APPENDIX B – ACCIDENT PREVENTION PLAN/SITE SAFETY AND HEALTH PLAN
FINAL
ACCIDENT PREVENTION PLAN AND SITE SAFETY AND HEALTH PLAN

REMEDIAL INVESTIGATION
FOR THE RICOCHET AREA MUNITIONS RESPONSE SITE
IN STATE GAME LANDS 211, PENNSYLVANIA

CONTRACT NO.: W9133L-09-F-0304

Prepared for:

NATIONAL GUARD BUREAU
1411 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202-3231

and

PENNSYLVANIA ARMY NATIONAL GUARD
DEPARTMENT OF MILITARY AND VETERANS AFFAIRS
FORT INDANTOWN GAP MILITARY RESERVATION
ANNVILLE, PA 17003

Prepared by

WESTON SOLUTIONS, INC.
1400 WESTON WAY
WEST CHESTER, PA 19380

WESTON Project No.: 12767.099.001.0022

March 2010
FINAL
ACCIDENT PREVENTION PLAN AND SITE SAFETY AND HEALTH PLAN

REMEDIAL INVESTIGATION
FOR THE RICOCHET AREA MUNITIONS RESPONSE SITE
IN STATE GAME LANDS 211, PENNSYLVANIA

CONTRACT NO.: W9133L-09-F-0304

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# SITE SAFETY AND HEALTH PLAN APPROVAL/SIGNOFF

**Site Name:** Ricochet Area Munitions Response Area – Remedial Investigation

**Work Location Address:** State Game Lands 211 adjacent to Fort Indiantown Gap Military Reservation, Annville, PA

I have read, understood, and agree to abide by the information set forth in this Site-Specific Health and Safety Plan and discussed in the Personnel Health and Safety briefing.

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<thead>
<tr>
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<th>Description</th>
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<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists</td>
</tr>
<tr>
<td>AHA</td>
<td>Activity Hazard Analysis</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td>APP</td>
<td>Accident Prevention Plan</td>
</tr>
<tr>
<td>BBP</td>
<td>bloodborne pathogens</td>
</tr>
<tr>
<td>BBS</td>
<td>behavior-based safety</td>
</tr>
<tr>
<td>BEI</td>
<td>Biological Exposure Index</td>
</tr>
<tr>
<td>BIP</td>
<td>blow-in-place</td>
</tr>
<tr>
<td>BRAC</td>
<td>Base Realignment and Closure</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>CIH</td>
<td>Certified Industrial Hygienist</td>
</tr>
<tr>
<td>CTT</td>
<td>Closed, Transferring and Transferred</td>
</tr>
<tr>
<td>DOT</td>
<td>U.S. Department of Transportation</td>
</tr>
<tr>
<td>DSM</td>
<td>Division Health and Safety Manager</td>
</tr>
<tr>
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</tr>
<tr>
<td>EMP</td>
<td>Explosives Management Plan</td>
</tr>
<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
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<td>EPSP</td>
<td>Environmental Protection and Sustainability Plan</td>
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<td>ESP</td>
<td>Explosives Site Plan</td>
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<td>FAA</td>
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<td>FIG</td>
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<td>FLD</td>
<td>Field Operating Procedure</td>
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<td>HAZWOPER</td>
<td>Hazardous Waste Operations and Emergency Response</td>
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<tr>
<td>in</td>
<td>inch</td>
</tr>
<tr>
<td>MEC</td>
<td>munitions and explosives of concern</td>
</tr>
<tr>
<td>MGFD</td>
<td>munition with the greatest fragmentation distance</td>
</tr>
<tr>
<td>mm</td>
<td>millimeter</td>
</tr>
<tr>
<td>MRS</td>
<td>Munitions Response Site</td>
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<td>MSDS</td>
<td>Material Safety Data Sheet</td>
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<tr>
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<td>Occupational Safety and Health Administration</td>
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<td>OSWER</td>
<td>Office of Solid Waste and Emergency Response</td>
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<tr>
<td>PGC</td>
<td>Pennsylvania Game Commission</td>
</tr>
<tr>
<td>PSM</td>
<td>Program Safety Manager</td>
</tr>
<tr>
<td>QC</td>
<td>Quality Control</td>
</tr>
<tr>
<td>RI</td>
<td>Remedial Investigation</td>
</tr>
<tr>
<td>SGL</td>
<td>State Game Lands</td>
</tr>
<tr>
<td>SOP</td>
<td>standard operating procedure</td>
</tr>
<tr>
<td>SOW</td>
<td>Scope of Work</td>
</tr>
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<td>SSHO</td>
<td>Site Safety and Health Officer</td>
</tr>
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<td>SSHP</td>
<td>Site-Specific Safety and Health Plan</td>
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<tr>
<td>TLV</td>
<td>Threshold Limit Value</td>
</tr>
<tr>
<td>TWA</td>
<td>time-weighted average</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>USACE</td>
<td>U.S. Army Corps of Engineers</td>
</tr>
<tr>
<td>UXO</td>
<td>unexploded ordnance</td>
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<tr>
<td>WESTON</td>
<td>Weston Solutions, Inc.</td>
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SECTION 1

