes a hazard (Subpart R; 29 CFR 1926.753(c)(1)(ii))."

Q. Steel Erection – Structural Steel Assembly

- 1. "When deemed necessary by a **competent person**, plumbing-up equipment shall be installed in conjunction with the steel erection process to ensure the stability of the structure (Subpart R; 29 CFR 1926.754(d)(1))."
- 2. "Plumbing-up equipment shall be removed only with the approval of a **competent person** (Subpart R; 29 CFR 1926.754(d)(3))."

R. Steel Erection – Column Anchorage

"All columns shall be evaluated by a **competent person** to determine whether guying or bracing is needed; if guying or bracing is needed, it shall be installed (Subpart R; 29 CFR 1926.755(a)(4))."

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S. Steel Erection – Beams and Columns

“A **competent person** shall determine if more than two bolts are necessary to ensure the stability of cantilevered members; if additional bolts are needed, they shall be installed (Subpart R; 29 CFR 1926.756(a)(2)).”

T. Underground Construction

1. “The employer shall assign a **competent person** who shall perform all air monitoring required by this section (Subpart S; 29 CFR 1926.800(j)(1)(i)(A)).”
2. “Where this paragraph requires monitoring of airborne contaminants ‘as often as necessary,’ the **competent person** shall make a reasonable determination as to which substances to monitor and how frequently to monitor (Subpart S; 29 CFR 1926.800(j)(1)(i)(B)).” The standard indicates the following factors should be considered:
 - a. Location of jobsite: Proximity to fuel tanks, sewers, gas lines, old landfills, coal deposits, and swamps;
 - b. Geology: Geological studies of the jobsite, particularly involving the soil type and its permeability;
 - c. History: Presence of air contaminants in nearby jobsites, changes in levels of substances monitored on the prior shift; and
 - d. Work practices and jobsite conditions: The use of diesel engines, use of explosives, use of fuel gas, volume and flow of ventilation, visible atmospheric conditions, decompression of the atmosphere, welding, cutting and hot work, and employees’ physical reactions to working underground.
3. “When the **competent person** determines, on the basis of air monitoring results or other information, that air contaminants may be present in sufficient quantity to be dangerous to life, the employer shall:
 - a. Prominently post a notice at all entrances to the underground jobsite to inform all entrants of hazardous condition, and
 - b. Ensure that the necessary precautions are taken (Subpart S; 29 CFR 1926.800(j)(1)(iv))”

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4. "When ventilation has been reduced to the extent that hazardous levels of methane or flammable gas may have accumulated, a **competent person** shall test all affected areas after ventilation has been restored and shall determine whether the atmosphere is within flammable limits before any power, other than for acceptable equipment, is restored or work is resumed (Subpart S; 29 CFR 1926.800(k)(7))."
5. "A **competent person** shall inspect the roof (back), face, and walls of the work area at the start of each shift and as often as necessary to determine ground stability (Subpart S; 29 CFR 1926.800(o)(3)(i)(A))."
6. "A **competent person** shall determine whether rock bolts meet the necessary torque, and shall determine the testing frequency in light of the bolt system, ground conditions and the distance from vibration sources (Subpart S; 29 CFR 1926.800(o)(3)(iv)(B))."
7. "After blasting operations in shafts, a **competent person** shall determine if the walls, ladders, timbers, blocking, or wedges have loosened. If so, necessary repairs shall be made before employees other than those assigned to make the repairs are allowed in or below the affected areas (Subpart S; 29 CFR 1926.800(o)(4)(iii))."
8. "A **competent person** shall inspect all drilling and associated equipment prior to each use. Equipment defects affecting safety shall be corrected before the equipment is used (Subpart S; 29 CFR 1926.800(q)(1))."
9. "A **competent person** shall inspect haulage equipment before each shift (Subpart S; 29 CFR 1926.800(r)(1)(i))."
10. "A **competent person** shall visually check all hoisting machinery, equipment, anchorages, and hoisting rope at the beginning of each shift and during hoist use, as necessary (Subpart S; 29 CFR 1926.800(t)(3)(xix))."
11. "Each safety device shall be checked by a **competent person** at least weekly during hoist use to ensure suitable operation and safe condition (Subpart S; 29 CFR 1926.800(t)(3)(xx))."

U. Compressed Air

1. "There shall be present, at all times, at least one **competent person** designated by and representing the employer, who shall be familiar with this Subpart in all respects, and responsible for full compliance

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with these and other applicable subparts (Subpart S; 29 CFR 1926.803(a)(1)).”

2. “At all times there shall be a thoroughly experienced, **competent**, and reliable **person** on duty at the air control valves as a gauge tender who shall regulate the pressure in the working areas. During tunneling operations, one gauge tender may regulate the pressure in not more than two headings provided that the gauge and controls are all in one location. In caisson work, there shall be a gauge tender for each caisson (Subpart S; 29 CFR 1926.803(h)(1)).”

V. Demolition – Preparatory Operations

“Prior to permitting employees to start demolition operations, an engineering survey shall be made, by a **competent person**, of the structure to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. The employer shall have in writing evidence that such a survey has been performed (Subpart T; 29 CFR 1926.850(a)).”

W. Mechanical Demolition

“During demolition, continuing inspections by a **competent person** shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, or walls, or loosened material. No employee shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means (Subpart T; 29 CFR 1926.859(g)).”

X. Blasting and the Use of Explosives

1. Precautions taken to prevent the accidental discharge of electric blasting caps shall include “the prominent display of adequate signs, warning against the use of mobile radio transmitters, on all roads within 1,000 feet of blasting operations. Whenever adherence to the 1,000-foot distance would create an operational handicap, a **competent person** shall be consulted to evaluate the particular situation, and alternative provisions may be made which are adequately designed to prevent any premature firing of electric blasting caps. A description of any such alternatives shall be reduced to writing and shall be certified as meeting the purposes of this subdivision by the **competent person** consulted. The description shall be maintained at the construction site during the duration of the work, and shall be available for inspection by representatives of the Secretary Labor (Subpart U; 29 CFR 1926.900(k)(3)(i)).”

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2. “The blaster shall be knowledgeable and **competent** in the use of each type of blasting method used (Subpart U; 29 CFR 1926.901(e)).”

Y. Ladders

1. “Ladders shall be inspected by a **competent person** for visible defects on a periodic basis and after any occurrence that could affect their safe use (Subpart X; 29 CFR 1926.1053(b)).”
2. “The employer shall ensure that each employee has been trained by a **competent person** in the following areas, as applicable:
 - a. The nature of fall hazards in the work area;
 - b. The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used;
 - c. The proper construction, use, placement, and care in handling of all stairways and ladders;
 - d. The maximum intended load-carrying capacities of ladders used; and
 - e. The standards contained in this subpart (Subpart X; 29 CFR 1926.1060(a)(1)).”

Z. Toxic Substances – Asbestos

1. “**Competent person** means, in addition to the definition in 29 CFR 1926.32 (f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f): in addition, for Class I and Class II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor, or its equivalent and, for Class III and Class IV work, who is trained in a manner consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92 (a)(2).” (Subpart Z; 29 CFR 1926.1101(b))
2. “The **competent** person shall examine worksuits worn by employees at least once per workshift for rips or tears that may occur during performance of work (Subpart Z; 29 CFR 1926.1101(i)(4)(i)).”

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3. "On all construction worksites covered by this standard, the employer shall designate a **competent person**, having the qualifications and authorities for ensuring worker safety and health required by Subpart C, General Safety and Health Provisions for Construction (Subpart Z; 29 CFR 1926.1101(o)(1))."
4. "The **competent person** shall make frequent and regular inspections of the job sites, in order to perform the duties set out below in paragraph (o)(3)(i) and (ii) of this section. For Class I jobs, on-site inspections shall be made at least once during each work shift, and at any time at employee request. For Class II, III, and IV jobs, on-site inspections shall be made at intervals sufficient to assess whether conditions have changed, and at any reasonable time at employee request (Subpart Z; 29 CFR 1926.1101(o)(3))."
5. "On all worksites where employees are engaged in Class I or II asbestos work, the **competent person** shall perform or supervise the following duties, as applicable:
 - a. Set up the regulated area, enclosure, or other containment;
 - b. Ensure (by on-site inspection) the integrity of the enclosure;
 - c. Set up procedures to control entry to and exit from the enclosure and/or area;
 - d. Supervise all employee exposure monitoring required by this section and ensure that it is conducted as required by paragraph (f) of this section;
 - e. Ensure that employees working within the enclosure and/or using glove bags wear respirators and protective clothing as required by paragraphs (h) and (i) of this section;
 - f. Ensure through on-site supervision, that employees set up, use, and remove engineering controls, use work practices and personal protective equipment in compliance with all requirements;
 - g. Ensure that employees use the hygiene facilities and observe the decontamination procedures specified in paragraph (j) of this section;

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- h. Ensure that through on-site inspection, engineering controls are functioning properly and employees are using proper work practices; and,
 - i. Ensure that notification requirement in paragraph (k) of this section are met (Subpart Z; 29 CFR 1926.1101(o)(3)(i)).”
6. “For Class I and II asbestos work the **competent person** shall be trained in all aspects of asbestos removal and handling, including: abatement, installation, removal and handling; the contents of this standard; the identification of asbestos; removal procedures, where appropriate; and other practices for reducing the hazard. Such training shall be obtained in a comprehensive course for supervisors that meets the criteria of EPA’s Model Accreditation Plan (40 CFR part 763, subpart E, Appendix C), such as a course conducted by an EPA-approved or state-approved training provider, certified by EPA or a state, or a course equivalent in stringency, content, and length (Subpart Z; 29 CFR 1926.1101(o)(4)(i)).”
7. “For Class III and IV asbestos work, the **competent person** shall be trained in aspects of asbestos handling appropriate for the nature of the work, to include procedures for setting up glove bags and mini-enclosures, practices for reducing asbestos exposures, use of wet methods, the contents of this standard, and the identification of asbestos. Such training shall include successful completion of a course that is consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2), or its equivalent in stringency, content and length (Subpart Z; 29 CFR 1926.1101(o)(4)(ii)).”

AA. Toxic Substances – Cadmium

1. “**Competent person**, in accordance with 29 CFR 1926.32 (f), means a person designated by the employer to act on the employer’s behalf who is capable of identifying existing and potential cadmium hazards in the workplace and the proper methods to control them in order to protect workers, and has the authority necessary to take prompt corrective measures to eliminate or control such hazards. The duties of a **competent person** include at least the following: Determining prior to the performance of work whether cadmium is present in the workplace; establishing, where necessary, regulated areas and assuring that access to and from those areas is limited to authorized employees; assuring the adequacy of any employee exposure monitoring required by this standard; assuring that all employees exposed to air cadmium levels above the PEL wear appropriate

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personal protective equipment and are trained in the use of appropriate methods of exposure control; assuring that proper hygiene facilities are provided and that workers are trained to use those facilities; and assuring that the engineering controls required by this standard are implemented, maintained in proper operating condition, and functioning properly (Subpart Z; 29 CFR 1926.1127(b)).”

2. “Prior to the performance of any construction work where employees may be potentially exposed to cadmium, the employer shall establish the applicability of this standard by determining whether cadmium is present in the workplace and whether there is the possibility that employee exposures will be at or above the action level. The employer shall designate a **competent person** who shall make this determination. Investigation and material testing techniques shall be used, as appropriate, in the determination. Investigation shall include a review of relevant plans, past reports, material safety data sheets, and other available records, and consultations with the property owner and discussions with appropriate individuals and agencies (Subpart Z; 29 CFR 1926.1127(d)(1)(i)).”
3. “Where cadmium has been determined to be present in the workplace, and it has been determined that there is a possibility the employee’s exposure will be at or above the action level, the **competent person** shall identify employees potentially exposed to cadmium at or above the action level (Subpart Z; 29 CFR 1926.1127(d)(1)(ii)).”
4. “The employer also shall institute the exposure monitoring required under paragraphs (d) (2) (i) and (d) (3) of 29 CFR 1926.1127 whenever there has been a change in the raw materials, equipment, personnel, work practices, or finished products that may result in additional employees being exposed to cadmium at or above the action level or in employees already exposed to cadmium at or above the action level being exposed above the PEL, or whenever the employer or **competent person** has any reason to suspect that any other change might result in such further exposure (Subpart Z; 29 CFR 1926.1127(d)(4)).”
5. “A **competent person** shall review the comprehensive compliance program initially and after each change (Subpart Z; 29 CFR 1926.1127(f)(5)(iii)).”

BB. Toxic Substances – 1,2-Dibromo-3-Chloropropane

“Since many of the duties relating to employee protection are dependent on the results of monitoring and measuring procedures, employers should

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assure that the evaluation of employee exposures is performed by a **competent** industrial hygienist or other technically qualified **person** (Subpart Z; 29 CFR 1926.1144; makes direct reference to 29 CFR 1910.1044, Appendix B, IV.B).”

CC. Toxic Substances – Acrylonitrile

“Since many of the duties relating to employee exposure are dependent on the results of monitoring and measuring procedures, employers shall assure that the evaluation of employee exposures is performed by a **competent** industrial hygienist or other technically qualified **person** (Subpart Z; 29 CFR 1926.1145; makes direct reference to 29 CFR 1910.1045, Appendix B, IV.B).”

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This supplement defines and lists the areas within the OSHA General Industry Standards where a competent person is required to be part of a particular project activity

A. Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms

1. “**Competent person** means a person who, because of training and experience, is capable of identifying hazardous or dangerous conditions in powered platform installations and of training employees to identify such conditions (Subpart F; 29 CFR 1910.66(d)).”
2. “Related building supporting structures shall undergo periodic inspection by a **competent person** at intervals not exceeding 12 months (Subpart F; 29 CFR 1910.66(g)(2)(i)).”
3. “All parts of the equipment including control systems shall be inspected, and, where necessary, tested by a **competent person** at intervals specified by the manufacturer/supplier, but not to exceed 12 months, to determine that they are in safe operating condition. Parts subject to wear, such as wire ropes, bearings, gears, and governors shall be inspected and/or tested to determine that they have not worn to such an extent as to affect the safe operation of the installation (Subpart F; 29 CFR 1910.66(g)(2)(ii)).”
4. “A maintenance inspection and, where necessary, a test shall be made of each platform installation every 30 days, or where the work cycle is less than 30 days such inspection and/or test shall be made prior to each work cycle. This inspection and test shall follow procedures recommended by the manufacturer, and shall be made by a **competent person** (Subpart F; 29 CFR 1910.66(g)(3)(i)).”
5. “Inspection of governors and secondary brakes shall be performed by a **competent person** (Subpart F; 29 CFR 1910.66(g)(4(v))).”
6. “Suspension wire rope shall be inspected by a **competent person** for visible defects and gross damage to the rope before every use and after each occurrence which might affect the wire rope's integrity (Subpart F; 29 CFR 1910.66(g)(5)(ii)).”
7. “A thorough inspection of suspension wire ropes in service shall be made once a month. Suspension wire ropes that have been inactive for 30 days or longer shall have a thorough inspection before they are placed into service. These thorough inspections of suspension wire

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ropes shall be performed by a **competent person** (Subpart F; 29 CFR 1910.66(g)(5)(iii)).”

8. “Any other condition which the **competent person** determines has significantly affected the integrity of the rope (Subpart F; 29 CFR 1910.66(g)(5)(iv)(J)).”
9. “Training of employees in the operation and inspection of working platforms shall be done by a **competent person** (Subpart F; 29 CFR 1910.66(i)(1)(iii)).”
10. “**“Competent person”** means a person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as in their application and use with related equipment (Subpart F; 29 CFR 1910.66 App. C, (I)(b)).”
11. “Personal fall arrest systems or components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection unless inspected and determined by a **competent person** to be undamaged and suitable for reuse (Subpart F; 29 CFR 1910.66 App. C, (I)(e)(7)).”
12. “**“Comment compatibility considerations.”** Ideally, a personal fall arrest system is designed, tested, and supplied as a complete system. However, it is common practice for lanyards, connectors, lifelines, deceleration devices, body belts and body harnesses to be interchanged since some components wear out before others. The employer and employee should realize that not all components are interchangeable. For instance, a lanyard should not be connected between a body belt (or harness) and a deceleration device of the self-retracting type since this can result in additional free fall for which the system was not designed. Any substitution or change to a personal fall arrest system should be fully evaluated or tested by a **competent person** to determine that it meets the standard, before the modified system is put in use (Subpart F; 29 CFR 1910.66 App. C, (III)(c)).”

B. Explosives and Blasting Agents

1. “Magazines shall be in the charge of a **competent person** at all times and who shall be held responsible for the enforcement of all safety precautions (Subpart H; 29 CFR 1910.109(c)(5)(viii)).”
2. “Explosives recovered from blasting misfires shall be placed in a separate magazine until **competent personnel** have determined from the manufacturer the method of disposal.

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Caps recovered from blasting misfires shall not be reused. Such explosives and caps shall then be disposed of in the manner recommended by the manufacturer (Subpart H; 29 CFR 1910.109(c)(5)(ix)).”

3. “Extinguishers shall be filled and ready for immediate use and located near the driver’s seat. Extinguishers shall be examined periodically by a **competent person** (Subpart H; 29 CFR 1910.109(d)(2)(iii)(b)).”
4. “The distances in the table apply to ammonium nitrate that passes the insensitivity test prescribed in the definition of ammonium nitrate fertilizer promulgated by the National Plant Food Institute; and ammonium nitrate failing to pass said test shall be stored at separation distances determined by **competent persons** (Subpart H, 29 CFR 1910.109, Table H-22, Footnote (3)).”
5. “Every warehouse used for the storage of blasting agents shall be under the supervision of a **competent person** (Subpart H, 29 CFR 1910.109(g)(5)(vii)).”

C. Helicopters

“Cargo hooks. All electrically operated cargo hooks shall have the electrical activating device so designed and installed as to prevent inadvertent operation. In addition, these cargo hooks shall be equipped with an emergency mechanical control for releasing the load. The employer shall ensure that the hooks are tested prior to each day’s operation by a **competent person** to determine that the release functions properly, both electrically and mechanically (Subpart N, 29 CFR 1910.183(d)).”

D. Slings

1. “**Inspections.** Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a **competent person** designated by the employer. Additional inspections shall be performed during sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service (Subpart N, 29 CFR 1910.184(d)).”
2. “The thorough inspection of alloy steel chain slings shall be performed by a **competent person** designated by the

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employer, and shall include a thorough inspection for wear, defective welds, deformation and increase in length. Where such defects or deterioration are present, the sling shall be immediately removed from service (Subpart N, 29 CFR 1910.184(e)(3)(iii)).”

E. Telecommunications

1. “**Support structures.** No employee, or any material or equipment, may be supported or permitted to be supported on any portion of a pole structure, platform, ladder, walkway or other elevated structure or aerial device unless the employer ensures that the support structure is first inspected by a **competent person** and it is determined to be adequately strong, in good working condition and properly secured in place (Subpart R, 29 CFR 1910.268(b)(6)).”
2. “**Tools and personal protective equipment -- Generally.** Personal protective equipment, protective devices and special tools needed for the work of employees shall be provided and the employer shall ensure that they are used by employees. Before each day's use the employer shall ensure that these personal protective devices, tools, and equipment are carefully inspected by a **competent person** to ascertain that they are in good condition (Subpart R, 29 CFR 1910.268(e)).”
3. “**General.** Safety belts and straps shall be provided and the employer shall ensure their use when work is performed at positions more than 4 feet above ground, on poles, and on towers, except as provided in paragraphs (n)(7) and (n)(8) of this section. No safety belts, safety straps or lanyards acquired after July 1, 1975 may be used unless they meet the tests set forth in paragraph (g)(2) of this section. The employer shall ensure that all safety belts and straps are inspected by a **competent person** prior to each day's use to determine that they are in safe working condition (Subpart R, 29 CFR 1910.268(g)(1)).”
4. “The employer shall ensure that pole climbers are inspected by a **competent person** for the following conditions: Fractured or cracked gaffs or leg irons, loose or dull gaffs, broken straps or buckles. If any of these conditions exist, the defect shall be corrected before the climbers are used (Subpart R, 29 CFR 1910.268(g)(3)(ii)).”

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5. "The employer shall ensure that no employee nor any material or equipment may be supported or permitted to be supported on any portion of a ladder unless it is first determined, by inspections and checks conducted by a **competent person** that such ladder is adequately strong, in good condition, and properly secured in place, as required in Subpart D of this part and as required in this section (Subpart R, 29 CFR 1910.268(h)(1))."
6. "The employer shall ensure that visual inspections are made of the equipment by a **competent person** each day the equipment is to be used to ascertain that it is in good condition (Subpart R, 29 CFR 1910.268(j)(1)(i))."
7. "The employer shall ensure that tests shall be made at the beginning of each shift by a **competent person** to insure the vehicle brakes and operating systems are in proper working condition (Subpart R, 29 CFR 1910.268(j)(1)(ii))."
8. "The employer shall ensure that the derrick and its associated equipment are inspected by a **competent person** at intervals set by the manufacturer but in no case less than once per year. Records shall be maintained including the dates of inspections, and necessary repairs made, if corrective action was required (Subpart R, 29 CFR 1910.268(j)(4)(iv)(F))."

URS SAFETY MANAGEMENT STANDARD

Vehicle Safety Program

1. Applicability

This standard applies to the operations of Infrastructure & Environment business of URS Corporation and its subsidiary companies.

This standard applies to employees who operate motor vehicles that are owned, rented, or leased by URS and to employees who use personal, client or government-supplied vehicles while conducting URS business. This safety management standard (SMS) does not apply to heavy equipment operations (see SMS 019 – Heavy Equipment Operations).

2. Purpose and Scope

This standard defines the policies that help URS minimize losses, injuries, and legal liabilities associated with improper vehicle use. This policy also provides information for required training and makes all applicable employees aware of their respective duties and obligations when driving on URS business.

The standard applies to operations worldwide. For countries outside the United States, some terminology may need to be read in the context of local or national regulations.

3. Implementation

The overall responsibility for this standard implementation is with the URS Office Manager. Additional responsibilities are as follows:

Fleet Management	Participation in the Vehicle Safety Program, vehicle acquisition, insurance claims reporting, controlling access to vehicles, fueling and maintenance of vehicles, and participation in the incident review processes.
Human Resources	Documentation of driver's license upon hire, and participation in the incident review processes when necessary and any related performance management issues.
Health and Safety	Employee safety training, maintenance of the Vehicle Safety Program, and participation in the incident review processes.
Employee	Familiarization with URS Vehicle Safety Program and compliance with its requirements.

URS SAFETY MANAGEMENT STANDARD

Vehicle Safety Program

4. Requirements

A. Authorized Drivers

1. Authorized Drivers are those individuals permitted to drive URS-owned, -rented, or -leased vehicles, client vehicles, and employees driving a personal vehicle for work purposes.
2. The Authorized Driver must be at least 18 years of age (noncommercial license) or 21 years of age (commercial license) and have a current driver's license for the appropriate class of vehicle (unless more stringent requirements are established by the leasing/renting agency). Employees with conditional licenses are prohibited from operating vehicles on URS business.
3. Human Resources/Administration will conduct an authorized background check, which includes a driving record, and will obtain a copy of the state-issued driver's license for all Authorized Drivers during the new hire process. The employee will not be permitted to be an Authorized Driver if the background check indicates legal action involving alcohol or drug use (e.g. driving under the influence [DUI]), a driving without a license violation, or a hit-and-run/leaving the scene of an accident within the past two years.

URS employees that are Authorized Drivers will produce their driver's license upon request at any time. Authorized drivers who lose their driver's license through legal action or are otherwise unauthorized to drive *must* notify their Human Resources Representative immediately. The Human Resources Representative will notify the Fleet Manager, Office Manager, and Health, Safety and Environment (HSE) Representative of this employee's loss of authorization to drive for URS.

4. Authorized drivers must:
 - a. Review SMS 057 – Vehicle Safety Program.
 - b. Report any conviction for driving under the influence of drugs or alcohol to the Human Resources Representative responsible for the employee's office or operation.
 - c. Complete vehicle safety training, including the URS online training module and other sanctioned driving courses described in Section 4.B, Training.

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Vehicle Safety Program

- d. Report all incidents in accordance with Section 4.E, Notifications.
 - e. Cooperate with any URS investigation concerning the incident.
 - f. Complete remedial driver safety training described in Section 4.B.3 as appropriate following an incident.
5. Non-URS employees (e.g., subcontractors, alliance partners) may operate URS-owned, -leased, or -rented vehicles or client vehicles only when this activity is specifically agreed to in the applicable contract and only within the parameters of the contract and project plans.
6. For URS operations or offices that plan vehicle use that requires compliance with Federal Motor Carrier Regulations, the affected manager directing operations at the facility or site must obtain approvals from the Vice President/Director HSE and the Fleet Manager. This requirement typically applies to vehicles with a gross vehicle weight over 10,000 pounds, vehicles carrying more than 15 passengers, or vehicles used for hazardous materials transport. The driver must have an appropriate commercial driver's license and may be subject to specific training and medical surveillance (see SMS 024 – Medical Screening and Surveillance).
7. Only Authorized Drivers can be reimbursed mileage for the use of their personal vehicle on URS business. Requests for reimbursements for mileage by nondesignated drivers may be denied.