INTRODUCTION
1. INTRODUCTION

This Accident Prevention Plan and Site-Specific Safety and Health Plan (APP/SSHP) is for the Fort Indiantown Gap (FIG) Military Reservation Ricochet Area Munitions Response Site (MRS) Remedial Investigation (RI) within Pennsylvania State Game Lands (SGL) 211 work conducted by Weston Solutions, Inc. (WESTON). The work is being performed to investigate and assess the potential presence of MEC/MC at the Ricochet Area MRS.

The APP/SSHP presents the minimum requirements for safety and health that must be met by site personnel engaged in site operations. The APP/SSHP does not in any way relieve site personnel, contractors, or subcontractors from responsibility for the safety and health of their personnel. Contractors shall be required to review site conditions, and work to be performed, to determine specific safety and health requirements for their personnel. Any visitors to the site shall be required to comply with the approved APP/SSHP to gain entry to work sites.

1.1 PROJECT DESCRIPTION

Fieldwork under this task order shall include the following:

- Mobilization of equipment and personnel to the project site for clearing, surveying, visual surveys, geophysical activities, munitions and explosives of concern (MEC) removals associated with RI activities.

- Site preparation including site surveying to delineate work areas, confirm existing control points, and establish site survey limits.

- Site clearing including removal of brush and vegetation less than 2 inches in diameter along the survey areas.

- Instrument aided visual surveys.

- Digital geophysical mapping.

- Intrusive investigations.

- Sampling for munitions constituents.

- Demobilization of equipment and personnel.
1.2 SITE LOCATION AND DESCRIPTION

The Ricochet Area MRS is approximately 8,002 acres and is located within the Pennsylvania SGL 211, owned by the Commonwealth of Pennsylvania and managed by the Pennsylvania Game Commission (PGC). The Ricochet Area MRS lies within East Hanover Township in Dauphin County and Cold Spring Township in Lebanon County.

The Ricochet Area MRS is adjacent to the northern boundary of the Fort Indiantown Gap Military Reservation (FIG) property. The ridgeline of Stony Mountain bounds the MRS to the north based on the fact that there is no historical evidence of ricochets north of Stony Mountain. Because there are no topographic features to bound the site to the east and west, the east and west boundaries correspond to the area documented in the United States (U.S.) Army Garrison Safety Range Regulation for FTIG (Army Regulation 385-1) as Restricted Airspace R5802A or also known as Restricted Area R5802A (Army, 1995). This regulation describes the area as “a fall area for spent ordnance which ricochets north of Second Mountain.”