B. Training

- 1. Within 1 month of their hire date, Authorized Drivers will complete basic driver safety training, including a review of the URS Vehicle Safety Program (SMS 057) and the 30-minute online Learning Management System (LMS) Vehicle Safety training module.
- 2. Authorized Drivers will complete the 4-hour web-based defensive driving training program provided through the National Safety Council (NSC). Other defensive driving training programs that are equivalent or exceed the NSC training (e.g., the Smith Driving System) may be substituted by approval of the Regional HSE

URS SAFETY MANAGEMENT STANDARD

Vehicle Safety Program

Manager. *All URS Authorized Drivers shall complete this web-based defensive driver training or equivalent.*

3. Additional training is required for employees who have been involved in multiple work-related, at-fault vehicle incidents where \$2,000 in damages was sustained. This additional training will be determined by concurrent agreement from the URS Operating Unit Manager, the URS Fleet Manager, and the Vice President/Director HSE and may be in the form of a behind-the-wheel training equivalent to the Smith Driving System.
- C. General Operating Policy and Procedure (Applies to Authorized Drivers and Passengers Operating Motor Vehicles on Official URS Business)
1. Only properly licensed employees who are specifically authorized to drive URS vehicles may operate motor vehicles owned, rented, or leased by URS.
 2. **The use of cellular phones/devices, including cellular phones with hands-free devices, while driving is prohibited.** If you need to make a call on a cellular phone, pull over and park in a safe area. This prohibition includes text messaging and other wireless devices (e.g., Blackberries, iPhones).
 3. Authorized drivers required to operate vehicles with special hazards (i.e., trucks carrying fuel cells, vehicles used to tow trailers, vehicles with limited visibility, etc.) will be thoroughly briefed on the hazards and control measures necessary for safe operation of the vehicle. The local URS operation will maintain documentation of the briefing.
 4. Drivers/operators will know and obey all federal, state, and local motor vehicle laws applicable to the operation of their vehicle.
 5. A driver will not permit unauthorized persons to operate a vehicle owned, rented, or leased by URS.
 6. URS policy regarding reimbursement and insurance coverage requirements for use of personal automobiles may be found in the Policies and Procedures Manual (Section 074.020). Only Authorized Drivers may be reimbursed mileage for the use of a personal vehicle.

URS SAFETY MANAGEMENT STANDARD
Vehicle Safety Program

7. Personal vehicles driven by Authorized Drivers for business use must satisfy the state's registration and inspection requirements and may not be modified beyond manufacturer's specifications.
8. All cargo extending 4 feet or more beyond the end of a truck, trailer, or similar vehicle will be clearly marked with a red warning flag or cloth measuring no less than 16 inches square. Red lights must be used at night.
9. URS-owned, -rented, or -leased vehicles are for official business use only and are not to be used for personal activities. Exceptions to this requirement can be made only with the specific approval of a Business Manager, Senior Vice President, or the URS Fleet Manager.
10. Seat belts and shoulder harnesses (occupant restraint systems) will be worn or used whenever the vehicle is in operation. The vehicle may not move until all passengers have fastened their restraints. Vehicles are not to be operated or used by URS employees if seatbelts are not included as part of the vehicle's safety equipment.
11. When parking or leaving a vehicle, the following procedures must be followed: Shut off the engine, engage the transmission in park (automatic transmission) or first gear (standard transmission), set the parking brake, remove the ignition keys, and lock the vehicle.
12. The vehicle's engine is to be turned off during refueling. Smoking or cellular phone use is not allowed while refueling.
13. Drivers/operators will not drive or operate vehicles while under the influence of alcohol or illegal drugs. Additional details on the URS Substance Abuse Policy are available in the Policies and Procedures Manual (Section 034.030).
14. Drivers/operators will not drive or operate vehicles while under the influence of medications when told by a physician, another healthcare provider, or the manufacturer (i.e., instructions on the label) that the activity is unsafe.
15. Vehicle operators are responsible for any fines levied by law enforcement agencies for the operation of their vehicles.
16. Driver/operators may not deactivate or muffle any backup warning device.

URS SAFETY MANAGEMENT STANDARD
Vehicle Safety Program

17. Distractions while driving are a major cause of incidents. Distractions include the use of cellular phones (including texting), eating, drinking, smoking, and engaging in intense conversations. URS Authorized Drivers must exercise proper control of the vehicle at all times, including the management of possibly distracting actions and behaviors. If you have to eat, pull over and park. If you become engaged in an intense conversation to the point of distraction, pull over and park or end the conversation.
18. Fatigue is the result of physical or mental exertion that impairs performance. Driver fatigue may be due to lack of adequate sleep, extended work hours, strenuous work or non-work activities, or a combination of other factors. When drivers recognize the signals of drowsiness (e.g., frequent yawning, heavy eyes, or blurred vision) they will pull over in a safe location and rest. Refer to SMS 060 – Fatigue Management for additional information.
19. The use of motorcycles on URS business is prohibited.
20. The use of all-terrain vehicles is prohibited without the approval of a Division, Regional, or Business Unit HSE Manager or Director. All-terrain vehicle operators will be required to have the proper qualifications, training and personal protective equipment prior to operating the vehicle.
21. When practical, drivers should travel during daylight hours and avoid driving during adverse weather conditions. Drivers should also inform colleagues of their travel itinerary including destination and anticipated departure and arrival times.
22. When practical, alternatives to road travel should be evaluated including teleconferencing/video conferencing, the use of public transportation or carpooling.

D. Field/Site Vehicle Safety

1. Define specific vehicle travel routes and parking areas at field sites. Use fencing, cones, or other markings to define roads and parking. SMS 032 – Work Zone Traffic Control provides additional information.
2. If parking on the shoulder of an active road, park as far off the road as possible.

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3. If work (e.g., surveying) is required alongside an active road, park the vehicle behind the area of work to provide a barrier against out-of-control vehicles.
4. URS will not transport DOT-placard quantities of hazardous materials. However, small quantities of hazardous materials (e.g., sample coolers) may be transported if properly packaged. Take precautions to prevent chemical contamination of the vehicle. Further details on DOT shipping may be found in SMS 048 – Hazardous Materials/Dangerous Goods Shipping.
5. Nuclear density meters (e.g., Troxler units) may be transported only by employees who have been trained in the use of nuclear density meters (see SMS 044 – Radiation Safety for Portable Gauges). Nuclear density meters must be secured from movement and locked during transport. Nuclear Regulatory Commission (NRC) and state-specific regulations regarding transport documentation also apply.
6. When performing fieldwork that requires the blocking of traffic lanes (e.g., bridge inspection), follow SMS 032, the Manual on Uniform Traffic Control Devices for Streets and Highways (American National Standards Institute D6.1), and local police requirements for barriers, cones, and flaggers.
7. No employee may ride in the bed of a pickup truck unless seating and restraints are provided for this specific use.
8. Articles (e.g., tools, equipment, stickers, and labels) placed in/on vehicles will not interfere with vision or the proper operation of the vehicle in any way. All items in the vehicle must be secured to prevent them from moving about or out of the vehicle during sudden stops or turning, potentially injuring vehicle occupants, the public or damaging equipment. Company equipment (e.g., tools) shall be removed from the vehicle when parking overnight, unless parked in a secure area.
9. Whenever practicable, backing of a vehicle should be prevented. Trucks or vehicles with obstructed rearview mirrors must observe the following procedures when backing up: Position an employee to act as a spotter at the rear of the vehicles, in the driver's line of sight, to ensure that the area behind the truck is clear. If no other employee is present, then the driver must step out of the vehicle

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and check the area behind the vehicle before backing up. As an added precaution, avoid backing up whenever possible.

10. All uncontrolled intersections (no traffic lights or traffic signs) will be treated as a four-way stop. The driver will exercise extreme caution at uncontrolled intersections.
11. URS drivers carrying more than 15 passengers will perform route planning using Journey Management Plan – Attachment 057-2 NA. A Journey Management Plan is also recommended when employees travel to a new location or unfamiliar destination. Route planning will address hazards associated along the intended route, including lack of traffic controls, speed, and hazards associated with road conditions, weather, visibility, and other threats. Route planning will be verified by the Office or Site Manager and will be reviewed by affected employees.
12. On buses and vehicles capable of carrying more than 15 passengers, no passengers may ride in a seat in the driver's row, which would otherwise impede the driver's lateral visibility.
13. Drivers must identify a reliable method of communication (e.g., cell phones) in case of an emergency and vehicles should be equipped with a roadside emergency kit when practical.

E. Incident Response and Reporting

1. In case of injury, call or have someone else call 9-1-1 immediately for emergency assistance. If you are involved in an incident and are not injured, the following requirements apply:
 - a. Protect the scene.
 - b. Do not admit liability or place any blame for the incident.
 - c. Provide only your name, address, driver's license number, and vehicle insurance information.
 - d. Complete the Auto Claim Report – Attachment 057-1 NA and obtain the following information:
 - i. Name(s), addresses, and telephone number(s) of the owner(s).
 - ii. Name(s) of the driver and any occupants of other vehicle(s).
 - iii. The owner's insurance company.

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- iv. Driver's license number.
- v. Year, make, model, and license number of the vehicle(s).
- vi. Name(s) and addresses of any witnesses.

e. DO NOT

- Make any admissions of guilt or culpability.
- Call the insurance company; the Fleet Manager's office will do this (unless the incident involves your personal vehicle).
- Give a statement to the press.
- Give a signed statement to the claims adjuster representing the other driver's insurance company.

Note: The Auto Claim Report for vehicles owned or leased by URS is located in the vehicle glove compartment. The driver must complete this form at the scene.

2. Notifications

All incidents with a URS-owned, -rented, or -leased vehicle, or client vehicle or with a personally owned vehicle used for business must be reported to the Office Manager within 24 hours of the incident or on the next business day.

Incidents involving URS-owned, -leased, client vehicles or personally owned vehicles used for company business The Auto Claim Report, Attachment 057-1 NA, must be completed and distributed as instructed on the form. In addition, incidents involving rental vehicles will be reported to the rental agency.

Additionally, for motor vehicle incidents involving injured parties, the Incident Report Form – Attachment 049-1 NA must be completed.

Traffic violations received while operating a URS-owned, -rented, or -leased vehicle, client vehicle or with a personally owned vehicle used for company business must be reported to your Office Manager within 24 hours of the violation or on the next business day.

F. Incident Review

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1. A violation of this vehicle safety standard is subject to disciplinary action, including termination. The Fleet Manager will review all incidents involving URS-owned, -rented, or -leased vehicles.
2. URS may suspend the privilege to operate vehicles on URS business because of noncompliance with the URS Vehicle Safety Program, involvement in a motor vehicle incident, or resulting citations or other legal actions associated with motor vehicle violations. Personnel authorized to suspend an employee's status as an Authorized Driver include the following:
 - a. A Project Manager with responsibility for dedicated vehicles on a site. The suspension is applicable to those site vehicles only.
 - b. A URS Operations Manager responsible for the employee.
 - c. The URS Fleet Manager.
 - d. The Vice President/Director HSE.
3. The employee's driving privileges *will be* suspended for any of the following:
 - a. Accidents or legal action involving alcohol or drug use (e.g., driving under the influence [DUI]).
 - b. Driving without a license.
 - c. Hit-and-run driving or leaving the scene of an accident.
 - d. Unauthorized use of URS vehicles (i.e., using a URS vehicle for moving personal items, carrying passengers who are not associated with work activities, etc.).
4. The employee's driving privileges *may be* suspended for any of the following:
 - a. Two or more at-fault accidents involving the same Authorized Driver within a 12-month period.
 - b. Multiple complaints from other employees or members of the public about driving performance.

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- c. Any accident caused by a URS Authorized Driver where damages exceed \$2,000.
 - d. Failure to comply with the cellular phone use policy.
 - e. Gross misconduct or violation of policy.
- 5. An Authorized Driver's driving privileges may be reinstated as follows:
 - a. For any suspension resulting from law enforcement agency legal action involving drugs and alcohol on the part of the former Authorized Driver, driving privileges may be reinstated only by concurrent agreement from the URS Operating Unit Manager, the URS Fleet Manager, the Vice President/Director HSE, and the appropriate Human Resources Regional Manager.
 - b. For those Authorized Driver's privilege suspensions that are not related to driving under the influence of drugs or alcohol, privileges may be reinstated with concurrent agreement by the URS Operating Unit Manager, the Vice President/Director HSE, and appropriate Human Resources Regional Manager upon completion of required remedial training (see Section 4.B.3).
- 6. Disciplinary action may include the following:
 - a. Loss of URS driving privileges.
 - b. Additional driver safety training. Refer to Section 4.B, Training.
 - c. Disciplinary warning.
 - d. Termination.

G. Inspection

- 1. The driver is responsible for inspecting the vehicle prior to use and not driving a vehicle with obvious safety defects. Attachment 057-3 NA may be used to document the inspection.
- 2. Basic safety checks must include the following:

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- a. Tire condition/pressure.
- b. Lights/turn signals.
- c. A clean windshield and adequate window washer fluid.
- d. Gauges/warning lights indicating a normal condition.
- e. Mirrors properly adjusted.
- f. Brakes with adequate pedal pressure for proper braking.

Any defects must be reported to the local office Fleet Representative or Office Administrator.

H. Vehicle Maintenance

1. The Office Administrator (or designee) is to ensure that all vehicles owned or leased by URS are properly maintained.
2. Routine maintenance must be performed in accordance with the schedule provided in the owner's manual stored in the vehicle.
3. Reported defects/problems with vehicles must be repaired promptly.

5. Documentation Summary

The following documentation will be maintained in the office/project file:

- A. Auto Claim Reports
- B. Journey Management Plans
- C. Vehicle Inspections

6. Resources

- A. National Safety Council, Information on Defensive Driving Courses
<http://www.nscddonline.com/>
- B. AAA Foundation for Traffic Safety
<http://www.aaafoundation.org/>
- C. Smith Driving System
<http://smith-system.com/>

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- D. American National Standards Institute (ANSI) D6.1 – Manual on Uniform Traffic Control Devices for Streets and Highways
- E. [SMS 019](#) – Heavy Equipment Operations
- F. [SMS 024](#) – Medical Screening and Surveillance
- G. [SMS 032](#) – Work Zone Traffic Control
- H. [SMS 044](#) – Radiation Safety for Portable Gauges
- I. [SMS 048](#) – Hazardous Materials/Dangerous Goods Shipping
- J. [SMS 049](#) – Injury/Illness/Incident Reporting and Notifications
- K. [SMS 060](#) – Fatigue Management
- L. [Attachment 057-1 NA](#) – Auto Claim Report
- M. [Attachment 057-2 NA](#) – Journey Management Plan
- N. [Attachment 057-3 NA](#) – Vehicle Inspection Checklist



Health, Safety and Environment

Attachment 057-1 NA

AUTO CLAIM REPORTIssue Date: February 2001
Revision 11: September 2012

To be used for all vehicle accidents involving URS-leased/owned, client, and rental vehicles and for personal vehicles used on company business.

Name of Employee Involved in Accident _____

Was the employee injured? Yes ☐ No ☐ If Yes, complete SMS 049-1NA. _____

Was anyone else injured? Yes ☐ No ☐ **Details:** _____

Office Location _____ **Date of Accident** _____

Employee Phone/Cell # _____ **Office Phone #** _____

Describe Injury (including medical treatment, if any):

Company Vehicle¹ ☐ On Company business at the time of accident? Yes ☐ No ☐
Personal Vehicle¹ ☐ Was alcohol or drugs involved at the time of accident? Yes ☐ No ☐
Rental Vehicle² ☐ Vehicle Identification Number (company or personal): _____
Government or Client Vehicle ☐ _____

Year _____ Make _____ Model _____

Other Driver's Information

Name _____ Phone Number _____

Address _____

Insurance Co. _____ Policy # _____

License Plate # _____ Make _____ Model _____

Description of Accident

Time of Accident _____ Police Report # _____

Location of Accident _____ Police Department _____

At any time, were police or authorities called or present? Yes ☐ No ☐

Description (provide a clear, inclusive description of the accident):

Distribution: ☐ Office/Site Manager ☐ Regional HSE Manager ☐ Office/Site HSE Representative

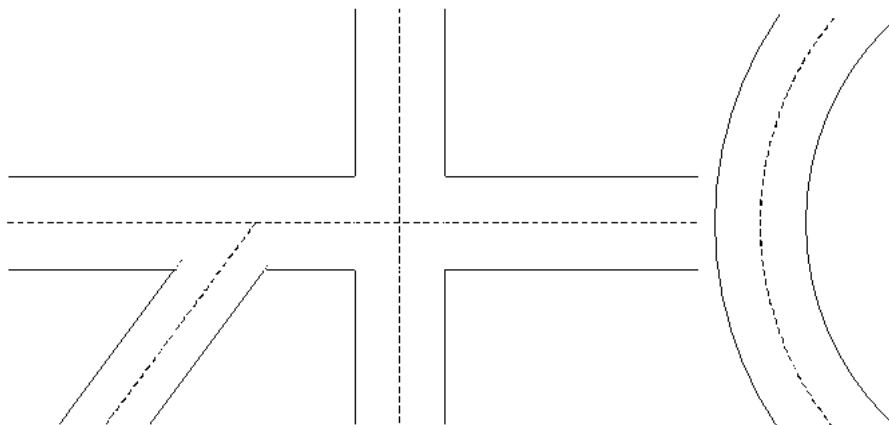
¹ All accidents occurring in the US to company, client or personal vehicles will be reported to:
PHH
Phone 800 446 7052 Fax 410 771 2619

² All accidents occurring in rental vehicles will also be reported to the rental agency. All accidents occurring outside the US will be reported to the Regional HSE Manager.

**AUTO CLAIM REPORT**Issue Date: February 2001
Revision 11: September 2012

To be used for all vehicle accidents involving URS-leased/owned, client, and rental vehicles and for personal vehicles used on company business.

Draw a diagram showing the position of vehicles before and after the accident. Correct the diagram to fit your situation. Attach police report if available.

**Check all applicable conditions on each subject****WEATHER**

- ☐ Clear
☐ Cloudy
☐ Fog
☐ Rain
☐ Snow
☐ Sleet
☐ Other

LIGHTING

- ☐ Daylight ☐ Dark
☐ Dusk ☐ Dawn
☐ Dark - no street lights on
☐ Dark - street lights on
☐ Headlights
☐ Headlights on dim
☐ Headlights on bright
☐ No lights on

ROAD SURFACE

- ☐ Dry
☐ Wet
☐ Muddy
☐ Snowy
☐ Snow-covered
☐ Ice in places
☐ Ice -covered
☐ Other

ROAD DESCRIPTION

- ☐ Straight ☐ Curve
☐ Level
☐ Hill ☐ Up ☐ Down
☐ Paved ☐ Black top
☐ One-way
☐ Two-way
☐ Divided road
☐ Intersection

ACTION OF DRIVER**You****Other**

Exceeding safe speed	☐	☐
On wrong side of street	☐	☐
Did not have right-of-way	☐	☐
Disobeyed traffic signal	☐	☐
Passed illegally	☐	☐
Improper turning	☐	☐
Improper backing	☐	☐
Following too closely	☐	☐
Failure to signal	☐	☐
Improper lane change	☐	☐
Misjudged clearance	☐	☐
Other	☐	☐

What was speed limit?

____ MPH

Witnesses?

- ☐ Yes ☐ No

Traffic control

- ☐ Signal lights
☐ Caution lights
☐ Stop sign
☐ Police officer
☐ None ☐ Other

Witness Name

Address _____

Name _____

Address _____

I understand that any misrepresentation or material omission made by me on this Auto Claim Report will be sufficient cause for immediate termination of employment whenever it may be discovered. I represent and warrant that I have read and fully understand the foregoing, that all information I have provided on this Report is true and accurate.

Signature

Date



Health, Safety and Environment
JOURNEY MANAGEMENT PLAN

Attachment 057-2 NA

Issue Date: February 2001
Revision 11: September 2012

Commencement Point		Destination Point	
Issue #: 1 Date:			
<u>ROUTE DIRECTIONS</u>		<u>PERSONAL PROTECTIVE EQUIPMENT</u>	
<u>TIME AND DISTANCE, ROUND TRIP</u>		<u>SPECIAL INSTRUCTIONS</u> 1. Do not use cell phone or two-way communication devices while driving. 2. Use three points of contact when entering/exiting the cab. 3. Everyone has the authority and responsibility to stop work if conditions are unsafe. 4. Do not drive while under the influence of medication, drugs or alcohol. 5. Do not drive when you are fatigued.	
<u>SITE HAZARDS</u>			
<u>ROUTE HAZARDS</u>		<u>EMERGENCY INFORMATION</u>	
<u>DESTINATION ENTRY INSTRUCTIONS</u>		<u>EMERGENCY CONTACT NUMBERS</u> Fire/Ambulance/Police:	
<u>DESTINATION HAZARDS</u>		<u>SITE CONTACT NUMBERS</u> Site Manager:	
		Safety Manager:	
<u>DESTINATION EXIT INSTRUCTIONS</u>		<u>CURRENT TRIP INFORMATION UPDATE</u>	
<u>RETURN JOURNEY</u>			



Health, Safety and Environment
JOURNEY MANAGEMENT PLAN

Attachment 057-2 NA
Issue Date: February 2001
Revision 11: September 2012

ROUTE MAP

	Health, Safety and Environment	Attachment 057-3 NA
	VEHICLE	
	INSPECTION CHECKLIST	Issue Date: June 1999 Revision 11: September 2012

Make/Model/Plate #: _____ Inspector's Name: _____

Mileage: _____ Date: _____

ITEM INSPECTED	CHECK IF SATISFACTORY	COMMENTS
Vehicle Registration	☐	
Insurance Information	☐	
Tires (Tread Depth, Inflation)	☐	
Spare Tire	☐	
Shocks	☐	
Exhaust System	☐	
Engine	☐	
Steering	☐	
Horn	☐	
Mirrors	☐	
First Aid Kit	☐	
Fire Extinguisher	☐	
Brakes	☐	
Parking Brake	☐	
Windshield Wipers	☐	
Windshield	☐	
Washers	☐	
Headlights (High, Low)	☐	
Turn Signals	☐	
Brake Lights	☐	
Back-up Lights	☐	
Instrument Lights	☐	
Tail Lights	☐	
Body Condition	☐	
Back-up Alarm	☐	
Ice Scraper	☐	
Spare Tire	☐	
Clutch	☐	
Safety Restraints	☐	
Fluids	☐	
Engine Oil	☐	
Brake Fluid	☐	
Transmission Fluid	☐	
Engine Coolant	☐	
Washer Fluid	☐	
Power Steering Fluid	☐	

URS SAFETY MANAGEMENT STANDARD

Cold Stress

1. Applicability

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

2. Purpose and Scope

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

3. Implementation

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

4. Requirements

- A. Carefully plan work anticipated to be performed in cool or cold conditions. Include costs in project budgets for specialized equipment and supplies needed to complete the field activities.
- B. Monitor weather forecasts immediately prior to entering the field. If possible, schedule heavy work during the warmer parts of the day. Implement a work-warming regimen by taking breaks out of the cold.
- C. Observe and monitor weather conditions such as ambient temperature, wind speed, and precipitation while in the field. If needed, use Supplemental Information B to determine wind chill.
- D. Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. Adequate insulating dry clothing will be required in air or wind chill temperatures below 40 °F (4.4 °C).
 - 1. Wear at least 3 layers of clothing to help prevent cold stress. It is important to preserve the air space between the body and the outer layer of clothing to retain body heat.
 - 2. Wear an outer layer to break the wind and allow some ventilation (e.g., Gortex® or nylon).

URS SAFETY MANAGEMENT STANDARD

Cold Stress

3. Wear a middle layer of down, wool, or similar materials to provide insulation.
4. Wear an inner layer of cotton or synthetic weave to allow ventilation.
5. Wear a hat or hardhat liner. Up to 40 percent of body heat can be lost when the head is left exposed.
6. Wear insulated boots or other insulated footwear, and insulated gloves to help reduce the chance of frostbite.
7. Keep a change of dry clothing available in case work clothes become wet.
8. Do not wear tight clothing. Loose clothing allows better ventilation.
9. Skin should not be left exposed on a continuous basis when air temperature or chill factors are below -17°F (-27°C).
10. Drink plenty of liquids, avoiding caffeine and alcohol, which are vasoconstrictors. It is easy to become dehydrated in cold weather.

E. Use the following work practices:

1. Use Supplemental Information C to establish work/rest cycles in cold weather.
2. Drink plenty of warm liquids. It is easy to become dehydrated in cold weather.
3. Avoiding caffeine and alcohol. Alcohol will accelerate loss of body heat.
4. Eat high calorie snacks to help maintain body metabolism.
5. If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold.
6. Work in pairs to keep an eye on each other and watch for signs of cold stress.
7. NEVER IGNORE SHIVERING. Persistent or violent shivering is a clear warning that you are on the verge of hypothermia.
8. Avoid exhaustion.

URS SAFETY MANAGEMENT STANDARD
Cold Stress

F. When possible, use the following engineering controls:

1. Provide shelter to escape cold, wind, and precipitation
2. Provide a source of heat (such as warm packs or portable heaters).
3. Use insulating materials on equipment handles when temperatures drop below 30°F (-1°C).

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

H. Treat cold stress illness as follows:

1. Hypothermia: Prompt treatment of hypothermia is essential. Once the body temperature drops below 95°F (35°C), the loss of temperature control occurs, and the body can no longer rewarm itself. Initial treatment includes reducing heat loss by moving the individual out of the wind and cold, removing wet clothing, applying external heat (such as a pre-warmed sleeping bag, electric blanket, or body-heat from other workers), and obtaining follow-up medical attention.
2. Frost Bite: The initial treatment for frostbite includes bringing the individual to a warm location, removing clothing in the affected area, and, **if help is delayed**, placing the affected parts in warm (100° to 104°F or 38° to 40°C) water. Do not massage or rub the frostbite area. After the initial treatment, wrap the affected area loosely in sterile gauze and seek medical attention.

For further discussion on Cold Stress treatment, please refer to Supplemental Information A.

I. Hypothermia in Water:

Loss of body heat to the water is a major cause of deaths in boating and working near water incidents. Often the cause of death is listed as drowning; however, the primary cause is often hypothermia. It should also be noted that alcohol lowers the body temperature around 2 to 3 degrees by dilating the blood vessels. Do not drink alcohol around cold water. The following table shows the effects of hypothermia in water:

URS SAFETY MANAGEMENT STANDARD
Cold Stress

WATER TEMPERATURE	EXHAUSTION	SURVIVAL TIME
32.5°F (0°C)	Under 15 minutes	Under 15 to 45 minutes
32.5 to 40°F (0 to 4°C)	15 to 30 minutes	30 to 90 minutes
40 to 50°F (4 to 10°C)	30 to 60 minutes	1 to 3 hours
50 to 60°F (10 to 16°C)	1 to 2 hours	1 to 6 hours
60 to 70°F (16 to 21°C)	2 to 7 hours	2 to 40 hours
60 to 70°F (16 to 21°C)	3 to 12 hours	3 hours to indefinite
Over 80°F (27°C)	Indefinite	Indefinite

SOME POINTS TO REMEMBER:

1. Wear your PFD. Review SMS 027 – Work Over Water, SMS 053 – Marine Safety and Boat Operations and SMS 095 – Barge Operations.
2. If the water is less than 50°F (10°C), wear a wet suit or dry suit for work in water (e.g., wading), or if a significant potential to fall in water exists.
3. While in the water, do not attempt to swim unless to reach nearby safety. Unnecessary swimming increases the rate of body heat loss. Keep your head out of the water. This will increase your survival time.
4. Keep a positive attitude about your rescue. This will increase your chances of survival.
5. If there is more than one person in the water, huddling is recommended.

J. Training

Workers at risk of developing hypothermia or cold-related injury will be trained in:

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

URS SAFETY MANAGEMENT STANDARD

Cold Stress

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

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Cold stress training records.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Fact Sheets – [“Protecting Workers in Cold Environments”](#)
- B. [OSHA Publication 3156 – Quick Reference Card](#)
- C. [SMS 027](#) – Work Over Water
- D. [SMS 053](#) – Marine Safety and Boat Operations
- E. [SMS 095](#) – Barge Operations

7. Supplemental Information

- A. [Signs of, and Treatment for, Cold Stress-Related Illnesses](#)
- B. [Wind Chill Index](#) (units in °F and miles/hour, and units in °C and Kilometers/hour)
- C. [Work/Warm-up Schedule for Outside Workers](#) based on a Four-Hour Shift

	Health, Safety and Environment SIGNS OF AND TREATMENT FOR COLD STRESS RELATED ILLNESSES	SMS 059 NA Supplemental Information A Issue Date: February 2009 Revision 1: March 2013

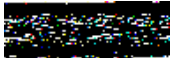
Hypothermia: Hypothermia results when the body loses heat faster than it can be produced. When this situation first occurs, blood vessels in the skin constrict in an attempt to conserve vital internal heat. Hands and feet are first affected. If the body continues to lose heat, involuntary shivers begin. This is the body's way of attempting to produce more heat, and it is usually the first real warning sign of hypothermia. Further heat loss produces speech difficulty, confusion, loss of manual dexterity, collapse, and finally death. Wet clothes or immersion in cold water greatly increases the hypothermia risk. The progressive clinical presentation of hypothermia is described in the table below.

Frostbite: Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite can be categorized into:

- **Frost Nip or Initial Frostbite:** (1st degree frostbite) Characterized by blanching or whitening of skin.
- **Superficial Frostbite:** (2nd degree frostbite) Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient. Blistering and peeling of the frozen skin will follow exposure.
- **Deep Frostbite:** (3rd degree frostbite) Tissues are cold, pale, and solid; extremely serious injury with possible amputation of affected area.

Frostbite can occur without hypothermia when the extremities do not receive sufficient heat. The toes, fingers, cheeks, and ears are the most commonly affected. Frostbite occurs when there is freezing of the fluids around the cells of the affected tissues. The first symptom of frostbite is an uncomfortable sensation of coldness, followed by numbness. There may be tingling, stinging, or cramping. Contact by the skin with tools or other metal objects below 20°F (-7°C) may result in contact frostbite.

Condition	Core Body Temperature	Signs/Symptoms	Treatment
Mild Hypothermia	99 - 97 F 37 - 36 C	Normal, shivering may begin	Seek dry shelter; replace wet clothing, insulate whole body and head, avoid sweating, use external warmth (bath, fire) only if core above 95 degrees F, give warm sweet drinks and food.
	97 - 95 F 36 - 35 C	Cold sensation, goose bumps, unable to perform complex tasks with hands, shiver can be mild to severe, hands numb.	
Moderate Hypothermia	95 - 93 F 35 - 34 C	Intense shivering, muscle in-coordination becomes apparent, movements slow and labored, stumbling pace, mild confusion may appear alert.	Avoid exercise and external warmth, gently rest; give warm sweet drinks and calories, internal warming via warm moist air, monitor pulse and breathing.
	93 - 90 F 34 - 32 C	Violent shivering persist, difficulty speaking, sluggish thinking, amnesia starts to appear, gross muscle movements sluggish, unable to use hands, stumbles frequently, signs of depression, withdrawn.	
Severe Hypothermia	90 - 86 F 32 - 30 C	Shivering stops, exposed skin blue or puffy, muscle coordination very poor, inability to walk, confusion, incoherent/irrational behavior, but may be able to maintain posture and appearance of awareness.	Medical emergency, give nothing by mouth, wrap in an insulated blanket, avoid rapid rewarming, transfer to hospital immediately.
	86 - 82 F 30 - 28 C	Muscle rigidity, semiconscious, stupor, loss of awareness of others, pulse and respiration rate decrease, possible heart fibrillation.	
	82 - 78 F 28 - 25.5 C	Unconscious, heart beat and respiration erratic, pulse may not be palpable.	
	78 - 75 F 25.5 - 24 C	Pulmonary edema, cardiac and respiratory failure, death. Death may occur before this temperature is reached.	

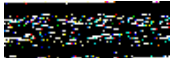
	Health, Safety and Environment WIND CHILL INDEX	SMS 059 NA Supplemental Information B Issue Date: February 2009

Estimated wind speed	Actual temperature reading (°F/°C)											
	50/10	40/4	30/-1	20/-7	10/-12	0/-18	-10/-23	-20/-29	-30/-34	-40/-40	-50/-46	-60/-51
(mph/kph)	Equivalent wind chill temperature (°F/°C)											
0 (Calm)	50/10	40/4	30/-1	20/-7	10/-12	0/-18	-10/-23	-20/-29	-30/-34	-40/-40	-50/-46	-60/-51
5/8	48/9	37/3	27/-3	16/-9	6/-14	-5/-21	-15/-26	-26/-32	-36/-38	-47/-44	-57/-49	-68/-56
10/16	40/4	28/-2	16/-9	4/-16	-9/-23	-24/-31	-33/-36	-46/-43	-58/-50	-70/-57	-83/-64	-95/-71
15/24	36/2	22/-6	9/-13	-5/-21	-18/-28	-32/-36	-45/-43	-58/-50	-72/-58	-85/-65	-99/-73	-112/-80
20/32	32/0	18/-8	4/-16	-10/-23	-25/-32	-39/-39	-53/-47	-67/-55	-82/-63	-96/-71	-110/-79	-121/-85
25/40	30/-1	16/-9	0/-18	-15/-26	-29/-34	-44/-42	-59/-51	-74/-59	-88/-67	-104/-76	-118/-83	-133/-92
30/48	28/-2	13/-11	-2/-19	-18/-28	-33/-36	-48/-44	-63/-53	-79/-62	-94/-70	-109/-78	-125/-87	-140/-96
35/56	27/-3	11/-12	-4/-20	-20/-29	-35/-37	-51/-46	-67/-55	-82/-63	-98/-72	-113/-81	-129/-89	-145/-98
40/64	26/-3	10/-12	-6/-21	-21/-29	-37/-38	-53/-47	-69/-56	-85/-65	-100/-73	-116/-82	-132/-91	-148/-100
	LOW HAZARD Risk of exposed, dry skin being affected in less than one hour. Awareness of hazard low.				INCREASING HAZARD Danger from freezing of exposed flesh within one minute.				HIGH HAZARD Flesh may freeze within 30seconds.			

Note that wind speeds greater than 40 mph/64 kph have little additional effect.

Information in this table was originally developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA, and is further adapted from the 2004 *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*, published by the ACGIH. The ACGIH publication provides the equivalent table with temperature in degrees Fahrenheit and wind speed in mph.

Equivalent wind chill temperatures identified require dry clothing to maintain core body temperature above 96.8°F (36°C).

	Health, Safety and Environment WORK / WARM-UP SCHEDULE FOR OUTSIDE WORKERS BASED ON A FOUR-HOUR SHIFT	SMS 059 NA Supplemental Information C Issue Date: February 2009

How fast a person's body cools in cold weather depends on: air temperature, wind speed, heat of the sun, and work being done. The fingers and toes usually feel cold first. Shivering then sets in. Shivering is the body's way of warning that it needs to be warm-up. I

The Work Warm-Up Schedule shows the warm-up breaks needed for work in cold conditions. It assumes that normal work practice provides for breaks in warm locations every two hours. The schedule provides for additional breaks as the wind velocity at the work site increases and/or the temperature drops. Warm-up breaks should begin when the temperature reaches -15° (-26° C) with winds of 10 mph (16 km/h) or greater. When the work involves riding on an unshielded vehicle or some other activity that generates wind, the number of breaks should be increases appropriately. If effective protection against the wind can be provided by shields or screens, work modifications or measures, then the work warm-up schedule for "No Noticeable Wind" would apply.

The information below applies to any four-hour period. Warm-up breaks are assumed to provide 10 minutes in a warm environment. These guidelines apply to workers wearing dry clothing.

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx.)	°F (approx.)	Max. work Period	No. of Breaks**	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm breaks) 1		(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20°to -24°	(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25°to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-38° to -39°	-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease					
-40° to -42°	-40°to -44°	30 min.	5	Non-emergency work should cease							
-43° & below	-45° & below	Non-emergency work should cease									

Note: All temperatures are approximate.

Apply the schedule one step lower for work with limited physical activity. For example, at -30° F (-35° C) with no noticeable wind, a worker with a job requiring little physical movement should have a maximum work period of 40 minutes with four breaks in a four-hour period.

If reliable weather reports are not available, us the following as a guide to estimate wind velocity:

- A 5 mph (8 km/h) wind will move a light flag
- A 10 mph (16 km/h) wind will fully extend the flag
- A 15 mph (24 km/h)wind will raise a newspaper sheet
- A 20 mph (23 km/h) wind will produce blowing and drifting snow.

Source: Saskatchewan Labour Occupational Health and Safety, January 2000.

URS SAFETY MANAGEMENT STANDARD

Machine Guarding

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where employees are exposed to moving parts of equipment and machinery.

2. Purpose and Scope

The purpose of this standard is to protect employees from the hazards associated with moving parts of equipment and machinery.

3. Implementation

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

4. Requirements

- A. One or more types of machine guarding is required to protect the operator and other personnel in the machine area from hazards such as those created by point-of-operation, nip points, rotating parts, flying chips, and sparks. The machine area will vary based on the hazard zone or control area associated with the operation. Personnel not participating in machine activities will be restricted from the hazard control area. Specifically, any of the mechanisms listed below that are exposed require guarding:
 - 1. Rotating mechanisms
 - 2. Cutting or shearing mechanisms
 - 3. Nip points
 - 4. Screw or worm mechanisms
 - 5. Forming or bending mechanisms
 - 6. Impact mechanisms.
- B. Always guard the point-of-operation of a piece of machinery if the machine operation poses a hazard to the operator. This guard must be designed in accordance with applicable standards. In the absence of any such standard, the guarding device must prevent the operator from having any part of their body in the danger zone during the operating cycle.

URS SAFETY MANAGEMENT STANDARD

Machine Guarding

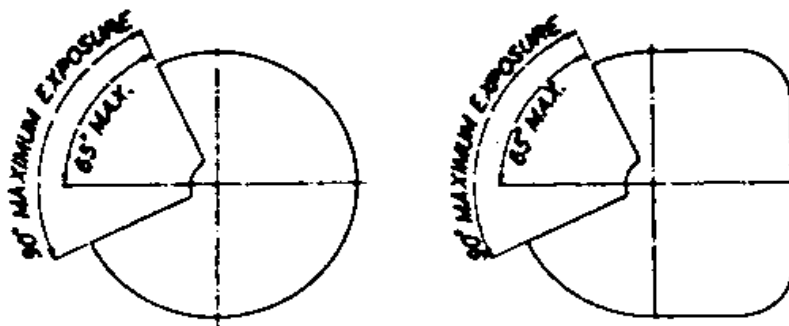
- C. Guard other areas of machinery where moving parts or other machine hazards can indirectly cause injury. Indirect causes of injury may include work in progress (e.g., flying metal chips, wood discharged from saw); machine failure due to overloading; or improper use and operator error caused by lack of knowledge or skill.
- D. Affix guards to the machine where possible, and secure elsewhere, if for any reason attachment to the machine is not possible. The guard will be such that it does not create a hazard.
- E. Guard revolving drums, barrels, and containers by an enclosure that is interlocked with the drive mechanism, so that the barrel, drum, or container cannot revolve unless the guard enclosure is in place.
- F. Guard revolving shafts (excluding drill rig augers/shafts), wheels, pulleys, and other revolving parts to prevent an employee from contacting the moving part.
- G. Securely anchor machines or equipment designed for a fixed location to prevent walking or moving. Tag out-of-service machinery being moved or re-located until it is properly anchored to prevent inadvertent use.
- H. Do not wear loose clothing or jewelry while working near the moving equipment. Pull back long hair to avoid entanglement with moving parts.
- I. Do not operate equipment without guards in place or other features of the machinery in proper operating order.
- J. Tag and remove from service machines and equipment with broken or missing guards until the guard(s) can be repaired or replaced.
- K. Employees must obey all operating instructions and warning signs posted for the equipment operation.
- L. Prohibit tamping, bypassing, or removing a guard without authorization from management.
- M. Use special hand tools for placing and removing material, thus helping prevent the operator from placing their hand in a danger zone. However, these tools must not be used in lieu of other guarding required by this procedure.
- N. Provide employees exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases with the personal protective equipment necessary to protect them from the hazard.

URS SAFETY MANAGEMENT STANDARD

Machine Guarding

O. Equipment Specific Guarding

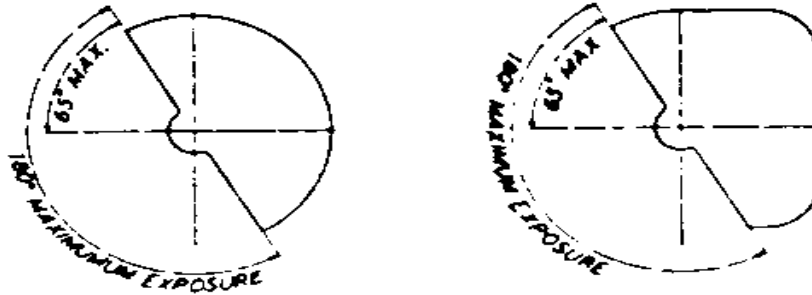
1. Fans – Guard the blades if the periphery of blades of a fan is less than 7 feet (2.13 meters) above the floor or working level. The guard must have openings that are no larger than ½ inch (1.3 cm).
2. Abrasive wheel machinery – Construct guards so that the peripheral protecting member can be adjusted to the constantly decreasing diameter of the wheel. Do not exceed the maximum angular exposure above the horizontal plane of the wheel spindle as specified in 2 and 3, and the distance between the wheel periphery and the adjustable tongue or the end of the peripheral member at the top must never exceed ¼ inch (0.635 cm). Work rests must be adjusted within ⅛ inch (0.3 cm) of the wheel. Guards and tool rests must not be adjusted while the machine is in motion.
3. Bench and floor stands – Do not exceed 90 degrees or one-fourth of the periphery for the angular exposure of the grinding wheel periphery and sides for safety guards used on machines known as bench and floor stands. This exposure shall begin at a point not more than 65 degrees above the horizontal plane of the wheel spindle. If the work requires contact with the wheel below the horizontal plane of the spindle, the exposure must not exceed 125 degrees.



4. Cylindrical grinders – Do not exceed 180 degrees for the maximum angular exposure of the grinding wheel periphery and sides for the safety guards used on cylindrical grinding machines. The exposure will begin at a point not more than 65 degrees above the horizontal plane of the wheel spindle.

URS SAFETY MANAGEMENT STANDARD

Machine Guarding



5. Table Saws – Guard table saws by a hood that completely encloses the portion of the saw above the table and above the work. The hood must automatically adjust to the thickness of, and remain in contact with, the material being cut. A spreader is required to prevent material from squeezing the saw or being thrown back on the operator. Non-kickback fingers are required when the spreader is in place and must be located to oppose the thrust or tendency of the saw to pick up the material, or to throw it back toward the operator. These devices must be designed to provide adequate holding power for all the thicknesses of materials being cut.
6. Radial Saws – The upper hood must completely enclose the upper portion of the blade down to a point that will include the end of the saw arbor. The upper hood must protect the operator from flying splinters, broken saw teeth, etc.; and deflect sawdust away from the operator. Guard the sides of the lower exposed portion of the blade to the full diameter of the blade by a device that automatically adjusts itself to the thickness of the stock, and remains in contact with the stock to give maximum protection for the operation being performed. Radial saws used for ripping must have non-kickback fingers or dogs located on both sides of the saw to oppose the thrust or tendency of the saw to pick up the material, or to throw it back toward the operator.
7. Bandsaws – Enclose or guard portions of the blade, except for the working portion of the blade between the bottom of the guide rolls and the table. Bandsaw wheels must be fully encased. The guard for the portion of the blade between the sliding guide and the upper-saw-wheel guard must protect the saw blade at the front and outer side. This portion of the guard must be adjustable to raise and lower with the guide.
8. Jointers – An automatic guard is required to cover the entire section of the head on the working side of the fence or gage. The guard must effectively keep the operator's hand from coming in contact with the revolving knives.

URS SAFETY MANAGEMENT STANDARD

Machine Guarding

The guard must automatically adjust itself to cover the unused portion of the head, and must remain in contact with the material at all times. Portions of exposed head behind the gage or fence must be covered by a guard.

9. Planers – The entire cutting head, and any attached fixtures such as saw blades, must be covered by a metal guard. Feed rolls must be guarded by a good or suitable guard to prevent the hands of the operator from coming in contact with the in-running rolls at any point. The guard must be fastened to the frame carrying the rolls to remain in adjustment for any thickness of stock.
10. Shapers – The cutting heads will be enclosed with a cage or adjustable guard designed to keep the operator's hand away from the cutting edge. The diameter of circular shaper guards will not be less than the greatest diameter of the cutter.
11. Drill Presses – The rotating chuck and swarf that is produced by the drill bit must be guarded by telescoping or adjustable shields.
12. Lathes – Rotating heads must be covered as completely as possible by hoods or shields, which should be hinged so they can be opened when making adjustments.
13. Sanding Machines – Feed rolls of self-feed sanding machines must be protected with a semi-cylindrical guard to prevent the hands of the operator from coming in contact with the in-running rolls at any point. The bottom of the guard should come down to within three-eighths of an inch of a plane formed by the bottom or contact face of the feed roll where it touches the stock. Each drum sanding machine must have an exhaust hood or guard that encloses the revolving drum, except for that portion of the drum above the table. Each disk sanding machine must have an exhaust hood, or other guard that encloses the revolving disk, except for that portion of the disk above the table. Each belt sanding machine must have an exhaust hood, or other guard that encloses the unused portion of the belt and nip points where the belt runs onto a pulley.
14. Equip all hand-held, powered platen sanders, grinders with wheels 2 inches (5.1 cm) in diameter or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jigsaws with blade shanks one-fourth of an inch wide or less with only a positive "on-off" control.
15. Equip all hand-held, powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels greater than 2 inches (5.1 cm) in

URS SAFETY MANAGEMENT STANDARD

Machine Guarding

diameter, disc sanders, belt sanders, reciprocating saws, saber saws, and other similarly operating powered tools with a momentary contact “on-off” control; these may have a lock-on control, provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.

16. Equip all other hand-held powered tools, such as circular saws, chainsaws, and percussion tools without positive accessory holding means, with a contact pressure switch that will shut off the power when the pressure is released. Chainsaws must have an automatic chain brake or kickback device.

P. Safeguard Design

Guidance on machine and equipment safeguard design can be found in American National Standards Institute (ANSI) standards and applicable regulations. If specific guidance on safeguard design is available, compliance with the guidance is required. Commercially available safeguards will be used when feasible. When no guidance on safeguard design is available, the following requirements must be followed to ensure the safeguard functions properly.

1. The safeguard must be considered a permanent part of the machine or equipment
2. The safeguard must provide maximum protection, not only to the operator but also to personnel in the vicinity.
3. The safeguard must prevent access to the danger zone or point-of-operation during operation, as well as any other hazardous area of the machine accessible to operators or other employees.
4. The safeguard must not weaken the structure of the machine.
5. The safeguard must not interfere with efficient operation of the machine, cause discomfort to the operator, or complicate maintenance or cleaning of the area around the machine.
6. The safeguard must be designed for the specific job and specific machine (provisions must be made for maintenance and repair of the equipment).
7. The safeguard must be strong enough to resist normal wear and shock, and durable enough to serve over a long period with minimal maintenance.

URS SAFETY MANAGEMENT STANDARD

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8. The safeguard must not be a source of additional hazards, such as splinters, pinch points, sharp corners, rough edges, or other potential sources of injury.
9. If possible, a safeguard covering rotating parts should be interlocked with the machine itself so that the machine cannot be operated unless the safeguard is in place.
10. Employees working on or in the vicinity of machines requiring guarding must be instructed in application and function of that guard, and informed that in no case may the guard be bypassed or altered.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Equipment and machinery operating manuals.
- B. Safeguard design documentation.

6. Resources

- A. U.S. Occupational Safety and Health Administration ([OSHA](#)) [Standard – Machinery and Machine Guarding](#) – 29 Code of Federal Regulations (CFR) 1910.212
- B. OSHA Standard – Tools – Hand and Power – [29 CFR 1926.300](#)
- C. [SMS 016](#) – Hand and Power Tools
- D. ANSI B11.0-2010 – Safety of Machinery: General Requirements and Risk Assessment, The Association of Manufacturing Technology
- E. ANSI B11.19-2010 – Performance Requirements for Safeguarding, The Association of Manufacturing Technology
- F. OSHA Machine Guarding eTool – <http://www.osha.gov/SLTC/etools/machineguarding/index.html>
- G. OSHA Safeguarding Equipment and Protecting Employees from Amputations <http://www.osha.gov/Publications/osa3170.pdf>

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

1. Applicability

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

2. Purpose and Scope

This standard is designed to ensure that employees receive appropriate, immediate, and high-quality health care services that will minimize disability, promote rapid recovery, and save lives.

3. Implementation

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

4. Requirements

A. Pre-Injury Management

The following proactive plans and procedures will be in place before an injury or illness occurs.

1. Work Site Evaluation

Project and office locations will evaluate their location for first aid and medical requirements. The following factors should be considered:

- a. Types of accidents that could reasonably occur.
- b. Location of local clinics and hospitals.
- c. Response time for external emergency services.
- d. If corrosive or hazardous materials are in use.
- e. Any industry specific requirements.
- f. Types of training for employees and first aid responders.
- g. What first aid supplies should be available.

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

2. First Aid Services

a. First Aid Responders

There will be a sufficient number (but not less than one) of employees on each shift trained in first aid to provide adequate first response medical care available at the work site if either of these conditions exists:

- i. If life-threatening injuries can reasonably be expected, trained personnel must be available within 3 to 4 minutes. This generally means that community emergency medical services cannot be relied on since their response time is usually greater than 3 minutes.
- ii. If no life-threatening injuries can reasonably be expected, the response time for trained personnel is extended to 15 minutes.

The trained first aid responders should be designated so that the other employees know who they are and how to contact them. The trained responders must have a current first aid certificate and be trained in Bloodborne Pathogens (see SMS 051 – Bloodborne Pathogens).

For certain long-term, heavily staffed, or high hazard projects, URS may opt to establish a first aid station on site. It should be staffed with a person who is a nurse, Emergency Medical Technician (EMT), or Emergency Medical Technician Paramedic (EMT-P) who may practice limited treatment under the direction of a physician.

Where clients provide the services of a first aid station, the project manager will determine the specific services provided and the administrative procedures involved. Employees requiring first aid treatment by a client-provided facility must obtain prior approval from the project manager.

b. First Aid Kits

- i. Each site will maintain a first aid kit in accordance with Attachment 065-8 – First Aid Kit Supply List. The contents of the first aid kit will be checked prior to being sent out to each site/project and periodically thereafter to ensure that the expended items are replaced.

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

- ii. First aid kits will be maintained in readily accessible locations on each job site. For mobile or vehicle-based operations in remote locations, first aid kits may be necessary in vehicles.
- iii. Kits will be inspected prior to being sent to a work location and weekly while in use. Any items not approved for the kit will be removed during inspection.
- iv. At no time will over-the-counter medications such as antacids, aspirin, cold or cough drops, or other sundry items be stored in the kits without the approval of the URS Occupational Health Nurse or a URS-approved health care professional.

c. Emergency Services

The project Health, Safety, and Environment (HSE) Representative, in conjunction with the project manager, will identify emergency service providers, including ambulance and hospital services. Each location will post a current list of emergency telephone numbers and maps to access local medical emergency providers (SMS 003 – Emergency Preparedness/Crisis Management Plans). Advance contact with ambulance services to ensure they are familiar with location, access routes, and hospital locations is advised.

d. Eyewash and Safety Shower Facilities

A corrosive material is a highly reactive substance that causes obvious damage to living tissue. Corrosives act either directly by chemically destroying the part (oxidation) or indirectly by causing inflammation. A hazardous material is any substance or compound (including corrosives) that has the capability of producing adverse effects on the health and safety of humans. Review material safety data sheets for the health effects of compounds being used at the site to determine whether they meet the criteria defined previously.

If corrosive or otherwise hazardous materials are used, eyewash and body flush facilities must be provided. Where possible, these facilities should provide large quantities of clean water. The water source must be pressure controlled and clearly identified. Portable eyewash stations must contain a minimum of 1 gallon of potable water. See Supplemental Information A for additional guidance on eyewash and shower facilities.

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

e. Identification of Medical Facilities

The field and office location will identify a suitable local clinic, preferably specializing in occupational medicine, to treat nonemergency injuries and illnesses. In addition, a local hospital emergency room will be identified for treatment of life-threatening or after hours injuries. The URS Occupational Health Nurse, the Workers' Compensation Administrator, or the workers' compensation insurance carrier representative should be contacted to provide a listing of recommended medical facilities.

The project HSE Representative should visit the medical facility and meet with the medical provider to establish expectations. Clinics should be conveniently located, clean, professionally staffed, offer multiple services, and be supportive of early return to work practices.

Field/construction projects will make appropriate arrangements with local ambulance/emergency service providers prior to the start of work activities to ensure that appropriate transportation can be provided in the event of an emergency. These arrangements include establishment of an identifiable project address and emergency access point (i.e., location to meet emergency personnel).