1.2.1 Site History

In the early 1800s, coal mining and timber harvesting occurred in the area. In the late 1800s, the mining operations declined and recreational development (e.g., hiking, hunting, camping) of the area followed in the early 1900s. FIG was established in 1931 when the Army used an 80-acre parcel in the Cold Spring portion of the MRS for bivouacs and an artillery firing position from 1945 to 1958 (additional information about FIG operational history is in Subsection 1.2.2.1).

Although the Cold Spring portion of the area was used for artillery firing and the Ricochet Area MRS is adjacent to the FIG operational ranges, the MRS was not intentionally used as a target area for military activities conducted at FIG’s Operational Range Areas. The presence of munitions within the Ricochet Area MRS is the result of unintentional overshot and/or ricochets from historical FIG operational ranges from 1933 to 1998. Current FIG range practices incorporate firing angles that prevent ricochet into SGL 211.

In 2003, a Closed, Transferring and Transferred (CTT) Range Site Inventory was conducted for FIG and identified two areas: the Artillery Ricochet Area and the Cold Spring Range Fan.
Because both identified areas are eligible under the MMRP, the two were combined into the current single Ricochet Area MRS.

1.2.2 Fort Indiantown Gap Military Installation

FIG is located in Dauphin and Lebanon Counties in south-central Pennsylvania. The FIG cantonment area (i.e., support and logistical coordination area) and the FIG training corridor are separated by Blue Mountain (also called First Mountain). The training corridor is located in the valley between Blue and Second Mountains.

1.2.2.1 Operational History

FIG was established in 1931 when the Commonwealth of Pennsylvania purchased approximately 18,000 acres as a military training facility for PAARNG, with training maneuvers starting in 1933. The training area consisted of approximately 16,000 acres located northwest of the cantonment area. Weapons fire was supported by an approximate 1,500-acre impact area in the north-central portion of the training area. In 1940, the land was leased to the federal government for training U.S. Army Infantry and Armor Divisions. In 1942, the installation was put under the command of New York Port of Embarkation and served as a staging area for troops preparing for transport overseas. At about this time artillery shells were found at Cold Springs north of Second Mountain (Logan and Logan, 2005). From 1942 to the end of World War II, the facility supported the Transportation Corps Training Center and served as a prisoner of war camp for captured German soldiers. In 1945, the land north of FIG was purchased by the Commonwealth of Pennsylvania to be used as Cold Spring firing position, and military use continued until 1958 (Logan and Logan, 2005). This 80.5-acre parcel was conveyed from the Pennsylvania Department of Military Affairs to the Commonwealth of Pennsylvania for use by the Pennsylvania Game Commission in 1956. The Cold Spring Range Fan is estimated to have remained active from 1940 to 1970, and associated munitions types were 60-millimeter (mm), 81-mm, and 4.2-inch (in) mortars, and projectiles including 105-mm, 155-mm, and 8-in.

Between 1946 and 1951, FIG was placed on deactivated status as a federal base and served as the National Guard Training Site. FIG was returned to active status for the Korean conflict (1951-1953) and back to deactivated status in 1953, when it was returned to the Pennsylvania Military
District (URS, 2008). During the late 1960s and early 1970s, the installation served as the Reserve Officers Training Corps summer camps.

FIG held a “special license” from the PGC for 264 acres north of the impact area which licensed the Army to conduct indirect artillery firing over portions of SGL 211 during the months of June through August each year the license was in effect. FIG remained the Army’s responsibility until October 1998 when the NGB took control as part of the 1995 Base Realignment and Closure (BRAC). The site then became a National Guard and Army Reserves training center. FIG now serves as headquarters for the Pennsylvania Department of Military and Veterans Affairs and the Pennsylvania Army and Air National Guard, and as the primary training site in the Commonwealth of Pennsylvania for individual and collective weapons training qualification.