The project HSE Representative will communicate the following with the designated hospitals/clinics:

- i. Physical requirements for each trade.
- ii. Policies regarding availability of suitable work for partially disabled employees.
- iii. Procedures for reporting of treatment diagnosis and treatment plans to the company and its workers' compensation insurance carrier.
- iv. Requirements for alcohol and substance abuse testing per company and/or client-required substance abuse policies (as needed).

B. Post-Injury Management

1. Transportation

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

When employees require urgent medical attention as the result of a work-related injury/illness, transportation will be provided to the doctor's office, clinic, or hospital. Employees should not be permitted to drive unless it is safe to do so.

2. Emergency Injury/Illness Treatment

In all cases, critical injuries must be immediately referred for professional medical attention. The manner in which the referral is accomplished, and the person responsible for the referral, should be clearly defined in either a project safety plan and/or an office Emergency Preparedness Plan (SMS 003). Critical injuries/illnesses include, but may not be limited to, the following:

- a. Loss of consciousness.
- b. Unexplained chest pain.
- c. Breathing difficulty.
- d. Uncontrolled bleeding.
- e. Fractured bones.
- f. Suspected internal injuries.
- g. Suspected exposure to chemical/biological hazard.
- h. Second or third degree thermal or chemical burns (i.e., blistering).
- i. Electrocution.
- j. Unexplained change in mental state following an injury (may indicate shock or other internal injuries).

3. Nonemergency Injury/Illness Treatment

When a work-related incident results in a noncritical injury/illness, the primary objective is to provide appropriate medical services to diagnose and treat the injury/illness. Options available to the employee and project/office management in these situations include the following:

- a. First aid treatment and/or review by a qualified first aid responder.

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

- b. First aid treatment and/or review by a qualified first aid responder followed by a referral to an occupational health clinic.

Additional support for the employee and managers in these situations can also be obtained from a URS HSE professional.

Attachment 065-1 NA – Injury Management Procedures Flow Chart provides a flow chart to assist employees and managers in determining the most appropriate option for obtaining medical services for nonemergency injuries/illnesses.

Note: Some states allow injured workers to choose their own initial medical provider. Employees are to be cautioned that not all medical providers accept workers' compensation insurance and coverage should be verified prior to treatment if an employee lives in a state that permits him/her to elect to see their personal doctor rather than the URS-recommended physician.

C. Workers' Compensation Case Management

1. Health and Safety

- a. Occupational Health Nurse/Workers' Compensation Administrator will
 - i. Evaluate and file workers' compensation claims for cases covered by the URS insurance program. Evaluate and provide consultation for injuries occurring in monopolistic states (Ohio, Washington, North Dakota, and Wyoming). Energy & Construction workers' compensation claims are filed by site personnel.
 - ii. Provide date of injury support to employees and supervisors, including monopolistic state claims.
 - iii. Coordinate regular follow-up of all cases, including monopolistic state claims, to ensure effective case management.
 - iv. Offer pre-injury consultation for offices and project sites.
 - v. Provide training and communication regarding the workers' compensation process.
- b. The HSE Representatives will assist with the early return to work program by interfacing with the supervisor and employee to evaluate whether appropriate and safe temporary transitional work is available.

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

- c. HSE Representatives will
 - i. Provide support to ensure that the requirements of this SMS are in place.
 - ii. Provide training on this SMS.
 - iii. Ensure proper reporting of incidents in accordance with SMS 049 – Injury/Illness/Incident Reporting and Notification.
 - iv. Ensure that requirements of this SMS are incorporated into all project health and safety plans.

2. Human Resources

Human Resources will

- a. The HR Representatives will forward any external communication (e.g., clinic bills, monopolistic state forms) to the Occupational Health Nurse or Workers' Compensation Administrator upon receipt.
- b. Assist with the return-to-work process, if needed.

3. Supervisor

The Supervisor (or HR or HSE Representative) will

- a. For initial medical treatment, escort employee to medical treatment provider.

The supervisor (or designated HSE or HR representative) will accompany the employee to the medical treatment provider. This reduces the risk of the employee driving while injured, ensures the injured employee is treated by the correct medical provider, coordinates alcohol and drug testing when applicable, and allows for another person to describe to the medical provider how the injury occurred, the type of work activities the injured person performs, and URS' return-to-work program.

- b. Sign the Medical Treatment Referral form (Attachment 065-2 NA) prior to the employee leaving the site for medical treatment (this will not be necessary in an emergency). The employee will also be given the Medical Authorization Form (Attachment 065-3 NA) to be signed with copy provided to the employee, health care provider, and Occupational Health Nurse or Workers' Compensation Administrator.

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

- c. Provide transitional job assignments, with consultation and approval of the office manager, whenever possible to enable an injured worker to return to work (Return to Work Policy Attachment 065-4 NA).
Transitional employment is defined as temporary modified or light duty work that covers the time from the injury until the release to full duty from the doctor. The return to work hierarchy includes the following:
 - i. Return to own job.
 - ii. Return to own job with accommodations/modifications.
 - iii. Return to another job at URS with or without accommodations/modifications.
 - iv. Placement in alternate jobs through telecommuting or other job assignments determined case by case.
- c. Provide, when requested by the treating physician or insurance carrier, the Description of Employee's Job Duties form (Attachment 065-5 NA).
- d. Maintain regular contact with employees who are temporarily disabled (contact at least weekly by phone or email).

4. Employee

The employees will

- a. Report injuries immediately to their supervisors. Employees are encouraged to contact their supervisor and/or the Occupational Health Nurse or Workers' Compensation Administrator prior to seeking any medical services for nonemergency injuries and illnesses.
 - b. Review and comply with Attachment 065-6 – Employee's Responsibilities.
- D. URS will follow the recordability requirements of U.S. Occupational Safety and Health Administration (OSHA) (29 CFR 1904 and 1952) for both U.S. and international operations.
- 1. For Infrastructure & Environment and Federal Services, the Occupational Health Nurse will maintain OSHA 300 logs for U.S. locations. For Energy & Construction, the Business Group HSE Managers will maintain OSHA 300 logs for U.S. locations. The OSHA 300A forms and 300 logs will be distributed to the U.S. locations each January. 300 A forms will be posted from February 1 to April 30 in a location conspicuous to all employees.

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

The posted 300A form must not be altered, defaced, or covered by any other materials.

2. Sites working under the U.S. Mine Safety and Health Administration (MSHA) recordkeeping requirements will meet MSHA requirements, as well as track injuries using OSHA criteria for use in company HSE statistics.
3. For Infrastructure & Environment and Federal Services, the Occupational Health Nurse will make the initial decision on recordability of an injury/illness. For Energy & Construction, the Business Group HSE Manager will make the decision on recordability of an injury/illness.
4. For Infrastructure & Environment, a recordability review committee will be appointed by the Vice President HSE to review the recordable cases on a monthly basis. The review committee (based on OSHA regulations and information regarding the case) will make the final decision on recordability.
5. The injury/illness statistics (e.g., Total Recordable Incident Rate) will be calculated monthly and reported to URS management.
6. Completed logs of recordable cases, including any regulatory required forms (OSHA 300 logs, incident report forms, etc.) will be retained at least five years following the end of the calendar year these records cover.

5. Documentation

- A. The following documents will be maintained in the office/project safety file:
 1. Posting of medical services providers and emergency phone numbers.
 2. List of qualified first aid providers.
 3. Documentation of coordination between URS and emergency service providers for field/construction projects.
 4. Completed Injury/Illness/Incident Report Form (Attachment 049-1).
 5. Description of Employee's Job Duties form.
 6. Medical Treatment Referral form.
 7. Medical Authorization Form.

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

B. The following documents will be maintained by the HR Representative and copied to the Occupational Health Nurse or Workers' Compensation Administrator.

1. Physician's First Report of Injury and follow-up reports.
2. Medical Treatment Referral form.
3. Medical Authorization Form.
4. Description of Employee's Job Duties form.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) [29 Code of Federal Regulations \(CFR\) 1910.151](#) – Medical Services and First Aid
- B. [OSHA 29 CFR 1910.1030](#) – Bloodborne Pathogens
- C. [OSHA 29 CFR 1926.50](#) – Medical Services and First Aid
- D. [OSHA 29 CFR 1904](#) – Recording and Reporting Occupational Injuries and Illnesses
- E. [OSHA 29 CFR 1952](#) – Approved State Plans for Enforcement of State Standards
- F. American National Standards Institute ([ANSI Z358.1-2004](#)) – Emergency Eyewash and Shower Equipment
- G. [OSHA Instruction CPL 2-2.53](#) – Guidelines for First Aid Programs
- H. [OSHA Safety and Health Topics: Medical and First Aid](#)
- I. Red Cross Health and Safety Services – www.redcross.org/services/hss/
- J. [SMS 003](#) – Emergency Preparedness/Crisis Management Plans
- K. [SMS 024](#) – Medical Screening and Surveillance
- L. [SMS 049](#) – Injury/Illness/Incident Reporting and Notifications
- M. [SMS 051](#) – Bloodborne Pathogens
- N. Medical Services Provider – WorkCare™ 1-800-455-6155

URS SAFETY MANAGEMENT STANDARD

Injury and Claims Management

O. Contacts

Infrastructure & Environment	Federal Services	Energy & Construction
Occupational Health Manager	Occupational Health Nurse Workers' Compensation Manager	Claims Manager
Jeanette Schrimsher, RN COHN-S (866) 326-7321 (Toll Free-U.S.) (512) 656-0203 (Cell) (512) 419-6413 (Confidential Fax)	BJ Heinrich, RN, COHN-S/CM, STS (877) 878-9525 (Toll Free) (512) 656-8502 (Cell) (512) 419-6413 (Confidential Fax)	Terry Sower, CPCU, AIC, CWCP (208) 386-6038 (Office) (208) 890-3843 (Cell) (208) 386-5462 (Confidential Fax)

P. [Attachment 065-1 NA](#) – Injury Management Procedures Flow Chart

Q. [Attachment 065-2 NA](#) – Medical Treatment Referral form

R. [Attachment 065-3 NA](#) – Medical Authorization Form

S. [Attachment 065-4 NA](#) – Return to Work Policy

T. [Attachment 065-5 NA](#) – Description of Employee's Job Duties

U. [Attachment 065-6 NA](#) – Employee's Responsibilities

V. [Attachment 065-7 NA](#) – Injury Management Checklist

W. [Attachment 065-8 NA](#) – First Aid Kit Supply List

7. Supplemental Information

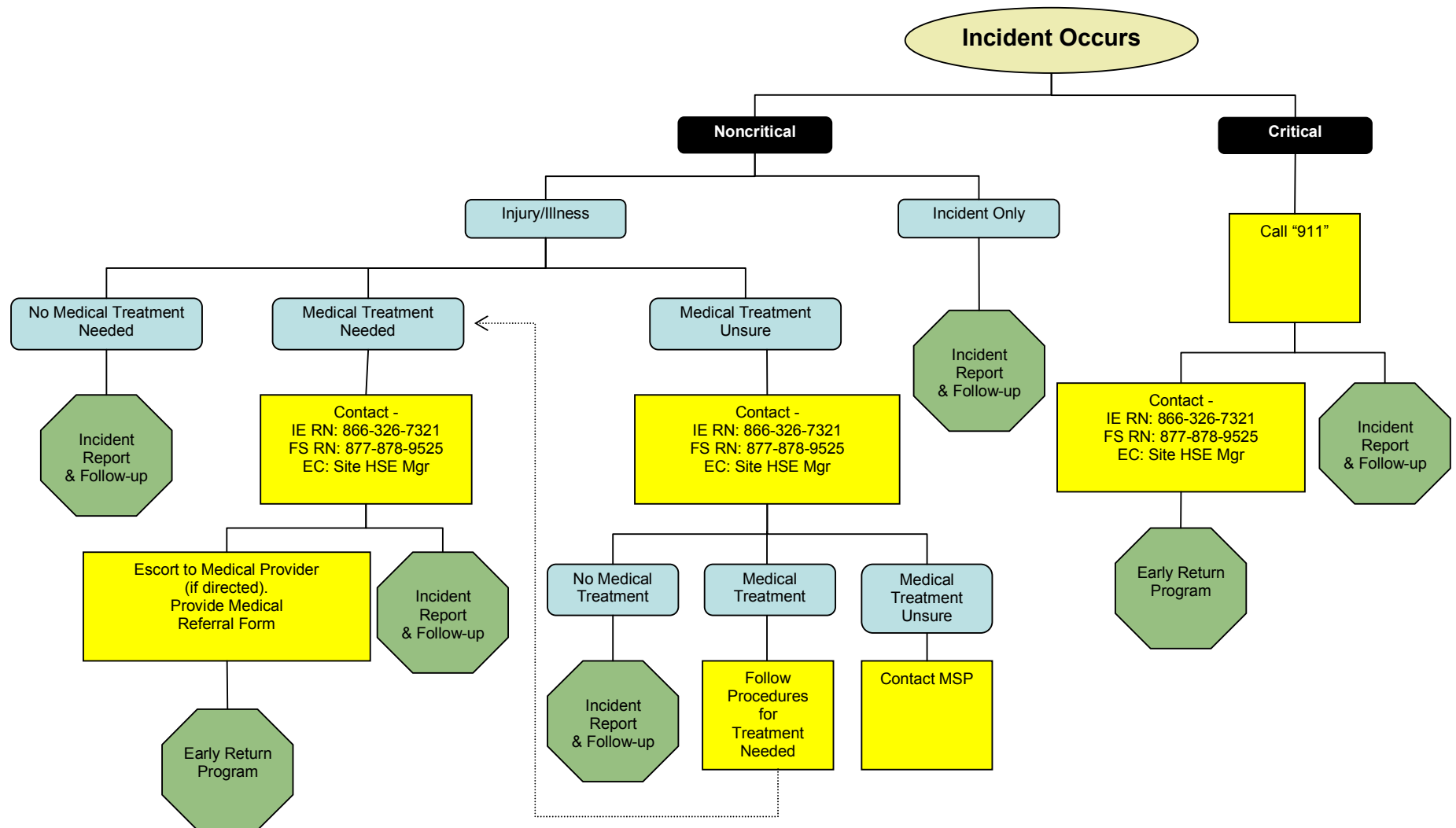
A. [Emergency Eyewash and Shower Equipment](#)



Health, Safety and Environment
**INJURY MANAGEMENT PROCEDURES
FLOW CHART**

Attachment 065-1 NA

Issue Date: January 2003
Revision 7: September 2012





Health, Safety, and Environment
MEDICAL TREATMENT REFERRAL

Attachment 065-2 NA

Issue Date: January 2003
Revision 7: September 2012

Date _____ Site Phone Number _____

URS Site Contact _____

Employee Name _____ Social Security # _____

Employee Signature _____

Brief Job Description _____

Date of Injury _____ Body Part Injured _____

Place of Injury _____

Post-accident drug and/or alcohol test required? Yes ☐ No ☐

Medical Provider:

Name _____ Phone _____

Address _____

Employee Transported to Medical Provider by: _____

**Workers' Compensation
Claims Administrator:**

Sedgwick CMS (see attached billing locations)
(except for: Washington, Ohio, North Dakota, Wyoming)

For questions, please contact:

Infrastructure & Environment	Jeanette Schrimsher, RN	(866) 326-7321
Federal Services	BJ Heinrich, RN	(877) 878-9525
Energy & Construction	Terry Sower	(208) 386-6038

Early Return-to-Work and Transitional Employment Policy

To Medical Providers: URS Corporation values its employees and believes that it is helpful to an injured worker's recovery to return to work as soon as medically approved. Please contact us if you have any questions regarding releasing the employee to work either in a modified/light duty status or full duty clearance. Please send a work status report to the site contact listed above following the initial medical evaluation and each follow-up appointment.

Supervisor Name _____

Supervisor Signature _____



Health, Safety, and Environment
MEDICAL TREATMENT REFERRAL

Attachment 065-2 NA

Issue Date: January 2003
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Providers: Send medical bills to Sedgwick CMS at the office address indicated for the state where the claim is filed.

URS Corporation & Sedgwick Claims Management Services, Inc.

Workers' Compensation Claims Handling Offices

Albuquerque, NM	Anchorage, AK	Baltimore, MD	Boise, ID
<u>States Served</u> NM <u>Office Information</u> Sedgwick CMS P.O. Box 14489 Lexington, KY 40512-4489 Toll-Free: 800-255-4349 Tel: 505-255-0437 Fax: 505-256-1412	<u>States Served</u> AK <u>Office Information</u> Sedgwick CMS PO Box 14518 Lexington, KY 40512-4518 Toll-Free: 866-853-0048 Tel: 907-868-2787 Fax: 907-868-3042	<u>States Served</u> DC, DE, MD, PA <u>Office Information</u> Sedgwick CMS P.O. Box 14491 Lexington, KY 40512-4491 Toll-Free: 800-285-3258 Tel: 410-773-4200 Fax: 410-773-4221	<u>States Served</u> ID <u>Office Information</u> Sedgwick CMS P.O. Box 14543 Lexington, KY 40512-4543 Toll-Free: 866-253-1074 Tel: 208-388-3200 Fax: 208-388-3210
Charleston, WV	Columbia, SC	Dallas, TX	Denver, CO
<u>States Served</u> WV <u>Office Information</u> Sedgwick CMS P.O. Box 14490 Lexington, KY 40512-4490 Toll-Free: 877-393-0022 Tel: 304-347-9600 Fax: 304-347-9610	<u>States Served</u> AL, GA, KY, MS NC, SC, TN, VA <u>Office Information</u> Sedgwick CMS P.O. Box 14480 Lexington, KY 40512-4480 Toll-Free: 800-426-9218 Tel: 803-772-1111 Fax: 803-750-2885	<u>States Served</u> LA, OK, TX <u>Office Information</u> Sedgwick CMS P.O. Box 14497 Lexington, KY 40512-4497 Toll-Free: 888-899-4694 Tel: 214-922-0600 Fax: 214-922-0650	<u>States Served</u> AZ, CO <u>Office Information</u> Sedgwick CMS P.O. Box 14493 Lexington, KY 40512-4493 Toll-Free: 800-507-9656 Tel: 303-713-6000 Fax: 303-713-6056
Portland, ME	Helena, MT	Honolulu, HI	Las Vegas, NV
<u>States Served</u> CT, MA, ME NH, RI, VT <u>Office Information</u> Sedgwick CMS P.O. Box 14492 Lexington, KY 40512-4492 Toll-Free: 800-526-3721 Tel: 207-874-9100 Fax: 207-874-9199	<u>States Served</u> MT <u>Office Information</u> Sedgwick CMS P.O. Box 14544 Lexington, KY 40512-4544 Toll-Free: 866-458-4737 Tel: 406-442-2202 Fax: 406-442-2865	<u>States Served</u> HI <u>Office Information</u> Sedgwick CMS P.O. Box 14541 Lexington, KY 40512-4541 Toll-Free: 866-580-6674 Tel: 808-523-3200 Fax: 808-523-3250	<u>States Served</u> NV <u>Office Information</u> Sedgwick CMS P.O. Box 14483 Lexington, KY 40512-4483 Toll-Free: 888-713-1112 Tel: 702-568-3800 Fax: 702-240-1962
Memphis, TN	Omaha, NE	Portland, OR	Rochester, NY
<u>States Served</u> AR <u>Office Information</u> Sedgwick CMS P.O. Box 14423 Lexington, KY 40512-4423 Toll-Free: 866-856-4805 Tel: 901-566-3300 Fax: 901-566-3415	<u>States Served</u> IA, IL, IN, KS MI, MN, MO NE, SD, WI <u>Office Information</u> Sedgwick CMS P.O. Box 14513 Lexington, KY 40512-4513 Toll-Free: 800-486-2152 Tel: 402-496-2000 Fax: 402-496-6511	<u>States Served</u> OR <u>Office Information</u> Sedgwick CMS P.O. Box 14514 Lexington, KY 40512-4514 Toll-Free: 800-906-3147 Tel: 503-412-3900 Fax: 503-412-3990	<u>States Served</u> NJ, NY <u>Office Information</u> Sedgwick CMS P.O. Box 14515 Lexington, KY 40512-4515 Toll-Free: 866-846-7757 Tel: 585-368-7700 Fax: 585-368-7710
Rancho Cordova, CA	Salt Lake City, UT	Tampa, FL	
<u>States Served</u> CA <u>Office Information</u> Sedgwick CMS P.O. Box 14433 Lexington, KY 40512-4433 Toll-Free: 866-274-6586 Tel: 916-771-2900 Fax: 916-771-2990	<u>States Served</u> UT <u>Office Information</u> Sedgwick CMS P.O. Box 14485 Lexington, KY 40512-4485 Toll-Free: 866-814-8220 Tel: 801-258-9700 Fax: 801-258-9730	<u>States Served</u> FL <u>Office Information</u> Sedgwick CMS P.O. Box 14437 Lexington, KY 40512-4437 Toll-Free: 888-390-9522 Tel: 813-287-8399 Fax: 813-282-6783	

	Health, Safety, and Environment MEDICAL AUTHORIZATION FORM	Attachment 065-3 NA Issue Date: January 2003 Revision 7: September 2012

**WORKERS' COMPENSATION
EMPLOYEE AUTHORIZATION LETTER**

To Whom It May Concern:

I, _____, hereby authorize any hospital,
Please Print Name
 medical practitioner, clinic, other medical or medically related facility, pharmacy,
 or insurance company to furnish to URS Corporation or its subsidiaries or
 representatives (orally or in writing) information with respect to any work-related
 injury or illness, including treatments, consultations, prescriptions, and copies of
 applicable records that may be requested. I also authorize my employer to
 disclose information needed to process my workers' compensation claim.

The information provided to URS Corporation, its subsidiaries, or representatives
 is to be used solely for the administration of my workers' compensation claim.

A photocopy of this authorization is to be considered as valid as the original and
 is effective for the duration of the claim.

Signature: _____ Date: _____

Signed copies to: ☐ Employee
☐ Medical Provider
☐ URS Occupational Health Nurse/Workers' Compensation Administrator

	Health, Safety, and Environment RETURN TO WORK POLICY	Attachment 065-4 NA Issue Date: January 2003 Revision 7: September 2012

Our primary goal in safety is the prevention of work-related injuries. When an injury does occur, it is the policy of URS to provide our employees with the best possible recovery program. A major component of any successful recovery program is returning the injured employee to the workforce as soon as medically possible. This type of Early Return Strategy has been shown to dramatically reduce the overall recovery time of injured workers, creating a benefit for the employee, his/her family, coworkers, and the firm.

As part of this policy, Operations; Human Resources; Health, Safety, and Environment; and our workers' compensation insurance carrier will work together with our employees and their treating physician to establish a recovery program that minimizes both the number of cases and total days away from work experienced by our employees. URS operations will accommodate transitional work (i.e., light duty or modified work) requirements for employees recovering from work related injuries, whenever possible. The work limits, as defined by the treating physician, will be strictly adhered to. Modified job assignments will be structured to meet the capacities and therapy needs of the injured employee.

	Health, Safety and Environment	Attachment 065-5 NA
	DESCRIPTION OF EMPLOYEE'S JOB DUTIES	Issue Date: January 2003 Revision 7: September 2012

Print Name: _____

Location: _____ Phone: _____

Job Title: _____ No. Hours/Day: _____ No. Days/Week: _____

General Job Description: _____

1. Check the frequency and number of hours a day the activity is performed:

Activity	Frequency		Number of Hours Per Day										
	Continuous	Intermittent	0	1	2	3	4	5	6	7	8	9+	
Sitting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Walking	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Standing	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Bending	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Squatting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Climbing	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Kneeling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Twisting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

2. Hand manipulation required? (If yes, complete 2 a, b, c, d) Yes ☐ No ☐

2a. Simple grasping? Yes ☐ No ☐ Right ☐ Left ☐

2b. Power grasping? Yes ☐ No ☐ Right ☐ Left ☐

2c. Pushing and pulling? Yes ☐ No ☐ Right ☐ Left ☐

2d. Fine manipulation? Yes ☐ No ☐ Right ☐ Left ☐

3. Does the job require reaching at or above shoulder level? Yes ☐ No ☐

4. Does the job require use of the feet to operate foot controls? Yes ☐ No ☐

5. Are there special visual requirements? (Describe) Yes ☐ No ☐

6. Are there special hearing requirements? (Describe) Yes ☐ No ☐

	Health, Safety and Environment	Attachment 065-5 NA
	DESCRIPTION OF EMPLOYEE'S JOB DUTIES	Issue Date: January 2003 Revision 7: September 2012

7. Lifting and carrying (check weight lifted, frequency, and how far carried):

Weight	Frequency			Distance Carried
	Hourly	Daily	Weekly	
1-10 lbs.	☐	☐	☐	_____
11-25 lbs.	☐	☐	☐	_____
26-40 lbs.	☐	☐	☐	_____
41-60 lbs.	☐	☐	☐	_____
61-75 lbs.	☐	☐	☐	_____

8. Environmental conditions (check yes or no):

8a. Work near dust, gas, vapors, or fumes?	Yes ☐	No ☐
8b. Work in noisy environment?	Yes ☐	No ☐
8c. Work in extremely hot temperature?	Yes ☐	No ☐
8d. Work in extremely cold temperature?	Yes ☐	No ☐
8e. Work at heights?	Yes ☐	No ☐
8f. Walk on uneven surfaces?	Yes ☐	No ☐

9. Equipment operated (check yes or no):

9a. Computer and mouse? If yes, hours per day _____	Yes ☐	No ☐
Type of work _____		
9b. Drive car, truck, or van?	Yes ☐	No ☐
9c. Operate forklift or heavy equipment?	Yes ☐	No ☐
9d. Other (please describe):		

Print Name:

Signature:

Date:

Supervisor

Medical Provider

	Health, Safety and Environment EMPLOYEE'S RESPONSIBILITIES	Attachment 065-6 NA Issue Date: January 2003 Revision 7: September 2012

If an employee is injured at work or becomes ill due to a work-related issue, the employee must abide by the following:

1. Employee shall immediately notify their supervisor and HSE representative, even if the employee does not believe that they need medical attention.
2. With the assistance of their supervisor, the employee shall complete SMS 049-1 (in all cases), and SMS 065-3 (Medical Treatment Referral form) if medical attention is needed.
3. If it is perceived that medical attention is needed, an employee will be provided an opportunity for a telephonic consultation with the Occupational Health Nurse (OHN). During that consultation, if it is determined that an employee will need a physician evaluation, the OHN will contact the clinic with the necessary workers' compensation billing information. Unless it is an emergency, all employees are required to obtain approval from their supervisor and OHN. This ensures that URS, the workers' compensation carrier and the clinic are notified appropriately and timely medical treatment can be provided and follow-up given.
4. Provide the Medical Treatment Referral form to the treating physician. If employees are unable to obtain the form prior to being treated (i.e., onset of symptoms during non-work hours, work in remote locations), they must notify their supervisor as soon as possible on the next scheduled workday.
5. If an employee is treated by a physician, the employee is required to inquire if a consent form will need to be signed by the employee in order for medical records to be released to the URS Occupational Health Team. (Some clinics do not accept form SMS 065-3.) The employee will also need a work status form from the physician indicating if the employee can return to work, has restrictions or must be off work.
6. This work status form must be given to the employee's supervisor and/or HSE representative **and** emailed or faxed to URS Occupational Health Team immediately after the physician visit. Contact information for the URS Occupational Health Team is presented below.

Infrastructure & Environment	Federal Services	Energy & Construction
Occupational Health Manager	Occupational Health Nurse Workers' Compensation Manager	Claims Manager
Jeanette Schrimsher, RN, COHN-S	BJ Heinrich, RN, COHN-S/CM, STS	Terry Sower, CPCU, Als, s WCP
Toll-Free U.S): (866) 326-7321	Toll Free: (877) 878-9525	Office: (208) 386-6038
Cell: (512) 656-0203	Cell: (512) 656-8502	Cell: (208) 890-3843
Confidential Fax: (512) 419-6413	Confidential Fax: (512) 419-5252	Confidential Fax: (208) 386-5462
Email: jeanette.schrimsher@urs.com	Email: bj.heinrich@urs.com	Email: terry.sower@urs.com

	Health, Safety and Environment EMPLOYEE'S RESPONSIBILITIES	Attachment 065-6 NA Issue Date: January 2003 Revision 7: September 2012

- a. If a physician has indicated that a follow-up appointment is needed or the employee will need to schedule future follow-up appointments, the employee is required to attend the appointment regardless if the employee is feeling better or having no symptoms. There is a reason the physician felt like he/she needed to see the employee for that follow-up visit, and the visit is required to ensure proper recovery.
 - b. If an employee has been put on restrictions or is taken off work, once the employee is cleared to return to work the employee must receive a return to work without restrictions release from the physician. This updated work status report must be given to the employee's supervisor and/or HSE representative immediately. URS cannot return an employee to work without this release.
7. After every medical provider visit (whether the employee is off work/restricted work or is just having a follow-up) the employee is required to contact the URS Occupational Health Team. The employee shall provide an update as to the medical provider visit, plan of care, to ensure that the employee is getting the appropriate care in a timely manner, and to ensure that the physician is being reimbursed accordingly. The employee must also contact their supervisor and/or HSE representative to inform him/her of their work status.
8. Once the initial information of the employee's injury/illness is received by the URS workers' compensation insurance carrier, it is likely that the employee will be contacted by the workers' compensation carrier either by letter and/or by phone.
9. The claims adjuster, telephonic nurse case manager and/or field case manager may ask that the employee to communicate with them after every medical provider appointment as well. This would be in addition to the employee contacting the URS Occupational Health Team.

Off-Work or Restricted Work

It is URS' goal to return an employee back to work as quickly as possible to decrease an employee's healing time (as supported by medical studies that earlier return to work decreases complications), promote wellness, provide support to an employee during the recovery time, and to return the employee to full wage-earning capacity.

1. If an employee is placed off work by a physician for either personal medical reasons or work-related medical reasons, the employee is required to notify Human Resources, their supervisor, HSE representative and the URS Occupational Health Team. Human Resources may have additional requirements. For extended absences, an employee will want to discuss with Human Resources the necessary steps that an employee will need to take to maintain benefits that an employee has signed up for in active status (e.g., insurance premiums for personal medical insurance, short term disability, etc.).
2. For work-related incidents, once the workers' compensation carrier has determined that the case is accepted as a claim, the employee will begin receiving workers'

	Health, Safety and Environment EMPLOYEE'S RESPONSIBILITIES	Attachment 065-6 NA Issue Date: January 2003 Revision 7: September 2012

compensation payments up to a state-mandated weekly cap and after the state-mandated waiting period.

3. If an employee must be off work or is given restricted work for injury or illness of any kind, the employee is required to notify their supervisor immediately.
4. If an employee is absent for more than 3 days for personal illness or injury, an employee may be required to provide a physician note indicating the employee's work status and release to return to work. This will need to be provided to Human Resources and the employee's supervisor. For work-related illness or injury a physician's note is required for any absence due to an incident.



Health, Safety, and Environment
INJURY MANAGEMENT CHECKLIST

Attachment 065-7 NA
Issue Date: January 2003
Revision 7: September 2012

Before an Injury

- ☐ Identify emergency care service providers.
- ☐ Identify clinic for non-emergency medical care – Occupational Health physicians (give preference to Board-Certified).
- ☐ Post instructions for reporting injuries, medical providers, contact info, and driving directions on safety bulletin board(s).
- ☐ Develop a bank of light-duty positions with descriptions that would accommodate different levels of restrictions.
- ☐ Develop a relationship with the physician and clinic staff (especially Office Manager):
 - Philosophy – most effective treatment, minimize OSHA recordability, minimize impact to employee, light duty always available
 - Visit clinic often to maintain relationship (quarterly)
 - Invite physician to visit site and work areas
 - Provide copies of light-duty position descriptions.
- ☐ Implement first aid treatment program – designate/train first aid responders, keep first aid supplies readily available, etc.
- ☐ Identify who will be responsible for contacting any employees with lost work days.
- ☐ Train employees on program requirements:
 - Immediate reporting as a company mandate
 - Potential delay of treatment for late reporting
 - First aid treatment
 - Advantage for using Company physicians
 - Potential benefit loss and disciplinary action for unauthorized non-emergency treatment
 - Waiting periods for workers' compensation benefits.

When an injury occurs

- ☐ CALL 911 (or equivalent) if this is an emergency situation.
- ☐ Provide first aid treatment (e.g., ice, over-the-counter ibuprofen, bandages, a place to rest).
- ☐ Initiate an immediate investigation to ensure work-related written reports (employee and witnesses); review for red flags.
- ☐ Notify the Occupational Health Department (OHD) before non-emergency medical care; do not take to a clinic unless medically necessary.

Infrastructure & Environment	Federal Services	Energy & Construction
Jeanette Schrimsher (866) 326-7321 (Toll Free)	BJ Heinrich (877) 878-9525 (Toll Free)	Site HSE Manager or Supervisor

- ☐ Influence (or control, depending on state law) choice of treating physician.
- ☐ Escort injured employee to and remain through medical treatment.
- ☐ Remind clinic personnel of transitional duty and OSHA-recordable sensitive treatment.
- ☐ Remind injured worker of transitional-duty benefits – part of the team, receive full pay, save their personal leave time.
- ☐ Notify HSE chain-of-command and follow site communication protocol.
- ☐ Coordinate post-incident drug and alcohol screen.
- ☐ Review return-to-work slip before departing facility. Review restrictions; if unreasonable or unclear, discuss with clinic. Seek alternative solutions to lost time if medically feasible.
- ☐ Accommodate any restrictions.
- ☐ Obtain a second opinion if initial provider's diagnosis (especially lost time) is unreasonable; work closely with OHD
- ☐ Require a return-to-work slip following **all** medical visits and provide a copy to the OHD.
- ☐ Ensure the employee makes any follow-up visits or referrals to another provider – need to ensure to close the loop on workers' compensation claims.
- ☐ Maintain regular and personal contact with the employee:
 - Ensure he/she shows up for work the next day
 - If on restrictions, visit regularly to ensure working within restrictions
 - If on lost time, call on a regular basis to check status (minimum weekly).

	Health, Safety and Environment FIRST AID KIT SUPPLY LIST	Attachment 065-8 NA Issue Date: February 2001 Revision 7: September 2012

All first aid kits shall conform to the requirements of the ANSI Z308.1-2003, and shall contain the first aid items indicated below. The quantity, dimensions, or volume listed for each item is the **minimum** for compliance with this standard for Type I, II, or III kits.

- Type I kits are required to have a means for mounting in a fixed position and are generally not intended to be portable.
- Type II kits shall have a carrying handle.
- Type III kits shall have a carrying handle and shall provide a means to be mounted in a fixed position.

Required Contents:

- Absorbent Compress 32 sq in
- (16) Adhesive Bandages, 1X3 in
- Adhesive Tape - 3/8 in X 5 yd
- (10) Antiseptic 0.14 fl. oz. application
- (6) Burn Treatment, 1/32 oz. application
- Medical Exam Gloves
- Sterile pad - 3 X 3 in
- Triangular Bandage - 40 X 40 X 56 in

In addition to the required contents listed above, optional products and sizes may be included, depending on specific hazards, to augment a kit based upon the specific hazards existing in a particular work environment. Optional contents include:

- *Analgesic (Oral)* - Oral analgesics shall be packed in a single dose, tamper evident, package with full labeling as required by FDA regulations, and should contain no ingredients which are known to cause drowsiness.
- *Antibiotic Treatment* - Each antibiotic treatment shall be packaged in individual use applications containing at least 1/32 oz. of ointment. Each individual-use application shall not be reusable.
- *Bandage Compress* - Each compress shall consist of an absorbent, non-adherent pad substantially free from loose ends and raveling. The bandage shall be individually packaged, sealed and sterile.
- *Breathing Barrier* - The barrier shall be a single use disposable medical device for CPR use.
- *Burn Dressing* - Burn dressings shall be gel-soaked pad which is soluble in water and a single use.
- *Cold Pack* - Each cold pack shall be at least 4 X 5 in. and shall reach temperature within 10 seconds of activation. Cold packs shall activate under normal hand pressure and shall not leak under normal conditions of use.
- *Eye Covering* - Eye covering(s) shall have the ability to cover both eyes. Each eye covering shall be individually packaged, sealed, and sterile.
- *Eye Wash* - A minimum of 1 fl. oz. of a sterile isotonic buffered solution shall be contained in at least 0.5 fl. oz. individual use applications.
- *Roller Bandage* - Each bandage shall be at least 2 in. wide and at least 6 yd long. Each bandage shall be free from loose threads and raveling and individually packaged, and sealed.

	Health, Safety and Environment EMERGENCY EYEWASH AND SHOWER EQUIPMENT	SMS 065 NA Supplemental Information A Issue Date: February 2009 Revision 1: August 2010

A. Eyewash Equipment

Plumbed and self-contained eyewash units will meet the following specifications:

1. A controlled flow of flushing liquid will be provided to both eyes simultaneously at a velocity low enough so as to not cause injury to the user.
2. Spray nozzles will be protected from airborne contaminants. The removal of such protection during operation will not require a separate motion by the operator when activating the unit.
3. The eyewash will be designed and installed in such a manner that, once activated, it will not require the use of the operator's hands. The valve controlling the flow from the eyewash will remain open until it is intentionally closed.
4. Units will be constructed in such a manner that they will not corrode in the presence of the flushing fluid.
5. Stored flushing fluids will be protected against airborne contaminants.
6. Eyewash equipment will be capable of delivering flushing fluid to the eyes at a rate of not less than 0.4 gallons per minute (gpm), or 1.5 liters per minute (lpm), for 15 minutes.
7. The unit will be designed to provide sufficient room to allow the eyelids to be held open with the hands while the eyes are in the flushing stream.
8. The valve to open the eyewash flow will be simple to operate and will go from OFF to ON in 1 second or less.
9. The eyewash unit will be assembled and installed in accordance with the manufacturer's instructions.
10. The unit will be in an accessible location that requires no more than 10 seconds to reach. It will be on the same level as the hazard and the path of travel will be free of obstructions. For strong caustics or acids, the eyewash should be immediately adjacent to the hazard.
11. The unit will be located in an area identified with a highly visible sign positioned so that the sign will be visible within the area served by the eyewash. The area around the eyewash will be well lit.
12. The eyewash will deliver tepid flushing fluid.
13. Where the possibility of freezing conditions exists, equipment will be protected from freezing or freeze-protected equipment will be installed.

	Health, Safety and Environment EMERGENCY EYEWASH AND SHOWER EQUIPMENT	SMS 065 NA Supplemental Information A Issue Date: February 2009 Revision 1: August 2010

14. Plumbed eyewash equipment will be activated weekly to verify operation and ensure that flushing fluid is available. Self-contained eyewash equipment will be visually checked regularly to determine whether the flushing fluid needs to be changed or supplemented.
15. All eyewash units will be inspected annually for compliance with the requirements listed in this document.
16. Employees who may be exposed to hazardous materials will be instructed in the location and proper use of emergency eyewash units.

B. Shower Equipment

Plumbed and self-contained shower units will meet the following specifications:

1. A controlled flow of flushing liquid will be provided to both eyes simultaneously at a velocity low enough so as to not cause injury to the user.
2. The shower will be designed and installed in such a manner that, once activated, it will not require the use of the operator's hands. The valve controlling the flow from the eyewash will remain open until it is intentionally closed.
3. Units will be constructed in such a manner that they will not corrode in the presence of the flushing fluid.
4. Stored flushing fluids will be protected against airborne contaminants.
5. Shower equipment will be capable of delivering flushing fluid at a rate of not less than 20 gpm (75.7lpm) for 15 minutes.
6. The valve to open the eyewash flow will be simple to operate and will go from OFF to ON in 1 second or less.
7. The eyewash unit will be assembled and installed in accordance with the manufacturer's instructions.
8. The unit will be in an accessible location that requires no more than 10 seconds to reach. It will be on the same level as the hazard, and the path of travel will be free of obstructions.
9. The unit will be located in an area identified with a highly visible sign positioned so that the sign will be visible within the area served by the shower. The area around the eyewash will be well lit.
10. The shower will deliver tepid flushing fluid.
11. Where the possibility of freezing conditions exists, equipment will be protected from freezing or freeze-protected equipment will be installed.

	Health, Safety and Environment EMERGENCY EYEWASH AND SHOWER EQUIPMENT	SMS 065 NA Supplemental Information A Issue Date: February 2009 Revision 1: August 2010

12. Plumbed shower equipment will be activated weekly to verify operation and ensure that flushing fluid is available. Self-contained shower equipment will be visually checked regularly to determine whether the flushing fluid needs to be changed or supplemented.
13. All eyewash units will be inspected annually for compliance with the requirements listed in this document.
14. Employees who may be exposed to hazardous materials will be instructed in the location and proper use of emergency eyewash units.

C. Eye/Face Wash Equipment

Eye/face wash equipment will meet all the criteria outlined in Section A, except the equipment will be capable of delivering flushing fluid at a rate of not less than 3.0 gpm (11.4 lpm) for 15 minutes.

D. Combination Units

Combination units (eyewash and shower assemblies served by a single source of flushing fluid) will meet all the criteria outlined in Section B.

URS SAFETY MANAGEMENT STANDARD

Manual Material Handling

1. Applicability

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

2. Purpose and Scope

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

3. Implementation

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

4. Requirements

A. General

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

URS SAFETY MANAGEMENT STANDARD

Manual Material Handling

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

B. Preplanning

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

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Manual Material Handling

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

C. Lifting/Lowering Guidelines

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

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

D. Carrying/Holding Guidelines

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

E. Pushing/Pulling Guidelines

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

URS SAFETY MANAGEMENT STANDARD

Manual Material Handling

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

F. Workplace Design

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

G. Training

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

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Manual Material Handling

- a. Showing personnel how to avoid unnecessary physical stress and strain during MMH operations.
 - b. Teaching personnel to become aware of what they can comfortably handle without undue strain.
 - c. Instructing personnel on the proper use of equipment.
 - d. Teaching personnel to recognize potential hazards and how to prevent or correct them.
2. This training must be completed prior to an employee being assigned to a task that involves MMH activities.
 3. Assistance with training or training materials is available through the HSE staff.

5. Documentation Summary

The following documentation will be maintained in the project file:

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

6. Resources

- A. National Institute for Occupational Safety and Health (NIOSH) – Work Practices Guide for Manual Lifting <http://www.cdc.gov/niosh>
- B. Canadian Centre for Occupational Health and Safety
<http://www.ccohs.ca/oshanswers/ergonomics/>
- C. Oregon OSHA – Ergonomics of Manual Materials Handling
<http://www.cbs.state.or.us/external/osh/pdf/workshops/206w.pdf>
- D. North Carolina Department of Labor – A Guide to Manual Materials Handling and Back Safety
<http://www.nclabor.com/osh/etta/indguide/ig26.pdf>

7. Supplemental Information

- A. [Recommended Weight Limit \(RWL\) Calculations](#)

URS SAFETY MANAGEMENT STANDARD

Powered Industrial Trucks

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies that use powered industrial trucks. A powered industrial truck is defined as a mobile, power-propelled truck used to carry, push, pull, lift, stack, or tier materials. Forklifts, pallet trucks, rider trucks, fork trucks, lift trucks, pallet jacks, motorized hand trucks, and skid steer loaders are all types of powered industrial trucks. This standard does not apply to aerial lifts, cranes, or vehicles intended primarily for earth-moving or over-the-road hauling.

2. Purpose and Scope

The purpose of this standard is to provide direction for the safe operation of powered industrial trucks on all operations of URS Corporation and its subsidiary companies, thus limiting the potential for injury to both the operators of the equipment and ground personnel working in the immediate vicinity.

3. Implementation

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

4. Requirements

A. Eligibility

1. Train and authorize employees operating a powered industrial truck to use the specific type of truck to which they are assigned.
Training and evaluation must be conducted by personnel with adequate knowledge, training, and experience in the operation of the truck.
2. Maintain employee training documentation in the health and safety files.
3. Training will consist of a combination of formal instruction, practical training, and an evaluation of the operator's performance, and should consist of the following subjects:
 - a. Operating instructions, warnings, and precautions;
 - b. Differences between the truck and automobiles;
 - c. Truck controls and instrumentation;
 - d. Engine/motor operation;
 - e. Steering and maneuvering;
 - f. Visibility, including restrictions;
 - g. Attachment adaptation, operation, and use limitations;

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Powered Industrial Trucks

- h. Vehicle capacity and stability;
 - i. Refueling and/or recharging;
 - j. Vehicle inspection and maintenance required by the operator;
 - k. Operating limitations; and
 - l. Any other instructions, warnings, and precautions listed in the operator's manual.
4. Operators completing training will receive a certificate of completion. The certificate will include:
- Name of the operator
 - Date of training
 - Date of evaluation
 - Identity of the person(s) performing the training evaluation.
5. Refresher training must be conducted at least once every 3 years. Refresher training may be conducted on an as-needed basis if:
- a. The operator is observed to be using the truck in an unsafe manner;
 - b. The operator has been in an accident or a near-miss incident that is attributable to the operation of the truck;
 - c. The operator receives an evaluation that indicates unsafe operation of the truck;
 - d. The operator is assigned a different type of truck; or
 - e. A change occurs in the workplace that could affect the safe operation of the truck.

B. Inspections

- 1. Inspect the truck daily or before each shift.
- 2. Inspections should include each of the following:
 - a. Adjustment and wear of the control mechanisms;
 - b. Operation of safety devices (horns, seat belts, etc.);
 - c. Operation/deterioration of the hydraulic systems;
 - d. Operation of electrical systems;
 - e. Operation of steering and breaking systems; and
 - f. Condition of truck tires.

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Powered Industrial Trucks

3. Use Attachment 070-1 NA as a guide to inspections for battery-operated lift trucks, and Attachment 070-2 NA as a guide to inspections for engine-powered lift trucks.
4. Report any damage or problems identified during the inspection to your immediate supervisor. Tag and remove equipment from service when defects are found that can affect the safe operation. Do not use equipment until the damage or problems have been corrected.
5. Approved trucks will carry labels, nameplates, or identifying marks indicating the following:
 - a. Approval of the truck for fire safety purposes by a nationally recognized testing laboratory;
 - b. Capacity of the truck and its attachments;
 - c. Operation and maintenance instructions; and
 - d. Designation of the truck, based on fuel type and fire safety features. The eleven standard truck designations are discussed in Supplemental Information A.
6. Ensure that all labels, nameplates, or identifying marks are maintained in legible condition.

C. Operation

1. There are many types of powered industrial trucks for various applications. Use a type suitable for the task. Supplemental Information A provides additional information on the types of powered industrial trucks available.
2. Review and follow truck operating instructions as provided in the machine's operator manual.
3. Securely fasten seat belts or other restraining devices. Remain seated at all times while the truck is in operation.
4. Keep body parts within the truck while driving. Do not place any part of the body between mast uprights or any other part of the truck where a shear or crushing hazard may exist.
5. Look toward and keep a clear view of the path of travel.
6. Do not permit passengers to ride on the truck unless a separate seat and restraining device are provided.
7. Use extreme caution on or near ditches, holes, embankments, grades, ramps, or other slopes. Avoid turning on grades. Avoid use of the truck in areas where cracks and crumbling surface

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Powered Industrial Trucks

materials may be present. Never run over loose objects on the roadway surface.

8. Do not make quick starts, jerky stops, or turns at excessive speeds.
9. Slow the truck and sound the horn at cross aisles, intersections, building corners, or other locations where vision is obstructed. Lightly tap the horn to warn pedestrians when approaching from behind.
10. Operate the truck only at those speeds that will permit it to be stopped safely. Pay particular attention to wet or slippery surfaces.
11. Do not drive the truck up to anyone standing in front of a fixed object.
12. Observe all traffic regulations and signage. Maintain at least three truck lengths from other vehicles following the same travel path.
13. Cross railroad tracks or other bumps in the travel path diagonally where possible.
14. Engage the parking brake, lower any lifting devices, and neutralize all controls (e.g. remove keys) before dismounting from the truck. Block or chock the wheels if parked on an incline.
15. Turn off the truck engine when it is not under direct control of the operator (e.g., within 10 feet [3 meters] of the operator).
16. Stunt driving or horseplay is strictly prohibited.
17. Never allow anyone to ride on a truck's lifting device (if present) unless a legally acceptable elevating platform is used. If an elevating platform is used to raise personnel to a higher level, secure the elevating platform to the lifting carriage of the truck. Additionally, use a restraining device such as a rail, chain, or body belt with a lanyard for the employee on the platform.
18. In the event that a truck overturns, do not attempt to jump from the machine. Stay in the truck, holding on firmly and leaning in the opposite direction of the overturn.
19. Restrict the use of trucks in areas where large numbers of pedestrians are present (e.g., break areas, primary exits, etc.).
20. Use trucks only for the purpose for which they were designed. Do not use trucks to bump, push, or otherwise move materials or other trucks.

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Powered Industrial Trucks

D. Lifting and Moving Loads

1. Handle only stable or safely arranged loads.
2. Place heavy objects with the weight as low as possible.
3. Block or tie objects as necessary to prevent tipping or rolling.
4. Do not load objects to a height that blocks the view of the operator.
5. Do not exceed the rated capacity of the truck or of any attachments. Attachments must have a load rating plate affixed indicating the weight that may safely be carried.
6. Do not raise or lower a truck's lifting devices while the truck is in motion.
7. Use extreme care when tilting loads. Tilting a truck attachment forward (e.g., forks, etc.) is prohibited except when picking up or depositing a load.
8. On grades, tilt the load back slightly and raise it only as far as is needed to clear the road surface. For grades in excess of 10 percent, keep the load pointed upslope when ascending or descending.
9. If using a truck to load or unload materials from a trailer or rail car, ensure that their brakes are set and that wheel blocks have been set prior to loading or unloading. Inspect the flooring of trailers and rail cars for breaks or weakness prior to driving onto them.
10. Ensure that dock boards and/or bridge plates are properly secured before being driven over. Drive over dock boards and bridge plates slowly. Never exceed the rated capacity of a dock board or bridge plate.
11. Be observant of overhead installations and utilities such as doorways, pipes, sprinklers, and lights. Review travel pathways for sufficient clearance.

E. Ground Personnel

1. Separate truck traffic and ground personnel where possible.
2. If possible, install physical barriers between workstations and truck travel paths.
3. Do not stand or pass underneath the raised portion of a truck.
4. Do not stand between an operating truck and a fixed object (i.e., walls, posts, docks, benches).
5. Do not ride on the forks. Do not ride in the cab of a truck unless specifically permitted to do so (see Section C).

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Powered Industrial Trucks

F. Service and Maintenance

1. Turn off engines before filling or replacing fuels tanks or recharging/replacing batteries. Ensure that “No Smoking” signs are posted in refueling and/or recharging areas. Immediately clean up any fuel, oil, or electrolyte leaks.
2. Provide appropriate personal protective equipment to personnel assigned to charging and changing batteries, including, but not limited to, eye protection, protective barrier creams, protective clothing, safety boots, gloves, and respiratory protection.
3. Battery charging locations must be provided with facilities for:
 - a. Flushing and neutralizing spilled electrolyte;
 - b. Fire protection;
 - c. Protection of charging apparatus; and
 - d. Adequate ventilation for dispersal of fumes.
4. Remove trucks in need of repair from service until restored to a safe operating condition. Repairs may only be completed by qualified maintenance personnel or organizations.
5. Disconnect or lock out power sources before repairs can be started.
6. Modifications, additions, or attachments that will affect the capacity and safe operation of the truck are prohibited without the written approval of the manufacturer.
7. Trucks shall be maintained in accordance with manufacturer’s instructions and inspections conducted in accordance with any local regulatory requirements.

G. Hazardous Atmospheres

1. Classify the atmosphere of a work location as to whether it is hazardous or non-hazardous prior to considering which designation of powered industrial truck to use in the area.
2. Do not use powered industrial trucks in atmospheres containing hazardous concentrations of acetylene, butadiene, ethylene oxide, hydrogen (or gases or vapors equivalent in hazard to hydrogen, such as manufactured gas), propylene oxide, acetaldehyde, cyclopropane, diethyl ether, ethylene, isoprene, or unsymmetrical dimethyl hydrazine (UDMH).
3. Do not use powered industrial trucks in atmospheres containing hazardous concentrations of aluminum (and its commercial alloys), magnesium (and its commercial alloys), or other metals of similarly hazardous characteristics.