1.3 REGULATIONS AND GUIDELINES

To ensure the safety and health of on-site personnel, visitors, client personnel, and the local community, all local, state, and federal regulations and guidelines will be met as necessary. However, specific focus will be on the following regulations as they directly apply to the project:

- AR 385-10 Army Safety Program
- National Guard Regulation 385-63, Army National Guard Range Safety Program, Policy, and Standards.
- WESTON Corporate Environmental Health and Safety (EHS) Program.
1.4 ACTIVITY HAZARD ANALYSIS

The Activity Hazard Analysis (AHA) will define the activities being performed and identify the sequences of work, the specific hazards anticipated, site-specific conditions, equipment and materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.

An AHA will be developed and comply with EM 385-1-1 for all field operations and will be contained in this APP/SSHP in Section 10. The Site-Specific AHA will contain a summary of chemical, biological, physical, radiological, and unexploded ordnance (UXO) hazards.

1.5 DRUG AWARENESS AND DRUG-FREE WORKPLACE

WESTON fully supports all aspects of the Drug-Free Workplace Act of 1988. As such, WESTON has implemented Operating Practice 05-01-010, Drug-Free Workplace. Strict disciplinary actions are enforced for any violation of WESTON’s Drug-Free Workplace policy. All WESTON employees, as a condition of employment, have documented understanding and receipt of this policy.
Figure 1-1
Site Location
Fort Indiantown Gap, Annville, PA

Source: Grantville and Indiantown Gap PA USGS 7.5 minute Topographic Map, 1996

Note: The Ricochet Area MRS Boundary was designated based on topographic features to the north and south (Stony and Second Mountains) and the boundaries to the east and west correspond to Restricted Airspace R5824A.
SECTION 2

WESTON SOLUTIONS CORPORATE ENVIRONMENTAL HEALTH AND SAFETY PROGRAM WITH INTEGRATED COMPLIANCE PLAN
2. WESTON SOLUTIONS CORPORATE ENVIRONMENTAL HEALTH AND SAFETY PROGRAM WITH INTEGRATED COMPLIANCE PLAN

2.1 PURPOSE

The WESTON Corporate Environmental Health and Safety (EHS) Program was established to proactively assess current environmental health and safety programs, and to define strategies for coming years. Emphasis is directed to continuous compliance, continual improvement, and pollution prevention strategies. The entire WESTON Corporate EHS Program and an Integrated Compliance Plan is provided as Attachment A to this APP.

2.2 ENVIRONMENTAL HEALTH AND SAFETY PROGRAM

Due to the nature of WESTON’s work, it is essential that environmental health and safety (EHS) needs be considered from starting points/planning to work execution and completion. WESTON utilizes integrated EHS management systems to implement its corporate goal for Zero Accidents involving personnel and the environment. Regulators, industry, and clients are learning that integrated EHS management systems provide a positive approach to compliance assurance and elevate opportunities for performance improvement. For these reasons, WESTON embraces the key elements common to many strong EHS management systems as standard work practice for every job.

2.3 BEHAVIOR BASED SAFETY

WESTON has implemented a behavior-based safety (BBS) program where we are all responsible for each other, focusing on behaviors and intervention techniques to improve behavioral processes. Within BBS, our employees create high quality connections with one another, team members, and stakeholders to foster an active caring culture. Commitment is higher and we help each other be safe every minute of every day. By achieving this goal, we will achieve our expectation of zero incidents. All employees assume a safety leadership role and are responsible for the safety of co-workers, our team members, and stakeholders.
2.4 CORPORATE EHS COMPLIANCE PLAN

The WESTON Corporate EHS Compliance Plan establishes the approach to executing all operations in a manner that protects the safety of employees, the public, and the environment. The Plan provides the corporate framework for accomplishing WESTON's corporate policy for EHS compliance and controlling requirements delineated in this Corporate EHS Plan and applies to all employees. The Corporate EHS Compliance Plan will be augmented by project-specific plans at individual work sites and for WESTON clients.