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4. A list describing the use of powered industrial trucks in hazardous atmospheres by truck designation is provided in Supplemental Information A.
5. Evaluate carbon monoxide concentrations to ensure that they do not exceed published exposure limits when using fuel-powered trucks in an enclosed area.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Employee training records.
- B. Truck inspections.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) [29 Code of Federal Regulations \(CFR\) 1910.178](#) (Powered Industrial Trucks)
- B. [American Society of Mechanical Engineers B56.1-2000](#)
- C. Daily Battery-Powered Industrial Truck Safety Inspection Checklist – [Attachment 070-1 NA](#)
- D. Daily Engine-Powered Industrial Truck Safety Inspection Checklist – [Attachment 070-2 NA](#)

7. Supplemental Information

- A. [Powered Industrial Truck Designations and Use in Various Hazardous Locations](#)

	Health, Safety and Environment DAILY BATTERY-POWERED INDUSTRIAL TRUCK SAFETY INSPECTION CHECKLIST	Attachment 070-1 NA Issue Date: September 2004 Revision 2: February 2009

Equipment ID No.: _____ Inspector's Name: _____

Equipment Name: _____ Employee Number: _____

INSTRUCTIONS: The operator will inspect all applicable items indicated at the start of each shift. If an unsatisfactory condition is observed, immediately suspend operation of the truck and report the unsatisfactory condition to the site supervisor.

ITEM INSPECTED	SATISFACTORY?		COMMENTS
Falling Object Protective Structure	☐ Yes	☐ No	_____
Seat Belts	☐ Yes	☐ No	_____
Grab Handles	☐ Yes	☐ No	_____
Back-up Alarm	☐ Yes	☐ No	_____
Lights	☐ Yes	☐ No	_____
Horn	☐ Yes	☐ No	_____
Mirrors	☐ Yes	☐ No	_____
Fire Extinguisher	☐ Yes	☐ No	_____
Battery Connection	☐ Yes	☐ No	_____
Battery Charge	☐ Yes	☐ No	_____
Battery Load Test	☐ Yes	☐ No	_____
Hydraulic System	☐ Yes	☐ No	_____
Hydraulic Controls	☐ Yes	☐ No	_____
Gauge and Instrument Operation	☐ Yes	☐ No	_____
Tires	☐ Yes	☐ No	_____
Steering	☐ Yes	☐ No	_____
Brakes: Service and Emergency	☐ Yes	☐ No	_____
Attachments	☐ Yes	☐ No	_____
Informational Plates/ Markings	☐ Yes	☐ No	_____
Other (as appropriate)	☐ Yes	☐ No	_____

Operator Signature: _____

Date: _____ Time: _____

	Health, Safety and Environment DAILY ENGINE-POWERED INDUSTRIAL TRUCK SAFETY INSPECTION CHECKLIST	Attachment 070-2 NA Issue Date: September 2004 Revision 2: February 2009

Equipment ID No.: _____ Inspector's Name: _____

Equipment Name: _____ Employee Number: _____

INSTRUCTIONS: The operator will inspect all applicable items indicated at the start of each shift. If an unsatisfactory condition is observed, immediately suspend operation of the truck and report the unsatisfactory condition to the site supervisor.

ITEM INSPECTED	SATISFACTORY?		COMMENTS
Falling Object Protective Structure	☐ Yes	☐ No	_____
Seat Belts	☐ Yes	☐ No	_____
Grab Handles	☐ Yes	☐ No	_____
Back-up Alarm	☐ Yes	☐ No	_____
Lights	☐ Yes	☐ No	_____
Horn	☐ Yes	☐ No	_____
Mirrors	☐ Yes	☐ No	_____
Fire Extinguisher	☐ Yes	☐ No	_____
Fuel level	☐ Yes	☐ No	_____
Oil Pressure and Level	☐ Yes	☐ No	_____
Radiator Water Level	☐ Yes	☐ No	_____
Hydraulic System	☐ Yes	☐ No	_____
Hydraulic Controls	☐ Yes	☐ No	_____
Gauge and Instrument Operation	☐ Yes	☐ No	_____
Tires	☐ Yes	☐ No	_____
Steering	☐ Yes	☐ No	_____
Brakes: Service and Emergency	☐ Yes	☐ No	_____
Attachments	☐ Yes	☐ No	_____
Informational Plates/ Markings	☐ Yes	☐ No	_____
Other (as appropriate)	☐ Yes	☐ No	_____

Operator Signature: _____

Date: _____ Time: _____

	Health, Safety and Environment Powered Industrial Truck Designations & Use in Various Hazardous Locations	SMS 070 NA Supplemental Information A Issue Date: February 2009

Designation	Description
D	Diesel powered units having minimum acceptable safeguards against inherent fire hazards
DS	Diesel powered units provided with additional safeguards to the exhaust, fuel, and electrical system
DY	Diesel powered units provided with DS unit safeguards which have no electrical equipment (including ignition) and are equipped with temperature limitation features
E	Electrically powered units having minimum acceptable safeguards against inherent fire hazards
ES	Electrically powered units provided with additional safeguards to the electrical system to prevent emission of hazardous sparks and to limit surface temperatures
EE	Electrically powered units that have the electric motor and all other electrical equipment completely enclosed
EX	Electrically powered units in which electrical fittings and equipment are so designed, constructed, and assembled that the units may be used in certain atmospheres containing flammable vapors or dusts
G	Gasoline powered units having minimum acceptable safeguards against inherent fire hazards
GS	Gasoline powered units provided with additional safeguards to the exhaust, fuel, and electrical systems
LP	Liquefied petroleum gas powered units having minimum acceptable safeguards against inherent fire hazards
LPS	Liquefied petroleum gas powered units provided with additional safeguards to the exhaust, fuel, and electrical systems

Designation	Use Location
D	Piers, wharves, general storage, industrial or commercial properties with no hazardous atmospheres
DS	• Storage of hazardous liquids in sealed containers • Storage of liquefied or compressed gases in containers • Storage or handling of easily ignitable fibers • Any location designated for D units
DY	• Areas where volatile flammable liquids or gases are handled, processed, or used, but in which the hazard is normally contained within a closed container or system • Areas where deposits or accumulations of ignitable dusts are sufficient to be ignited by arcs or sparks originating from the truck • Areas where ignitable fibers or flyings are present, but are not likely

	Health, Safety and Environment Powered Industrial Truck Designations & Use in Various Hazardous Locations	SMS 070 NA Supplemental Information A Issue Date: February 2009

Designation	Use Location
	to be present in quantities to produce ignitable mixtures Any location designated for DS units
E	Piers, wharves, general storage, industrial or commercial properties with no hazardous atmospheres
ES	- Storage of hazardous liquids in sealed containers - Storage of liquefied or compressed gases in containers - Storage or handling of easily ignitable fibers - Any location designated for E units
EE	- Areas where volatile flammable liquids or gases are handled, processed, or used, but in which the hazard is normally contained within a closed container or system - Areas where deposits or accumulations of ignitable dusts are sufficient to be ignited by arcs or sparks originating from the truck - Areas where ignitable fibers or flyings are present, but are not likely to be present in quantities to produce ignitable mixtures - Any location designated for ES units
EX	- Areas where combustible dust is or may be in suspension constantly, intermittently, or periodically under normal conditions in quantities sufficient to produce explosive or ignitable mixtures (typically includes grain, flour, starch, or other organic dust-producing facilities; coal pulverizing plants; metal dust and powder producing facilities; and other similar locations) - Any location designated for EE units
G	Piers, wharves, general storage, industrial or commercial properties with no hazardous atmospheres
GS	- Storage of hazardous liquids in sealed containers - Storage of liquefied or compressed gases in containers - Storage or handling of easily ignitable fibers - Any location designated for G units
LP	Piers, wharves, general storage, industrial or commercial properties with no hazardous atmospheres
LPS	- Storage of hazardous liquids in sealed containers - Storage of liquefied or compressed gases in containers - Storage or handling of easily ignitable fibers - Any location designated for LP units

URS SAFETY MANAGEMENT STANDARD

Behavior-Based Safety

1. Applicability

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

2. Purpose and Scope

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

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

3. Implementation

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

4. Requirements

A. Definitions

1. **At-Risk Behavior:** Individual actions that increase the chance of injury, despite knowledge of the hazard. An example is excessive speed while driving.
2. **Activators:** Items that are intended to produce desired behaviors. URS activators for safety include, but are not limited to, policy statements, safety management standards (SMS), training, safety slogans, posters and signs, health and safety plans, safe work plans, safety meetings, and rules and regulations.
3. **Behaviors:** Visible actions on the part of individuals and can be characterized as safe (following health and safety plans, using work practices that minimize risk, coaching others on safe behavior, having safety as a priority over speed and convenience, etc.), or at-risk.
4. **Consequences:** Result of safe and at-risk behaviors, and can therefore be positive or negative. Examples of consequences include self-approval, reprimand, peer approval, penalty, feedback, inconvenience, and comfort. The most effective consequences are positive, immediate, and certain.

URS SAFETY MANAGEMENT STANDARD

Behavior-Based Safety

B. Values of Behavior-Based Safety

1. Employees hold safety as a core value.
2. Each employee feels responsible for the safety of their coworkers as well as themselves, and takes action accordingly.
3. Each employee is willing and able to “go beyond the call of duty” on behalf of the safety of others.

C. Roles for Safe Behavior

1. Supervisor’s Role:
 - a. Provide clearly defined safety expectations and encourage/reinforce the implementation of safety observations using the SMS 072-1 NA checklist or equivalent.
 - b. Provide consequences for observed behaviors throughout the course of the work shift.
2. Co-Worker Role
 - a. Intervene when observing at-risk behavior.
 - b. Provide positive feedback for safe behavior.
 - c. Volunteer to be observed.

C. Identification of At-Risk Behaviors

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

1. Employee observations.
 - a. Observation checklists, either project-specific or Attachment 072-1 NA, will be used as a tool to help identify safe and at-risk behaviors and why the behavior(s) occurred.
 - b. Employees will be instructed on using the checklists.
 - c. Checklists will be included in the site-specific health and safety plan or the safe work plan.
 - d. The checklists will include the expected safe behaviors.

URS SAFETY MANAGEMENT STANDARD

Behavior-Based Safety

- e. Peers will complete the checklist for applicable work tasks.
- f. Checklists may change throughout the project to include additional behaviors.

E. Feedback to Employees

- 1. Observers will immediately provide one-on-one feedback to the observed, noting both safe and at-risk behaviors.
- 2. Observer and observee will discuss the identified barriers to safe behavior, and potential solutions.
- 3. Near-Miss and Incident Reports will be reviewed to identify at-risk behaviors and corrective actions.
- 4. Management and Health, Safety, and Environment staff will verify compliance with this standard.

F. Feedback Follow-up

- 1. Observation checklists will be collected and discussed at periodic safety meetings.
- 2. The manager will review the trends for at-risk and safe behavior, and report the trends to the employees.
- 3. Project-specific trends are analyzed and areas of additional action are identified.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Behavior-Based Safety Checklists.

6. Resources

[Attachment 072-1 NA](#) – Behavior-Based Safety Checklist



Health, Safety and Environment
**BEHAVIOR BASED SAFETY
CHECKLIST**

Attachment 072-1 NA

Issue Date: September 2003
Revision 2: February 2009

Job Location: _____

Date: _____

Task/Work _____

Observer: _____

Observed: _____

	<u>Safe</u>	<u>Unsafe</u>	<u>Comments *</u>
Personal Protective Equipment			
Head	☐	☐	_____
Hand	☐	☐	_____
Feet	☐	☐	_____
Eyes/Face	☐	☐	_____
Skin	☐	☐	_____
Hearing	☐	☐	_____
Fall Protection	☐	☐	_____
Equipment / Tools			
Proper tool for the job	☐	☐	_____
Uondition	☐	☐	_____
Proper Cse	☐	☐	_____
Body Use / Position			
Lifting	☐	☐	_____
Pinch Point	☐	☐	_____
Ladder / stairs	☐	☐	_____
Hand placement	☐	☐	_____
Travel path / speed	☐	☐	_____
Body position	☐	☐	_____
Work Practices			
Follow Safety Plan / Procedures	☐	☐	_____
Housekeeping	☐	☐	_____
Other			
_____	☐	☐	_____
_____	☐	☐	_____
_____	☐	☐	_____

* Cse comment column when unsafe behavior / conditions were observed. Describe what was observed and why this occurred.

URS SAFETY MANAGEMENT STANDARD

Management of Change

1. Applicability

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

Applicability of this standard is not required at operations meeting the following criteria:

- Client-mandated systems are in place and are not subject to change by their contractors (e.g., flight operations or ground operations);
- Activities of the URS work force are directed by an alternate site owner or manager (i.e., locations at which URS provides labor, but does not manage the workplace processes or systems); and
- Compartmentalized or classified client operations which limit the ability to discuss systemic or operational changes across functions.

At these operations, URS personnel should familiarize themselves with client requirements for management of change (MOC) and follow them accordingly.

2. Purpose and Scope

The purpose of this standard is to protect personnel from hazards caused by changes in the work environment. In any operation, situations may arise that were not foreseen or accounted for when the operating procedures or plans were developed. A change in the way the operations are conducted will be needed so that the work can be performed safely. The changes may be temporary or permanent. When managing change, the following must be considered:

- The reason for the change (i.e., technical, environmental, organizational, or personal);
- Impact of the change on health and safety risks;
- Modifications required to operating procedures or plans;
- Time period required to safely implement the change; and
- Authorizations required for the change.

The health, safety, security, environmental, technical, and other impacts of temporary and permanent changes are to be assessed, managed, documented, and approved. Employee participation in the process is critical, as regular observations on the part of URS employees drive the identification of work environment changes.

URS SAFETY MANAGEMENT STANDARD

Management of Change

3. Implementation

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

Implementation of this standard is also the responsibility of any employee identifying changes in the work environment. Review of the implementation of this standard should be part of regular project reviews and office audits.

Definitions:

1. Affected Employee – An employee who is affected by temporary or permanent changes.
2. Authorizer – The individual responsible for authorizing the implementation of the change. The Authorizer is responsible for confirming that the MOC process has been followed appropriately.
3. Coordinator – The employee responsible for coordinating the evaluation and implementation of a change. Coordinators must understand the time commitment associated with the MOC process.
4. Reviewer – An individual whose expertise and experience qualifies him or her to be recognized as competent on the issues addressed by the MOC process.
5. Initiator – The employee who recognizes an opportunity for change and initiates the MOC process.

4. Requirements

A. Temporary Changes

1. Temporary changes are deviations from normal practice. They do not change the regular operating procedures. Examples of temporary changes are:
 - a. Changing construction materials
 - b. Using alternate or replacement equipment or machinery different from that specified in the work plan
 - c. Working in changing weather or daylight conditions
 - d. Changing site layout or characteristics

URS SAFETY MANAGEMENT STANDARD

Management of Change

- e. Temporarily removing equipment alarms and safety systems
 - f. Changing work scope daily
 - g. Using temporary electrical equipment and connections
 - h. Unexpectedly using subcontractors
 - i. Working without a full team or with substitute team members
 - j. Changing drilling or excavation locations
2. Temporary changes will be addressed in the following manner.
- a. Identify the Change
 - i. Initiator advises the Supervisor of the change.
 - ii. The Supervisor verifies the conditions identified by the Initiator and determines whether change is warranted.
 - iii. If change is warranted, an MOC Coordinator is identified. In the case of a site project, this would typically be the Supervisor. In the office, this would typically be a senior professional or Project Manager.
 - b. Risk Analysis Review
 - i. The MOC Coordinator assigns an evaluation team and appropriate Reviewers.
 - ii. The evaluation team determines health, safety, environment, security, and operational risks of the change.
 - iii. Risk mitigation measures are identified.
 - c. Obtain Change Authorization

The MOC Coordinator obtains approval for the change and mitigating measures from the appropriate Authorizer. In the case of a site project, the Authorizer is typically the Project Manager. In an office the Authorizer is typically the Office Manager.

URS SAFETY MANAGEMENT STANDARD

Management of Change

d. Implement the Change

- i. Communicated change and its implications and timing to all affected employees.
- ii. Provide necessary training.
- iii. Modify or note documentation (e.g., job safety analysis, health and safety plans, safe work plans, permits, work orders), as appropriate.
- iv. Implement change.
- v. The MOC Coordinator verifies that the change took place as expected.

C. Permanent Changes

1. Permanent changes modify normal practices and may require revisions in standard operating procedures. Examples of permanent changes are:
 - a. Major changes to the project scope
 - b. Changes to regulatory requirements affecting the project
 - c. Changes in company structure
 - d. Changes in work teams/departments
 - e. Changes in client requirements
 - f. Changes to company standards or requirements
 - g. Selling new services or starting a new business line
2. Permanent changes shall be addressed in the following manner:
 - a. Identify the Change
 - i. The Initiator advises the Supervisor of the change.
 - ii. The Supervisor shall verify the conditions identified by the Initiator and determine whether change is warranted.
 - iii. If change is warranted, an MOC Coordinator is assigned.
 - b. Risk Analysis Review

URS SAFETY MANAGEMENT STANDARD

Management of Change

- i. The MOC Coordinator assembles an evaluation team representing all areas affected by the change.
 - ii. The Evaluation Team determines health, safety, environment, security, operational, legal, and financial risks of the change.
 - iii. The Evaluation Team determines the appropriate risk mitigation measures.
 - iv. The MOC Coordinator assembles an appropriate team of Reviewers representing all areas affected by the change to review the document.
 - v. The MOC Coordinator maintains a record of the evaluation with the Reviewers' signatures.
- c. Obtain Change Authorization
- i. The MOC Coordinator obtains approvals for the change and mitigating measures from the Authorizer(s). The Authorizer(s) could vary greatly depending on the magnitude of the change.
 - ii. The MOC Coordinator communicates the timeline for implementation with the appropriate Authorizer(s).
 - iii. The MOC Coordinator documents the process. Attachment 098-1 NA may be used for this purpose.
- d. Implement the Change
- i. Implement the change timeline.
 - ii. Revise the appropriate control documents as required to implement the change.
 - iii. Communicate change and its implications and timing to all Affected Employees.
 - iv. Provide necessary training.
 - v. Complete the change.
 - vi. The MOC Coordinator verifies that change took place as expected.

URS SAFETY MANAGEMENT STANDARD
Management of Change

5. Documentation Summary

The following documentation will be maintained in the project or office file:

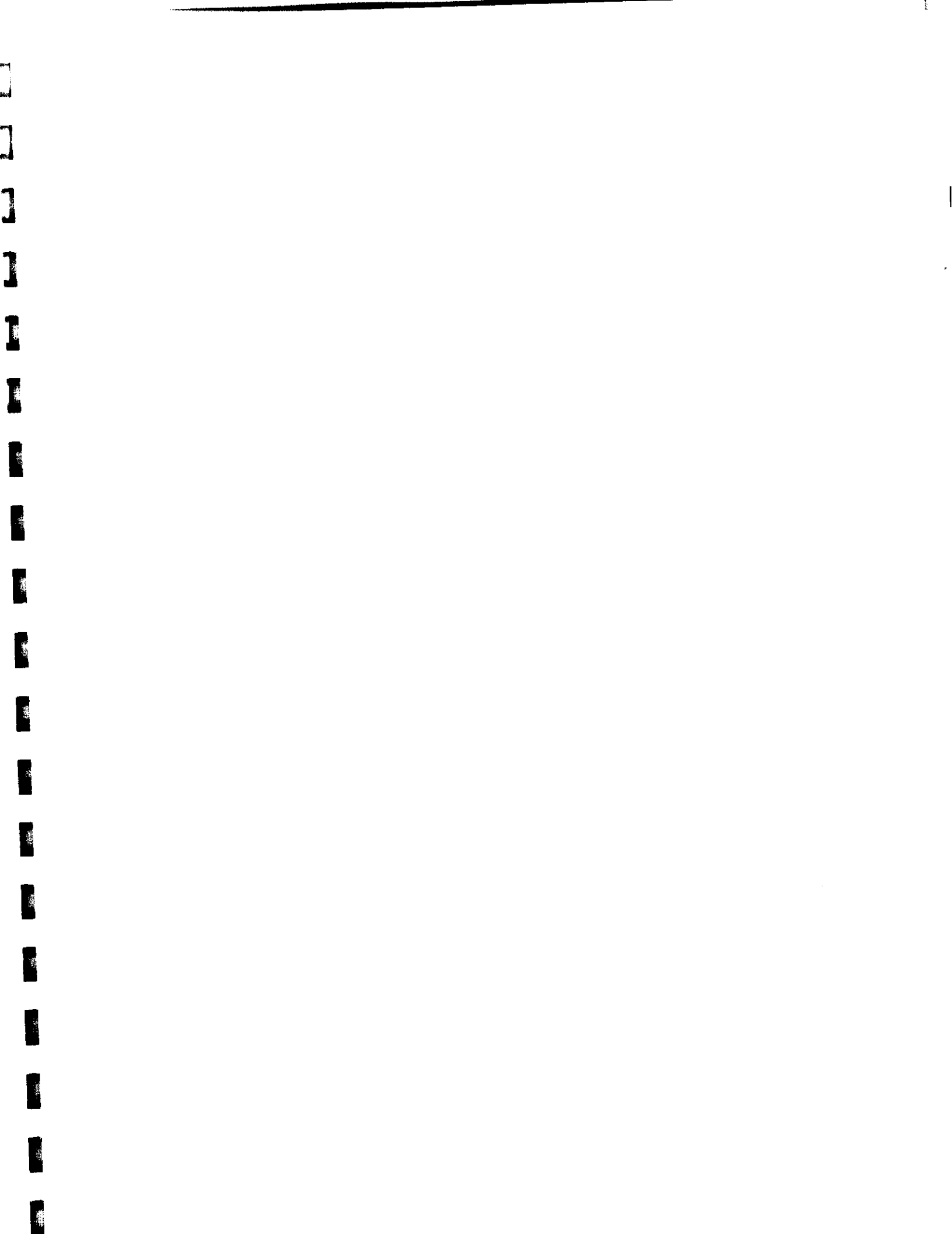
- A. Attachment 098-1 NA or equivalent

6. Resources

- A. [Attachment 098-1 NA](#) – Management of Change Authorization Form

	Health, Safety and Environment	Attachment 098-1 NA
	MANAGEMENT OF CHANGE AUTHORIZATION FORM	Issue Date: April 2010

Description of the Change (include the scope of the change and affected employees):		
Risks Identified:		Mitigation Measures:
1.		1.
2.		2.
3.		3.
4.		4.
5.		5.
MOC Coordinator:		
Print Name	Signature	Date
Evaluation Team:		
Print Name	Signature	Date
Reviewers:		
Print Name	Signature	Date
Timeline for Implementation:		
Comments/Conditions:		
Authorizer Approvals:		
Print Name	Signature	Date



APPENDIX B
SAFETY DATA SHEETS/SAFETY CARDS

Contaminants of Concern

Carbon Tetrachloride
Chloroform
Tetrachloroethene
Trichloroethene

Materials brought to the facility

Alconox[®]
DEET
Hydrochloric Acid
Isobutylene (isobutene)
Permanone[®]
Diesel Fuel
Freon

Material Safety Data Sheet

Carbon tetrachloride

ACC# 90116

Section 1 - Chemical Product and Company Identification

MSDS Name: Carbon tetrachloride

Catalog Numbers: AC148170000, AC148170250, AC167720000, AC167720010, AC167720025, AC167720100, AC167721000, AC258530000, AC269370000, AC269370010, AC269371000, AC326580000, AC326580010, AC326580025, AC600220000, AC600220010, AC600220025, AC600230000, AC600230010, AC600230025, 14817-0010, 14817-0025, 16772-5000, 25853-0010, 25853-0025, C1874, C1994, NC9267677, NC9472507, NC9596627

Synonyms: Tetrachloromethane; Carbon tet; Carbona; Carbon chloride; Methane tetrachloride.

Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
56-23-5	Carbon tetrachloride	99-100	200-262-8

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid.

Danger! May be fatal if inhaled, absorbed through the skin or swallowed. Causes eye, skin, and respiratory tract irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Cancer suspect agent. May cause liver and kidney damage. May cause central nervous system effects. This is a CFC substance which destroys ozone in the upper atmosphere. Destruction of the ozone layer can lead to increased ultraviolet radiation which, with excess exposure to sunlight, can lead to an increase in skin cancer and eye cataracts. Marine pollutant.

Target Organs: Kidneys, central nervous system, liver.

Potential Health Effects

Eye: Causes eye irritation. Vapors cause eye irritation.

Skin: Causes skin irritation. May be absorbed through the skin in harmful amounts. Contact with the skin defats the skin.

Ingestion: May cause liver and kidney damage. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Substance is a hepatotoxin and is capable of producing a toxic effect on the liver.

Inhalation: Causes respiratory tract irritation. May cause liver and kidney damage. Exposure produces central nervous system depression. May be harmful if inhaled.

Chronic: Prolonged or repeated skin contact may cause dermatitis. Chronic ingestion may cause effects similar to those of acute ingestion. May cause liver and kidney damage. May cause cancer according to animal studies. Chronic exposure may cause visual disturbances. Carbon tetrachloride is a CNS depressant.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

Inhalation: POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Material will not burn. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.

Flash Point: Not applicable.

Autoignition Temperature: > 982 deg C (> 1,799.60 deg F)

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Isolate area and deny entry. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Do not breathe vapor. Use only with adequate ventilation.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use only under a chemical fume hood.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Carbon tetrachloride	5 ppm TWA; 10 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous route	200 ppm IDLH	10 ppm TWA; 25 ppm Ceiling

OSHA Vacated PELs: Carbon tetrachloride: 2 ppm TWA; 12.6 mg/m³ TWA

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless

Odor: chloroform-like

pH: Not available.

Vapor Pressure: 91 mm Hg @ 20 deg C

Vapor Density: 5.31 (air=1)

Evaporation Rate: 12.8 (butyl acetate=1)

Viscosity: 0.97 PAS 20 deg C

Boiling Point: 76 deg C @ 760 mm Hg

Freezing/Melting Point: -23 deg C

Decomposition Temperature: > 100 deg C

Solubility: Insoluble.

Specific Gravity/Density: 1.5900 g/cm³

Molecular Formula: CCl₄

Molecular Weight: 153.82

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Light, excess heat.

Incompatibilities with Other Materials: Alkali metals, powdered aluminum, powdered magnesium, zinc powder, ethylene, allyl alcohol, barium, fluorine, dimethylformamide, powdered beryllium, decaborane, potassium tert-butoxide.

Hazardous Decomposition Products: Hydrogen chloride, chlorine, phosgene, carbon monoxide, carbon dioxide, chlorine dioxide, which may be spontaneously explosive.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 56-23-5: FG4900000

LD50/LC50:

CAS# 56-23-5:

- Dermal, guinea pig: LD50 = >9400 uL/kg;
- Draize test, rabbit, eye: 2200 ug/30S Mild;
- Draize test, rabbit, eye: 500 mg/24H Mild;
- Draize test, rabbit, skin: 4 mg Mild;
- Draize test, rabbit, skin: 500 mg/24H Mild;
- Inhalation, mouse: LC50 = 9526 ppm/8H;
- Inhalation, mouse: LC50 = 34500 mg/m3/2H;
- Inhalation, rat: LC50 = 8000 ppm/4H;
- Inhalation, rat: LC50 = 46000 mg/m3/6H;
- Oral, mouse: LD50 = 7749 mg/kg;
- Oral, rabbit: LD50 = 5760 mg/kg;
- Oral, rat: LD50 = 2350 mg/kg;

Skin, rabbit: LD50 = >20 Carbon tetrachloride is harmful to the liver and a CNS depressant following short-term inhalation, skin contact or ingestion. The liver effects have been observed at concentrations lower than those required to produce CNS effects. Two reviews indicate that ingestion of 14-20 ml or 50-150 ml could be fatal. Although, 1.5 ml (34 mg/kg) has caused death in a few cases.

Carcinogenicity:

CAS# 56-23-5:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 10/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

Epidemiology: No data available.

Teratogenicity: Animal studies have only shown harmful effects in the offspring of animals exposed to doses which also produced significant maternal toxicity.

Reproductive Effects: There is no human information available. There is insufficient animal information available to draw any conclusions about potential reproductive toxicity.

Mutagenicity: No data available.

Neurotoxicity: No data available.

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Fathead Minnow: LC50 = 20.8-41.4 mg/L; 96 Hr.; Flow-through; 21.7 degrees CFish: Bluegill/Sunfish: LC50 = 27-125 mg/L; 96 Hr.; Static Conditions; 23 degrees CBacteria: Phytobacterium phosphoreum: EC50 = 6.0 mg/L; Not available; Microtox testBacteria: Phytobacterium phosphoreum: EC50 = 33.0 mg/L; 30 minutes; Microtox test No data available.
Environmental: Terrestrial: Evaporates rapidly and migrates into groundwater. Aquatic: Rapidly evaporates, biodegradation an important fate process.
Physical: Atmospheric:Very stable in troposphere with a residence time of 30-50 years.
Other: Carbon tetrachloride has a low potential to bioconcentrate. Log of the bioconcentration factor in trout is 1.24, in bluegill sunfish - 1.48. Bioconcentration factor predicted from water solubility = 14.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series:

CAS# 56-23-5: waste number U211.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	CARBON TETRACHLORIDE	CARBON TETRACHLORIDE
Hazard Class:	6.1	6.1(9.2)
UN Number:	UN1846	UN1846
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 56-23-5 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 56-23-5: 10 lb final RQ; 4.54 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 56-23-5: immediate, delayed.

Section 313

This material contains Carbon tetrachloride (CAS# 56-23-5, 99-100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

CAS# 56-23-5 is listed as a hazardous air pollutant (HAP). CAS# 56-23-5 is listed as a Class 1 ozone depletor with an 1.1 ODP

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 56-23-5 is listed as a Hazardous Substance under the CWA. CAS# 56-23-5 is listed as a Priority Pollutant under the Clean Water Act. CAS# 56-23-5 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 56-23-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Carbon tetrachloride, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 56-23-5: 5 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.

R 40 Limited evidence of a carcinogenic effect.

R 59 Dangerous for the ozone layer.

R 48/23 Toxic : danger of serious damage to health by prolonged exposure through inhalation.

R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 23 Do not inhale gas/fumes/vapour/spray.

S 36/37 Wear suitable protective clothing and gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 59 Refer to manufacturer/supplier for information on recovery/recycling.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 56-23-5: 3

Canada - DSL/NDSL

CAS# 56-23-5 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1A, D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

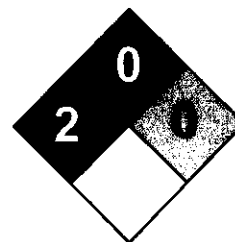
CAS# 56-23-5 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 7/20/1999

Revision #7 Date: 2/06/2008

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.



Health	2
Fire	0
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Chloroform MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chloroform

Catalog Codes: SLC1888, SLC5044

CAS#: 67-66-3

RTECS: FS9100000

TSCA: TSCA 8(b) inventory: Chloroform

CI#: Not available.

Synonym: Trichloromethane; Methane, trichlor-

Chemical Name: Chloroform

Chemical Formula: CHCl₃

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chloroform	67-66-3	100

Toxicological Data on Ingredients: Chloroform: ORAL (LD50): Acute: 695 mg/kg [Rat]. 36 mg/kg [Mouse]. 820 mg/kg [Guinea pig]. DERMAL (LD50): Acute: >20000 mg/kg [Rabbit]. VAPOR (LC50): Acute: 47702 mg/m 4 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects: CARCINOGENIC EFFECTS: Classified + (Proven.) by NIOSH. Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, heart. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances: Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: May explode if it comes in contact with aluminum powder, lithium, perchlorate, pentoxide, bis(dimethylamino)dimethylstannane, potassium, potassium-sodium alloy, sodium (or sodium hydroxide or sodium methoxide), and methanol

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions: Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as metals, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls: Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill: Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: TWA: 10 (ppm) [Australia] Inhalation TWA: 2 (ppm) from OSHA (PEL) [United States] Inhalation STEL: 9.78 (mg/m3) from NIOSH Inhalation STEL: 2 (ppm) from NIOSH Inhalation TWA: 9.78 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 10 (ppm) from ACGIH (TLV) [United States] [1999] Inhalation TWA: 2 (ppm) [United Kingdom (UK)] Inhalation TWA: 9.9 (mg/m3) [United Kingdom (UK)] Inhalation Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pleasant. Sweetish. Etheric. Non-irritating

Taste: Burning. Sweet.

Molecular Weight: 119.38 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 61°C (141.8°F)

Melting Point: -63.5°C (-82.3°F)

Critical Temperature: 263.33°C (506°F)

Specific Gravity: 1.484 (Water = 1)

Vapor Pressure: 21.1 kPa (@ 20°C)

Vapor Density: 4.36 (Air = 1)

Volatility: Not available.

Odor Threshold: 85 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2

Ioncity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, Light

Incompatibility with various substances: Reactive with metals, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Light Sensitive. Incompatible with triisopropyl phosphine, acetone, disilane, fluorine, strong bases and reactive metals (aluminum, magnesium in powdered form), light.

Special Remarks on Corrosivity: It will attack some forms of plastics, rubber, and coatings.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation.

Toxicity to Animals: WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 36 mg/kg [Mouse]. Acute dermal toxicity (LD50): >20000 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 47702 mg/m 4 hours [Rat]. 3

Chronic Effects on Humans: CARCINOGENIC EFFECTS: Classified + (Proven.) by NIOSH. Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, heart.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May affect genetic material (possible mutagen) and cause adverse reproductive effects(embryotoxicity and fetotoxicity) Suspected carcinogen (tumorigenic) and teratogen based on animal data. Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans: Acute Potential Health Effects: Skin: Causes skin irritation and may cause chemical burns. Eye: Causes eye irritation, burning pain and reversible injury to corneal epithelium. Inhalation: Causes irritation of the respiratory system (mucous membranes). May affect behavior/Nervous system (CNS depressant, fatigue, dizziness, nervousness, giddiness, euphoria, loss of coordination and judgement, weakness, hallucinations, muscle contraction/spasticity, general anesthetic, spastic paralysis, headache), anorexia (neurological and gastrointestinal symptoms resembling chronic alcoholism), and possibly coma and death. May affect the liver, kidneys and gastrointestinal tract (nausea, vomiting). Ingestion: Causes gastrointestinal tract irritation (nausea, vomiting). May affect the liver, urinary system (kidneys), respiration, behavior/nervous system (symptoms similar to inhalation), and heart. Chronic Potential Health Effects: Inhalation: Prolonged or repeated inhalation may affect the liver (hepatitis, jaundice, hepatocellular necrosis), metabolism (weight loss), respiration (fibrosis, pneumoconiosis), behavior/central nervous system (symptoms similar to acute inhalation), blood, musculoskeletal system, and kidneys. Ingestion: Prolonged or repeated ingestion may affect the liver, kidneys, metabolism (weight loss), endocrine system (spleen), blood (changes in cell count).

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 43.8 mg/l 96 hours [Trout].

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal: Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Chloroform UNNA: UN1888 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations: California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Chloroform California prop. 65 (no significant risk level): Chloroform: 0.02 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Chloroform New York release reporting list: Chloroform Rhode Island RTK hazardous substances: Chloroform Pennsylvania RTK: Chloroform Massachusetts RTK: Chloroform New Jersey: Chloroform California Director's List of Hazardous Substances (8 CCR 339): Chloroform Tennessee: Chloroform TSCA 8(b) inventory: Chloroform TSCA 8(d) H and S data reporting: Chloroform: effective: 6/1/87; sunset: 6/1/97 SARA 302/304/311/312 extremely hazardous substances: Chloroform SARA 313 toxic chemical notification and release reporting: Chloroform CERCLA: Hazardous substances.: Chloroform: 10 lbs. (4.536 kg)

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

OSCL (EEC): R20/22- Harmful by inhalation and if swallowed. R38- Irritating to skin. R40- Possible risks of irreversible effects. S36/37- Wear suitable protective clothing and gloves.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment: Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:16 PM

Last Updated: 11/01/2010 12:00 PM

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MSDS Number: T0767 * * * * * Effective Date: 05/19/08 * * * * * Supersedes: 08/16/05

MSDS

Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



Mallinckrodt
CHEMICALS



24 Hour Emergency Telephone: 800-659-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-466-6666

Outside U.S. and Canada
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TETRACHLOROETHYLENE

1. Product Identification

Synonyms: ethylene tetrachloride; tetrachloroethene; perchloroethylene; carbon bichloride; carbon dichloride

CAS No.: 127-18-4

Molecular Weight: 165.83

Chemical Formula: Cl₂C=CCl₂

Product Codes:

J.T. Baker: 9218, 9360, 9453, 9465, 9469

Mallinckrodt: 1933, 8058

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Tetrachloroethylene	127-18-4	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)

Flammability Rating: 0 - None

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate (Life)

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Irritating to the upper respiratory tract. Giddiness, headache, intoxication, nausea and vomiting may follow the inhalation of large amounts while massive amounts can cause breathing arrest, liver and kidney damage, and death. Concentrations of 600 ppm and more can affect the central nervous system after a few minutes.

Ingestion:

Not highly toxic by this route because of low water solubility. Used as an oral dosage for hookworm (1 to 4 ml). Causes abdominal pain, nausea, diarrhea, headache, and dizziness.

Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.

Eye Contact:

Causes irritation, redness, and pain.

Chronic Exposure:

May cause liver, kidney or central nervous system damage after repeated or prolonged exposures. Suspected cancer risk from animal studies.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance. The use of alcoholic beverages enhances the toxic effects.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of

water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard but becomes hazardous in a fire situation because of vapor generation and possible degradation to phosgene (highly toxic) and hydrogen chloride (corrosive). Vapors are heavier than air and collect in low-lying areas.

Explosion:

Not considered to be an explosion hazard. Containers may explode when involved in a fire.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Water spray may be used to keep fire exposed containers cool.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

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

7. Handling and Storage

Store in a cool, dry, ventilated area away from sources of heat or ignition. Isolate from

flammable materials. Protect from direct sunlight. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA), 200 ppm (ceiling),

300 ppm/5min/3-hour (max)

-ACGIH Threshold Limit Value (TLV):

25 ppm (TWA), 100 ppm (STEL); listed as A3, animal carcinogen

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Ethereal odor.

Solubility:

0.015 g in 100 g of water.

Specific Gravity:

1.62 @ 20C/4C

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

121C (250F)

Melting Point:

-19C (-2F)

Vapor Density (Air=1):

5.7

Vapor Pressure (mm Hg):

18 @ 25C (77F)

Evaporation Rate (BuAc=1):

0.33 (trichloroethylene = 1)

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Slowly decomposed by light.

Deteriorates rapidly in warm, moist climates.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition. Hydrogen chloride gas and phosgene gas may be formed upon heating. Decomposes with moisture to yield trichloroacetic acid and hydrochloric acid.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong acids, strong oxidizers, strong alkalis, especially NaOH, KOH; finely divided metals, especially zinc, barium, lithium. Slowly corrodes aluminum, iron and zinc.

Conditions to Avoid:

Moisture, light, heat and incompatibles.

11. Toxicological Information

Oral rat LD50: 2629 mg/kg; inhalation rat LC50: 4100 ppm/6H; investigated as a tumorigen, mutagen, reproductive effector.

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

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Tetrachloroethylene (127-18-4)	No	Yes	2A

12. Ecological Information

Environmental Fate:

When released into the soil, this material is expected to quickly evaporate. When released into the soil, this material may leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. When released into water, this material is not expected to biodegrade. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals.

Environmental Toxicity:

The LC50/96-hour values for fish are between 1 and 10 mg/l. The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be toxic to aquatic life.

13. Disposal Considerations

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

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TETRACHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 4L

International (Water, I.M.O.)

Proper Shipping Name: TETRACHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 4L

International (Air, I.C.A.O.)

Proper Shipping Name: TETRACHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 4L

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----
Ingredient TSCA EC Japan Australia

Tetrachloroethylene (127-18-4) Yes Yes Yes Yes

-----\Chemical Inventory Status - Part 2\-----
Ingredient Korea --Canada-- DSL NDSL Phil.

Tetrachloroethylene (127-18-4) Yes Yes No Yes

-----\Federal, State & International Regulations - Part 1\-----
Ingredient -SARA 302- -SARA 313-
RQ TPQ List Chemical Catg.

Tetrachloroethylene (127-18-4) No No Yes No

-----\Federal, State & International Regulations - Part 2\-----
Ingredient CERCLA -RCRA- -TSCA-
261.33 8(d)

Tetrachloroethylene (127-18-4) 100 U210 No

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

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 2[Z]

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 0 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor or mist.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Label First Aid:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

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Prepared by: Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: T4940 * * * * * Effective Date: 09/16/09 * * * * * Supercedes: 12/06/07

MSDS

Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



Mallinckrodt
CHEMICALS



24 Hour Emergency Telephone: 800-859-2161
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-496-4666

Outside U.S. and Canada
Chemtrec: 703-527-3867

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TRICHLOROETHYLENE

1. Product Identification

Synonyms: Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride

CAS No.: 79-01-6

Molecular Weight: 131.39

Chemical Formula: C₂HCl₃

Product Codes:

J.T. Baker: 5376, 9454, 9458, 9464, 9473

Mallinckrodt: 8600, 8633

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Trichloroethylene	79-01-6	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

Ingestion:

Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

Skin Contact:

Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

Eye Contact:

Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.

Chronic Exposure:

Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give

oxygen. Call a physician.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

5. Fire Fighting Measures

Fire:

Autoignition temperature: 420C (788F)

Flammable limits in air % by volume:

lcl: 8; ucl: 12.5

Explosion:

A strong ignition source, e. g., a welding torch, can produce ignition. Sealed containers may rupture when heated.

Fire Extinguishing Media:

Use water spray to keep fire exposed containers cool. If substance does ignite, use CO2, dry chemical or foam.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

6. Accidental Release Measures

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

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Trichloroethylene:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA), 200 ppm (Ceiling),

300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV):

10 ppm (TWA) 25 ppm (STEL); A2 Suspected Human Carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Chloroform-like odor.

Solubility:

Practically insoluble in water. Readily miscible in organic solvents.

Specific Gravity:

1.47 @ 20C/4C

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

87C (189F)

Melting Point:

-73C (-99F)

Vapor Density (Air=1):

4.5

Vapor Pressure (mm Hg):

57.8 @ 20C (68F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.

Hazardous Decomposition Products:

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.

Conditions to Avoid:

Heat, flame, ignition sources, light, moisture, incompatibles

11. Toxicological Information

Toxicological Data:

Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

This material has been linked to mutagenic effects in humans.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Trichloroethylene (79-01-6)	No	Yes	2A

12. Ecological Information

Environmental Fate:

When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity:

The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

13. Disposal Considerations

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

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TRICHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1710

Packing Group: III

Information reported for product/size: 4L

International (Water, I.M.O.)

Proper Shipping Name: TRICHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1710

Packing Group: III
Information reported for product/size: 4L

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\----- Ingredient	TSCA	EC	Japan	Australia
Trichloroethylene (79-01-6)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\----- Ingredient	Korea	DSL	--Canada-- NDSL	Phil.
Trichloroethylene (79-01-6)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\----- Ingredient	-SARA 302- RQ	TPQ	-----SARA 313----- List	Chemical Catg.
Trichloroethylene (79-01-6)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\----- Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Trichloroethylene (79-01-6)	100	U228	No

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

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: None allocated.

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NEPA Ratings: Health: 2 Flammability: 1 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT.

SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Keep away from heat and flame.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

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Prepared by: Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: A2052 * * * * * Effective Date: 09/22/09 * * * * * Supercedes: 08/03/07



Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response In Canada
CANUTEC: 613-996-8666

Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ALCONOX®

1. Product Identification

Synonyms: Proprietary blend of sodium linear alkylaryl sulfonate, alcohol sulfate, phosphates, and carbonates.

CAS No.: Not applicable.

Molecular Weight: Not applicable to mixtures.

Chemical Formula: Not applicable to mixtures.

Product Codes: A461

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Alconox® proprietary detergent mixture	N/A	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight

Flammability Rating: 0 - None

Reactivity Rating: 0 - None

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES

Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:

May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.

Ingestion:

May cause irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.

Skin Contact:

No adverse effects expected.

Eye Contact:

May cause irritation, redness and pain.

Chronic Exposure:

No information found.

Aggravation of Pre-existing Conditions:

No information found.

4. First Aid Measures

Inhalation:

Remove to fresh air. Get medical attention for any breathing difficulty.

Ingestion:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Wash exposed area with soap and water. Get medical advice if irritation develops.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not expected to be a fire hazard.

Explosion:

No information found.

Fire Extinguishing Media:

Dry chemical, foam, water or carbon dioxide.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. When mixed with water, material foams profusely. Small amounts of residue may be flushed to sewer with plenty of water.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Moisture may cause material to cake. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

None established.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear protective gloves and clean body-covering clothing.

Eye Protection:

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

White powder interspersed with cream colored flakes.

Odor:

No information found.

Solubility:

Moderate (1-10%)

Specific Gravity:

No information found.

pH:

No information found.

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

No information found.

Melting Point:

No information found.

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

No information found.

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

No information found.

Conditions to Avoid:

No information found.

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Alconox® proprietary detergent mixture	No	No	None

12. Ecological Information

Environmental Fate:

This product is biodegradable.

Environmental Toxicity:

No information found.

13. Disposal Considerations

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

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Alconox® proprietary detergent mixture	Yes	No	No	No

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.

Alconox®	No	No	Yes	No
proprietary detergent mixture				

-----\Federal, State & International Regulations - Part 1\-----				
	-SARA 302-		-----SARA 313-----	
Ingredient	RQ	TPQ	List	Chemical Catg.

Alconox®	No	No	No	No
proprietary detergent mixture				

-----\Federal, State & International Regulations - Part 2\-----			
		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)

Alconox®	No	No	No
proprietary detergent mixture			

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

Australian Hazchem Code: None allocated.

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 0 Flammability: 0 Reactivity: 0

Label Hazard Warning:

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.

Label Precautions:

Avoid contact with eyes.
 Keep container closed.
 Use with adequate ventilation.
 Avoid breathing dust.
 Wash thoroughly after handling.

Label First Aid:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

SANEX CHEMICALS, INCORPORATED -- DEET (INSECT REPELLANT) -- 6840-00-753-4963

===== Product Identification =====

Product ID:DEET (INSECT REPELLANT)
MSDS Date:01/01/1987
FSC:6840
NIIN:00-753-4963
MSDS Number: BFNFR
=== Responsible Party ===
Company Name:SANEX CHEMICALS, INCORPORATED
Address:21 WEBSTER STREET
City:NORTH TONAWANDA
State:NY
ZIP:14120-5809
Country:US
Info Phone Num:416-677-4890 - CANADA #
Emergency Phone Num:716-694-9325
CAGE:1EW21
=== Contractor Identification ===
Company Name:SANEX CHEMICALS, INC.
Address:15 WEBSTER STREET
Box:City:NORTH TONAWANDA
State:NY
ZIP:14120
Country:US
CAGE:1EW21

===== Composition/Information on Ingredients =====

Ingred Name:N,N'-DIETHYL-M-TOLUAMIDE CONTAINING 5% RELATED COMPOUNDS.
CAS:134-62-3
RTECS #:XS3675000
Fraction by Wt: 75%.

Ingred Name:ETHYL ALCOHOL (ETHANOL)
CAS:64-17-5
RTECS #:KQ6300000
Fraction by Wt: 25%.
OSHA PEL:1000 PPM
ACGIH TLV:1000 PPM; 9192

===== Hazards Identification =====

LD50 LC50 Mixture:LD50 (ORAL RAT) = 2000 MG/KG
Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:NOT KNOWN
Effects of Overexposure:INHALATION AND SWALLOWING CAN CAUSE
DIZZINESS,DROWSINESS,NAUSEA AND VOMITING.

===== First Aid Measures =====

First Aid:INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING GIVE CPR;
IF BREATHING DIFFICULT GIVE OXYGEN. EYE:IMMEDIATELY FLUSH WITH
PLENTY OF WATER. SKIN: WASH WITH SOAP & WATER. REMOVE CONTAMINATED
CLOTHING & SHOES. INGESTION: DO NOT INDUCE VOMITING. NOTHING BY
MOUTH IF UNCONSCIOUS.

===== Fire Fighting Measures =====

Flash Point Method:TCC
Flash Point:73F,23C
Extinguishing Media:CARBON DIOXIDE, FOAM, DRY CHEM.
Fire Fighting Procedures:NONE
Unusual Fire/Explosion Hazard:NOT ESTABLISHED.

===== Accidental Release Measures =====

Spill Release Procedures:LARGE SPILL (> GAL): REMOVE IGNITION SOURCES, VENTILATE AREA WELL. ABSORB WITH VERMICULITE OR OTHER MATERIALS, SUCH AS SAWDUST, RAGS, PAPER & PLACE IN CLOSED CONTAINER. USE NON SPARKING TOOLS. WEAR PROPER PROTECTIVE EQUIPMENT DURING CLEAN UP PROCEDURES

===== Handling and Storage =====

Handling and Storage Precautions:NONE NORMALLY REQUIRED. KEEP CONTAINERS TIGHTLY CLOSED.
Other Precautions:AVOID REPEATED USE OF THE PRODUCT. READ INSTRUCTIONS BEFORE USE.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NONE NORMALLY REQUIRED.
Ventilation:GENERAL ROOM VENTILATION. FOR BULK HANDLING: LOCAL EXHAUST TO ELIMINATE MISTS/FUMES/GASES.
Protective Gloves:IF NEEDED, USE RUBBER GLOVES
Eye Protection:IF NEEDED, USE SAFETY/CHEM GOGGLES
Other Protective Equipment:NONE
Supplemental Safety and Health
MSDS RECEIVED FROM SANEX WAS UNDATED. ACUTE ORAL LD50 RAT=2000MG/KG/. AT THE TIME (6/25/90) OF UPDATE THIS ENTRY, SUPPLIER DID NOT HAVE MSDS FOR THIS PRODUCT. HEALTH/SPILL DATA ESTABLISHED BY DGSC.

===== Physical/Chemical Properties =====

HCC:F3
Boiling Pt:B.P. Text:171F,77C
Vapor Pres:31.
Spec Gravity:0.9414
Evaporation Rate & Reference:1.7
Appearance and Odor:CLEAR LIQUID, VERY MILD ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
Stability Condition to Avoid:VERY HIGH TEMP.
Hazardous Decomposition Products:INCOMPLETELY BURNED CARBON PRODUCTS, CO*2, CO.

===== Disposal Considerations =====

Waste Disposal Methods:KEEP IN COVERED DRUMS, PENDING DISPOSAL. HANDLE & DISPOSE IN FULL COMPLIANCE WITH ALL APPLICABLE INTERNATIONAL, FEDERAL, STATE, & LOCAL REGULATIONS.