2.5 GOALS AND OBJECTIVES

In performing its mission, WESTON will conduct activities in a manner protecting human health and the environment:

- With commitment to ensuring employees and others work "safe every minute of every day" and are truly environmental stewards. This will ensure zero incident/accidents and zero releases to the environment.
- With commitment to regulatory compliance and other applicable requirements.
- In a manner protective of the worker, the public, and the environment.
- With environmental pollution, sustainability goals and continual improvement targets in the foreground.
- Communicating EHS awareness and policy to all personnel.
- Seeking performance improvement input from involved or affected personnel.
- Identifying environmental aspects with potential for significant impact.
- Prescribing remedies to offset impact potential.

As indicated in WESTON's Statement of Safety and Health Policy, our program is established to be proactive in ensuring safe work conditions. We fully expect all workers and visitors to comply with the requirements of this Accident Prevention Plan (APP) and all applicable rules, policies, and regulations associated with the Site.
2.6 ACCIDENT PREVENTION PLAN PURPOSE/OBJECTIVES

The purpose of this document is to establish standard safety and health procedures for WESTON and subcontractor personnel in performance of their work. Any project activity is to be carried out in accordance with this APP/SSHP. These documents are considered living documents and are subject to change based on review and the implementation of additional tasks.

This APP/SSHP establishes the work practices necessary to help ensure protection of site personnel, the local community, and client personnel during site activities. The objective of this EHS Program is to provide a mechanism for the establishment of safe working conditions. Specific hazard control methodologies have been evaluated and selected in an effort to minimize the potential of incident or injury.

All site activities will be performed in accordance with this APP/SSHP, applicable local and WESTON policies and procedures, OSHA, and client requirements. The levels of personal protection and the procedures specified in this plan are based on the best information available from reference documents and current site data. Therefore, these recommendations represent the minimum safety and health requirements to be observed by all personnel engaged in this project. Unforeseeable site conditions or changes in the Scope of Work (SOW) may warrant a reassessment of protection levels and controls stated. All adjustments to the EHS Program must have prior approval by the Program Safety Manager (PSM) and the client.

All WESTON, client, and subcontractor personnel involved in this project shall review and understand this document prior to the start of work. Any questions or concerns shall be directed to the Site Safety and Health Officer (SSHO). All on-site personnel shall follow the designated safety and health procedures, be alert to the hazards associated with working on-site, and exercise reasonable caution at all times.

The regulations and guidelines listed in these documents provide employers (including the client) and employees with the information and training necessary to improve workplace safety and health, thereby minimizing the potential for injury and illness.
These documents are designed to anticipate, identify, evaluate, and control safety and health hazards, in addition to providing emergency response procedures relative to operations conducted at the Site.

WESTON’s Health and Safety Program for field activities requires preparation and compliance with the following documents:

- This APP/SSHP, which is a standard document outlining criteria necessary for any field activity conducted in accordance with 29 Code of Federal Regulations (CFR) 1910.120 and/or USACE Safety and Health Requirements Manual (EM 385-1-1), and ER 385-1-92.

- This plan also provides necessary site-specific information relative to Hazardous Waste Operations and Emergency Response (HAZWOPER)-related actions and site chemical hazards with supporting procedures to ensure worker safety.

- The Environmental Protection and Sustainability Plan (EPSP), which is a document designed to provide guidance and information pertaining to permitting, regulatory applicability and waste management practices for the Site. The EPSP is included as Attachment E of this APP/SSHP.

Additional plans and appendices to the APP/SSHP complete necessary regulatory and policy requirements. This APP and WESTON's CECHSP Manual must be available on-site and communicated to all workers or affected personnel.
SECTION 3

PERSONNEL AND RESPONSIBILITIES
3. PERSONNEL AND RESPONSIBILITIES

All operations and personnel having the potential for exposure to site hazards are subject to the requirements of this APP/SSHP. Work shall not be performed in a manner that conflicts with the safety, health, or environmental precautions outlined in this plan. All site personnel, including any WESTON subcontractors, who have the potential for exposure to site hazards, are subject to the requirements of this APP/SSHP. Personnel violating safety procedures are subject to dismissal/removal from the project site. Roles and responsibilities for site personnel are summarized in the following subsections. An organizational chart depicting the chain of command for this project is presented on Figure 3-1.