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department

RTECS #:XS5250000
Fraction by Wt: <6.5%
OSHA PEL:200 PPM
ACGIH TLV:50 PPM, S
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS

Ingred Name:HEXANE; (N-HEXANE) (CERCLA)
CAS:110-54-3
RTECS #:MN9275000
Fraction by Wt: <3%
OSHA PEL:500 PPM
ACGIH TLV:50 PPM
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:CYCLOHEXANE (SARA 313) (CERCLA)
CAS:110-82-7
RTECS #:GU6300000
Fraction by Wt: <2.4%
OSHA PEL:300 PPM
ACGIH TLV:300 PPM
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS

Ingred Name:METHYL TERT-BUTYL ETHER (SARA 313) (CERCLA)
CAS:1634-04-4
RTECS #:KN5250000
Fraction by Wt: <15%
OSHA PEL:N/K
ACGIH TLV:N/K
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:BENZENE (SARA 313) (CERCLA). OSHA PEL:1 PPM TWA; 5 PPM STEL
(MFR).
CAS:71-43-2
RTECS #:CY1400000
Fraction by Wt: <4.9%
OSHA PEL:SEE INGREDIENT
ACGIH TLV:10 PPM
EPA Rpt Qty:10 LBS
DOT Rpt Qty:10 LBS

Ingred Name:SUPDAT:(CALLED ASPIR). CAN CAUSE SEV INJURY TO LUNGS &
DEATH. LIFETIME INHAL OF WHOLE GAS VAP HAS CAUSED INCR (ING 12)
RTECS #:9999999ZZ

===== Hazards Identification =====

LD50 LC50 Mixture:LD50:(ORAL,RAT) >5 ML/KG.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:YES
Health Hazards Acute and Chronic:EYE CONT:SLIGHTLY IRRIT & COULD CAUSE
PRLNG (DAYS) IMPAIRMENT OF VISION. SIGNS & SYMPS MAY INCL PAIN,
TEARS, SWELL, REDNESS & BLURRED VISION. VAPS, FUMES/SPRAY MIST
COULD ALSO CAUSE SIMILAR SIGNS & SY MPS. SKIN IRRIT:RPTD CONT MAY
CAUSE SKIN TO CRACK/DRY FROM DEFAT ACTION. INHAL:SLIGHTLY TOX.
TARGET (EFTS OF OVEREXP)

Explanation of Carcinogenicity:BENZENE:IARC MONOGRAPHS, SUPP, VOL 7, PG

120, 1987:GRP 1. NTP 7TH ANNUAL RPT ON CARCINS, 1994:KNOWN TO BE
(SUPP DATA)

Effects of Overexposure:HLTH HAZ:ORGAN:NERV SYS. CONCS >1000 PPM MAY
CAUSE CNS EFTS SUCH AS HDCH, DIZZ, LOSS OF APPETITE, WEAK & LOSS OF
COORD. CONCS >5000 PPM MAY CAUSE LOSS OF CONSCIOUSNESS, COMA &
DEATH. INGEST:SLIGHTLY TOX IF SWALLOWED. TARGET ORGAN:NERV
SYS.SIGNS & SYMPS OF CNS EFTS MAY INCL HDCH, DIZZ, LOSS OF
APPETITE, WEAK & (SUPDAT)

Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

===== First Aid Measures =====

First Aid:EYES:FLUSH IMMED W/FRESH WATER FOR AT LST 15 MINS WHILE
HOLDING LIDS OPEN. REMOVE CONT LENSES IF WORN. IF IRRIT PERSISTS,
SEE MD. SKIN:WASH THORO W/SOAP & WATER. REMOVE & WASH CONTAM CLTHG.
INHAL:MOVE TO FRESH AIR. IF ANY EFTS CONTINUE, SEE MD. INGEST:GIVE
WATER/MILK TO DRINK & TELEPHONE FOR MED ADVICE. DO NOT MAKE PERS
VOMIT UNLESS DIRECTED TO DO SO BY MED PERS. IF MED ADVICE CANNOT BE
(ING 17)

===== Fire Fighting Measures =====

Flash Point Method:PMCC

Flash Point:<-49F,<-45C

Lower Limits:1.4%

Upper Limits:7.6%

Extinguishing Media:FIRE FIGHTING FOAM:ALCOHOL RESISTANT TYPE (AR).

AFFF, CO*2, DRY CHEMICAL.

Fire Fighting Procedures:USE NIOSH APPROVED SCBA & FULL PROTECTIVE
EQUIPMENT .

Unusual Fire/Explosion Hazard:EXTREME FIRE HAZ. LIQ VERY QUICKLY EVAPS,
EVEN AT LOW TEMPS & FORMS VAP (FUMES) WHICH CAN CATCH FIRE & BURN
W/EXPLO VIOLENCE. INVISIBLE VAP SPREADS (SUPP DATA)

===== Accidental Release Measures =====

Spill Release Procedures:ELIM ALL SOURCES OF IGNIT. CLEAN UP SPILLS
IMMED, OBSERVING PRECS IN PROT EQUIP SECTION. MATL IS CONSIDERED TO
BE WATER POLLUTANT & RELS SHOULD BE PREVENTED FROM CONTAM SOIL &
WATER & FROM ENTERING DR AINAGE & SEWER SYS. U.S.A. REGS REQ (ING
19)

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:USE ONLY AS MOTOR FUEL. DO NOT USE FOR
CLEANING, PRESS APPLIANCE FUEL/ANY OTHER SUCH USE. USE ONLY IN WELL
VENTED AREA. KEEP OUT OF REACH OF CHILDREN.

Other Precautions:DO NOT USE/STORE NEAR FLAME, SPKS/HOT SURFS. KEEP
CNTNR CLSD. DO NOT TRANSFER LIQ TO UNLABELED CNTNR. DO NOT WELD,
HEAT/DRILL CNTNR. REPLACE CAP/BUNG. EMPTIED CNTNR STILL CNTNS
HAZ/EXPLO VAP/LIQ. READ & OBSERVE ALL PRECS ON PROD LABEL.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NO SPECIAL PROTECTION IS NORMALLY REQUIRED.
HOWEVER, IF OPERATING CONDITIONS CREATE AIRBORNE CONCENTRATIONS
WHICH EXCEED RECOMMENDED EXPOSURE STANDARDS, USE OF A NIOSH
APPROVED RESPIRATOR IS REQUIRED.

Ventilation:USE ONLY IN WELL VENTILATED AREAS.

Protective Gloves:IMPERVIOUS GLOVES .
Eye Protection:ANSI APPROVED CHEM WORKERS GOGGS .
Other Protective Equipment:ANSI APPROVED EYE WASH FOUNTAIN & DELUGE
SHOWER . CONTACT CAN BE MINIMIZED BY WEARING PROTECTIVE CLOTHING.
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
EXPLO HAZ:EASILY & CAN BE SET ON FIRE BY MANY SOURCES SUCH AS PILOT
LIGHTS, WELDING EQUIP & ELEC MOTORS & SWITCHES. EXPLAN OF
CARCIN:CARCIN. OSHA REGULATED:29 CFR 1910.1028. HUMAN:MYELOID
LEUKEMIA, HO DGKINS DISEASE, LYMPHOMA. EFTS OF OVEREXP:LOSS OF
COORD. SUBSTANCE CAN DIRECTLY ENTER LUNGS IF IT IS SWALLOWED (ING
11)

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:>77F,>25C
Vapor Pres:5-15 @100F
Vapor Density:3-4
Spec Gravity:0.7-0.8
Solubility in Water:INSOLUBLE
Appearance and Odor:ORANGE TO BRONZE LIQUID.
Percent Volatiles by Volume:>99

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
MAY REACT W/STRONG OXIDIZING AGENTS, SUCH AS CHLORATES, NITRATES,
PEROXIDES, ETC.
Stability Condition to Avoid:NEVER SIPHON GASOLINE BY MOUTH.
Hazardous Decomposition Products:NORMAL COMBUSTION FORMS CARBON DIOXIDE
& WATER VAPOR; INCOMPLETE COMBUSTION CAN PRODUCE CARBON MONOXIDE.

===== Disposal Considerations =====

Waste Disposal Methods:DISP MUST BE I/A/W FED, STATE & LOC REGS . CLEAN
UP SM SPILLS USING APPROP TECHNIQUES SUCH AS SORBENT MATLS/PUMPING.
WHERE FEASIBLE & APPROP, REMOVE CONTAM SOIL. FOLLOW PRESCRIBED
PROCS FOR REPO RTING & RESPONDING TO LGR RELS. PLACE (ING 21)

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Science Lab.com
Chemicals & Laboratory Equipment



Health	3
Fire	0
Reactivity	1
Personal Protection	

Material Safety Data Sheet Hydrochloric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Hydrochloric acid

Catalog Codes: SLH1462, SLH3154

CAS#: Mixture.

RTECS: MW4025000

TSCA: TSCA 8(b) inventory: Hydrochloric acid

CI#: Not applicable.

Synonym: Hydrochloric Acid; Muriatic Acid

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Hydrogen chloride	7647-01-0	20-38
Water	7732-18-5	62-80

Toxicological Data on Ingredients: Hydrogen chloride: GAS (LC50): Acute: 4701 ppm 0.5 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer). **CARCINOGENIC EFFECTS:** Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth. Repeated or prolonged exposure to the substance can produce target

organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of metals

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

Non combustible. Calcium carbide reacts with hydrogen chloride gas with incandescence. Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine. Rubidium acetylene carbides burns with slightly warm hydrochloric acid. Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas spontaneously flammable in air is evolved. Magnesium boride treated with concentrated hydrochloric acid produces spontaneously flammable gas. Cesium acetylene carbide burns hydrogen chloride gas. Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute. Reacts with most metals to produce flammable Hydrogen gas.

Special Remarks on Explosion Hazards:

Hydrogen chloride in contact with the following can cause an explosion, ignition on contact, or other violent/vigorous reaction: Acetic anhydride AgClO + CCl₄ Alcohols + hydrogen cyanide, Aluminum Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium hydroxide, Calcium carbide CaC₂ Chlorine + dinitroanilines (evolves gas), Chlorosulfonic acid Cesium carbide Cesium acetylene carbide, 1,1-Difluoroethylene Ethylene diamine Ethylene imine, Fluorine, HClO₄ Hexalithium disilicide H₂SO₄ Metal acetylides or carbides, Magnesium boride, Mercuric sulfate, Oleum, Potassium permanganate, beta-Propiolactone Propylene oxide Rubidium carbide, Rubidium, acetylene carbide Sodium (with aqueous HCl), Sodium hydroxide Sodium tetraselenium, Sulfonic acid, Tetraselenium tetranitride, U₃P₄, Vinyl acetate. Silver perchlorate with carbon tetrachloride in the presence of hydrochloric acid produces trichloromethyl perchlorate which detonates at 40 deg. C.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, organic materials, metals, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

CEIL: 5 (ppm) from OSHA (PEL) [United States] CEIL: 7 (mg/m³) from OSHA (PEL) [United States] CEIL: 5 from NIOSH CEIL: 7 (mg/m³) from NIOSH TWA: 1 STEL: 5 (ppm) [United Kingdom (UK)] TWA: 2 STEL: 8 (mg/m³) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pungent. Irritating (Strong.)

Taste: Not available.

Molecular Weight: Not applicable.

Color: Colorless to light yellow.

pH (1% soln/water): Acidic.

Boiling Point:

108.58 C @ 760 mm Hg (for 20.22% HCl in water) 83 C @ 760 mm Hg (for 31% HCl in water) 50.5 C (for 37% HCl in water)

Melting Point:

-62.25°C (-80°F) (20.69% HCl in water) -46.2 C (31.24% HCl in water) -25.4 C (39.17% HCl in water)

Critical Temperature: Not available.

Specific Gravity:

1.1- 1.19 (Water = 1) 1.10 (20% and 22% HCl solutions) 1.12 (24% HCl solution) 1.15 (29.57% HCl solution) 1.16 (32% HCl solution) 1.19 (37% and 38% HCl solutions)

Vapor Pressure: 16 kPa (@ 20°C) average

Vapor Density: 1.267 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.25 to 10 ppm

Water/Oil Dist. Coeff.: Not available.

Ioncity (In Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility: Soluble in cold water, hot water, diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, water

Incompatibility with various substances:

Highly reactive with metals. Reactive with oxidizing agents, organic materials, alkalis, water.

Corrosivity:

Extremely corrosive in presence of aluminum, of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Reacts with water especially when water is added to the product. Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg. C. Sodium reacts very violently with gaseous hydrogen chloride. Calcium phosphide and hydrochloric acid undergo very energetic reaction. It reacts with oxidizers releasing chlorine gas. Incompatible with, alkali metals, carbides, borides, metal oxides, vinyl acetate, acetylides, sulphides, phosphides, cyanides, carbonates. Reacts with most metals to produce flammable Hydrogen gas. Reacts violently (moderate reaction with heat of evolution) with water especially when water is added to the product. Isolate hydrogen chloride from heat, direct sunlight, alkalies (reacts vigorously), organic materials, and oxidizers (especially nitric acid and chlorates), amines, metals, copper and alloys (e.g. brass), hydroxides, zinc (galvanized materials), lithium silicide (incandescence), sulfuric acid(increase in temperature and pressure) Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid. Adsorption of Hydrochloric Acid onto silicon dioxide results in exothermic reaction. Hydrogen chloride causes aldehydes and epoxides to violently polymerize. Hydrogen chloride or Hydrochloric Acid in contact with the following can cause explosion or ignition on contact or

Special Remarks on Corrosivity:

Highly corrosive. Incompatible with copper and copper alloys. It attacks nearly all metals (mercury, gold, platinum, tantalum, silver, and certain alloys are exceptions). It is one of the most corrosive of the nonoxidizing acids in contact with copper alloys. No corrosivity data on zinc, steel. Severe Corrosive effect on brass and bronze

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

Acute oral toxicity (LD50): 900 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1108 ppm, 1 hours [Mouse]. Acute toxicity of the vapor (LC50): 3124 ppm, 1 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. May cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, . Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Doses (LDL/LCL) LDL [Man] -Route: Oral; 2857 ug/kg LCL [Human] - Route: Inhalation; Dose: 1300 ppm/30M LCL [Rabbit] - Route: Inhalation; Dose: 4413 ppm/30M

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (fetotoxicity). May affect genetic material.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Corrosive. Causes severe skin irritation and burns. Eyes: Corrosive. Causes severe eye irritation/conjunctivitis, burns, corneal necrosis. Inhalation: May be fatal if inhaled. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid fumes produces nose, throat, and laryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well as headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure, occur, particularly if exposure is prolonged. May affect the liver. Ingestion: May be fatal if swallowed. Causes irritation and burning, ulceration, or perforation of the gastrointestinal tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomiting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophageal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis). Acute exposure via inhalation or ingestion can also cause erosion of tooth enamel. Chronic Potential Health Effects: dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Hydrochloric acid, solution UNNA: 1789 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Hydrochloric acid Illinois toxic substances disclosure to employee act: Hydrochloric acid Illinois chemical safety act: Hydrochloric acid New York release reporting list: Hydrochloric acid Rhode Island RTK hazardous substances: Hydrochloric acid Pennsylvania RTK: Hydrochloric acid Minnesota: Hydrochloric acid Massachusetts RTK: Hydrochloric acid Massachusetts spill list: Hydrochloric acid New Jersey: Hydrochloric acid New Jersey spill list: Hydrochloric acid Louisiana RTK reporting list: Hydrochloric acid Louisiana spill reporting: Hydrochloric acid California Director's List of Hazardous Substances: Hydrochloric acid TSCA 8(b) inventory: Hydrochloric acid TSCA 4(a) proposed test rules: Hydrochloric acid SARA 302/304/311/312 extremely hazardous substances: Hydrochloric acid SARA 313 toxic chemical notification and release reporting: Hydrochloric acid CERCLA: Hazardous substances.: Hydrochloric acid: 5000 lbs. (2268 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R34- Causes burns. R37- Irritating to respiratory system. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References:

Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

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International Chemical Safety Cards

ISOBUTENE

ICSC: 1027

ISOBUTENE
Isobutylene
2-Methylpropene
(cylinder)
 $C_4H_8/CH_2=C(CH_3)_2$
Molecular mass: 56.1

CAS # 115-11-7
RTECS # UD0890000
ICSC # 1027
UN # 1055
EC # 601-012-00-4

ISOBUTENE Isobutylene 2-Methylpropene (cylinder) $C_4H_8/CH_2=C(CH_3)_2$ Molecular mass: 56.1			
CAS # 115-11-7 RTECS # UD0890000 ICSC # 1027 UN # 1055 EC # 601-012-00-4			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Extremely flammable.	NO open flames, NO sparks, and NO smoking. NO contact with oxidizing materials.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with sand, powder, carbon dioxide.
EXPLOSION	Gas/air mixtures are explosive. Risk of fire and explosion on contact with oxidants, halogens (see Chemical Dangers).	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.
EXPOSURE			
• INHALATION	Dizziness. Drowsiness. Dullness. Nausea. Unconsciousness. Vomiting.	Closed system and ventilation.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• SKIN	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention.
• EYES	Frostbite.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION			
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Ventilation. Remove all sources of ignition. Do NOT wash away into sewer. NEVER direct water jet on liquid (extra personal protection: self-		Fireproof. Separated from incompatible substances (see Chemical Dangers). Cool.	F symbol F+ symbol R: 12 S: (2-)9-16-33

contained breathing apparatus).

Note: C

UN Hazard Class: 2.1

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1027

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

ISOBUTENE

ICSC: 1027

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS COMPRESSED LIQUEFIED GAS OR COLOURLESS VOLATILE LIQUID , WITH CHARACTERISTIC ODOUR.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation.
	PHYSICAL DANGERS: The gas is heavier than air and may travel along the ground; distant ignition possible, and may accumulate in low ceiling spaces causing deficiency of oxygen. As a result of flow, agitation, etc., electrostatic charges can be generated.	INHALATION RISK: On loss of containment this liquid evaporates very quickly causing supersaturation of the air with serious risk of suffocation when in confined areas. A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.
	CHEMICAL DANGERS: The substance can presumably form explosive peroxides. The substance is able to polymerize with fire or explosion hazard. Reacts violently with oxidants, chlorine, fluorine, nitrogen oxides, hydrogen chloride, hydrogen bromide, causing fire and explosion hazard.	EFFECTS OF SHORT-TERM EXPOSURE: Rapid evaporation of the liquid may cause frostbite. The substance may cause effects on the central nervous system. Exposure may result in death. Medical observation is indicated.
	OCCUPATIONAL EXPOSURE LIMITS (OELs): MAK not established.	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
PHYSICAL PROPERTIES	Boiling point: -6.9°C Melting point: -140.3°C Relative density (water = 1): 0.59 Solubility in water: practically insoluble Vapour pressure, kPa at 20°C: 1976	Relative vapour density (air = 1): 1.94 Flash point: flammable°C Auto-ignition temperature: 465°C Explosive limits, vol% in air: 1.8-9.6%
ENVIRONMENTAL DATA		
NOTES		
Density of the liquid at boiling point: 0.605 kg/l. High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death. Check oxygen content before entering area. Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.		
Transport Emergency Card: TEC (R)-502 NFPA Code: H 1; F 4; R 0;		
ADDITIONAL INFORMATION		

ICSC: 1027

ISOBUTENE

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**IMPORTANT
LEGAL
NOTICE:**

Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.

FAIRFIELD AMERICAN CORP -- 82680 PERMANONE TICK REPELLENT -- 6840-00F029029

===== Product Identification =====

Product ID:82680 PERMANONE TICK REPELLENT
MSDS Date:07/31/1991
FSC:6840
NIIN:00F029029
MSDS Number: BRVJJ
=== Responsible Party ===
Company Name:FAIRFIELD AMERICAN CORP
Address:201 RT 17 N
City:RUTHERFORD
State:NJ
ZIP:07070
Country:US
Info Phone Num:201-507-4880
Emergency Phone Num:201-507-4880
Preparer's Name:REGULATORY DEPARTMENT
CAGE:66146
=== Contractor Identification ===
Company Name:FAIRFIELD AMERICAN CORP AN AOSI CO
Address:201 RT 17 NORTH
Box:City:RUTHERFORD
State:NJ
ZIP:07070
Country:US
Phone:201-507-4880
CAGE:66146

===== Composition/Information on Ingredients =====

Ingred Name:WEIGHT PER GALLON IN POUNDS: 6.597
RTECS #:9999999WG

Ingred Name:KEROSENE (PETROLEUM), HYDROTREATED; PETROLEUM DISTILLATE,
HYDROTREATED , (MINERAL SPIRITS)
CAS:64742-47-8
RTECS #:OA5504000
Fraction by Wt: 4.50%

Ingred Name:PERMETHRIN
CAS:52645-53-1
RTECS #:GZ1255000
Fraction by Wt: 0.50%
ACGIH TLV:NOT EST.

Ingred Name:STODDARD SOLVENT (PETROLEUM DISTILLATE), MINERAL SPIRITS
CAS:8052-41-3
RTECS #:WJ8925000
Fraction by Wt: 5.50%
Other REC Limits:350 MG/CUM
OSHA PEL:500 PPM
ACGIH TLV:100 PPM; 9293

===== Hazards Identification =====

LD50 LC50 Mixture:LD50 ORAL (RAT): >5 G/KG
Routes of Entry: Inhalation:NO Skin:NO Ingestion:NO

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:SLIGHT IRRITANT TO EYES.
Explanation of Carcinogenicity:NONE

===== First Aid Measures =====

First Aid:INGESTION: CONTACT A PHYSICIAN OR POISON CONTROL CENTER.
EYES: FLUSH W/PLENTY OF WATER. SKIN: WASH W/SOAP & WATER.
INHALATION: REMOVE TO FRESH AIR. OBTAIN MEDICAL ATTENTION IN ALL
CASES.

===== Fire Fighting Measures =====

Flash Point Method:TCC
Flash Point:>200F
Extinguishing Media:FOAM, CO2, DRY CHEMICAL & WATER FOG.

===== Accidental Release Measures =====

Spill Release Procedures:SOAK UP W/ABSORBENT MATERIAL SUCH AS SAND,
SAWDUST, EARTH, FULLER'S EARTH ETC. DISPOSE OF W/CHEMICAL WASTE.

===== Handling and Storage =====

Handling and Storage Precautions:CONTENTS UNDER PRESSURE. DON'T STORE
NEAR HEAT OR OPEN FLAME. DON'T PUNCTURE OR INCINERATE CONTAINER.
AVOID CONTACT W/FACE, EYES, & SKIN.
Other Precautions:EXPOSURE TO TEMPERATURES >130F MAY CAUSE BURSTING.
DON'T CONTAMINATE WATER, FOOD, OR FEED BY STORAGE OR DISPOSAL.
PRODUCT SHOULD NOT BE APPLIED TO CLOTHING WHILE IT IS BEING WORN.
AVOID BREATHING VAPO RS OR SPRAY MIST. SEE SUPP

===== Exposure Controls/Personal Protection =====

Ventilation:NORMAL (MECHANICAL) EXHAUST
Protective Gloves:RUBBER OR IMPERVIOUS
Eye Protection:SAFETY GLASSES OR GOGGLES
Work Hygienic Practices:REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE
REUSE. WASH THOUROUGHLY AFTER HANDLING & BEFORE EATING OR SMOKING.
Supplemental Safety and Health
PRECAUTIONS CONT.: UNDER NO CIRCUMSTANCES SHOULD BARE SKIN/CLOTHING ON
THE BODY BE TREATED. DON'T ALLOW CONTACT W/TREATED SURFACES UNTIL
SPRAY HAS DRIED. DON'T ALLOW SPRAY TO CONTACT FOOD/WATER SUPPLI ES.
DON'T ALLOW USE BY SMALL CHILDREN WITHOUT CLOSE ADULT SUPERVSION.

===== Physical/Chemical Properties =====

Spec Gravity:0.792
Solubility in Water:MISICIBLE
Appearance and Odor:MILKY WHITE PRESSURIZED LIQUID W/MILD MOTHBALL-LIKE
ODOR.
Percent Volatiles by Volume:>40

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS
Stability Condition to Avoid:HEAT OR OPEN FLAME

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF IN ACCORDANCE W/LOCAL, STATE, &
FEDERAL REGULATIONS. CONTAINER DISPOSAL: REPLACE CAP, WRAP
CONTAINER IN SEVERAL LAYERS OF NEWSPAPER. DISCARD IN TRASH. DON'T
INCINERATE OR PUNCTURE.

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assume responsibility for the suitability of this information to their
particular situation.

APPENDIX C

OSHA INFORMATION POSTER

Job Safety and Health It's the law!

OSHA
Occupational Safety
and Health Administration
U.S. Department of Labor

EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

**This free poster available from OSHA –
The Best Resource for Safety and Health**



Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA
www.osha.gov

3096-2166-12-001

APPENDIX D

HAZARD ASSESSMENT

A Hazard Assessment for the overall project including vapor phase carbon sampling is included below. Subcontractor JSAs will be prepared for construction management and OMM operations.

Vapor Phase Carbon Sampling

General Hazards

The following hazards will be a concern during this task:

POTENTIAL HAZARD

ANTICIPATED RISK

Inhalation of Dusts	low
Inhalation of Volatile Contaminants	low
Ingestion of Contaminants	low
Skin/Eye Contact with Contaminants	low
Working with/near Heavy Equipment	none
Excavation Hazards	none
Noise Exposure	low to moderate
Slip-Trip-Fall Hazards	low
Lifting Hazards	low
Weather Hazards	none
Underground Utilities	none
Overhead Hazards	low
Heat Stress	depends on ambient temperature
Cold Exposure	depends on ambient temperature
Biological Hazards	low
Flammable Hazards	low
Electrical Hazards	low

Additional Task-Specific Hazards

While opening the sampling location or deploying the SUMMA canister, the operator may physically place themselves in an awkward position. The operator should plan the entry to limit the need to take an awkward position.

Indoor and Ambient Air Sampling

General Hazards

The following hazards will be a concern during this task:

POTENTIAL HAZARD

ANTICIPATED RISK

Inhalation of Dusts

low

Inhalation of Volatile Contaminants

low

Ingestion of Contaminants

low

Skin/Eye Contact with Contaminants

low

Working with/near Heavy Equipment

none

Excavation Hazards

none

Noise Exposure

low to high

Slip-Trip-Fall Hazards

low

Lifting Hazards

low

Weather Hazards

none

Underground Utilities

none

Overhead Hazards

none

Heat Stress

depends on ambient temperature

Cold Exposure

depends on ambient temperature

Biological Hazards

low

Flammable Hazards

low

Electrical Hazards

low

Additional Task-Specific Hazards

While opening the sampling location or deploying the IAQ equipment, the operator may physically place themselves in an awkward position. The operator should plan the entry to limit the need to take an awkward position.

Differential Pressure Measurements

General Hazards

The following hazards will be a concern during this task:

POTENTIAL HAZARD

ANTICIPATED RISK

Inhalation of Dusts	low
Inhalation of Volatile Contaminants	low
Ingestion of Contaminants	low
Skin/Eye Contact with Contaminants	low
Working with/near Heavy Equipment	none
Excavation Hazards	none
Noise Exposure	low to high
Slip-Trip-Fall Hazards	low
Lifting Hazards	low
Weather Hazards	none
Underground Utilities	none
Overhead Hazards	none
Heat Stress	depends on ambient temperature
Cold Exposure	depends on ambient temperature
Biological Hazards	low
Flammable Hazards	low
Electrical Hazards	low

Additional Task-Specific Hazards

While opening the OMNIGUARD 4, the operator may physically place themselves in an awkward position. The operator should plan the entry to limit the need to take an awkward position.