3.1 PROJECT MANAGER

Mr. Gregory Daloisio, PMP will serve as the Project Manager for the activities covered under this contract. He has overall responsibility for the management and completion of the project, which includes resource allocation, financial reporting, schedule control, and review and approval of deliverables.

3.2 DEPUTY PROJECT MANAGER

Mr. John Gerhard will serve as the Deputy Project Manager for the activities covered under this contract. He has overall responsibility for the management and completion of the project, which includes resource allocation, financial reporting, schedule control, and review and approval of deliverables. Mr. Gerhard will assist the PM as needed.

3.3 QUALITY CONTROL MANAGER

Mr. Sonny Richardson will serve as the MEC QC Manager for this project. The Quality Control Manager is responsible for coordinating and supervising all site activities; which include, but are not limited to, the following:

- Supervision of WESTON and WESTON subcontractor personnel.
- Submission of daily reports, Quality Control (QC) data, and subcontractor reports.
3.4 SAFETY AND HEALTH MANAGEMENT

3.4.1 Program Safety Manager

The Program Safety Manager (PSM) for this project is Mr. George M. Crawford, Certified Industrial Hygienist (CIH). Mr. Crawford is certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene. He has over 20 years of industrial hygiene and safety experience. The PSM has the following responsibilities:

- Review and final approval of the APP/SSHP.
- Ensure that the APP/SSHP complies with all federal, state, and local health and safety requirements.
- If necessary, modify specific aspects of the APP/SSHP to adjust for on-site changes that affect safety.
- Evaluate and authorize any changes to the APP/SSHP.
- Implementation and oversight of the Health and Safety Program.
- Assist in acting as liaison with government officials regarding health and safety-related site matters.
- Maintain frequent communication with the SSHO regarding site activities and implementation of the SSHP. Assist in training site personnel in the site-specific hazards.
- Ensure that both the site and site personnel comply with the WESTON Safety Program and all other applicable plans.

3.4.2 Division Health and Safety Manager

The WESTON Mid Atlantic Division Health and Safety Manager (DSM) is Mr. Larry Werts. Mr. Werts will be responsible for the following actions:

- Oversee and maintain the WESTON Corporate EHS Program, and this APP/SSHP.
- Approve, by signature, the APP/SSHP.
Visit the project sites as needed to audit the effectiveness of the APP/SSHP.

Remain available for emergencies.

Develop modifications to the APP/SSHP as necessary.

Evaluate and authorize changes to the APP/SSHP based on field, occupational exposure, and air monitoring data as necessary.

Serve as a technical advisor.

3.4.3 Site Safety and Health Officer/Unexploded Ordnance Safety

The SSHO for this project will be responsible for implementing the APP/SSHP and ensuring that all project personnel follow the requirements of the APP/SSHP. In addition to overall site safety, he will also be responsible for enforcing UXO safety as it applies to UXO support activities.

The SSHO for this project will be approved by the DSM and will be a competent person as stated in OSHA 29 CFR 1926.32. As required by EM385-1-1, the SSHO will have at least five years of construction safety experience and successfully completed the OSHA 30-hour construction safety course (or equivalent course). The SSHO will have performed work on a site(s) of similar hazard, risk, and complexity to the task assignment, and be certified in first aid and CPR.

The SSHO will be responsible for conducting morning safety meetings for all site personnel to discuss the day’s activities, associated hazards, and UXO safety. He will also be required to report any incidents that occur on-site to the Site Manager, Project Manager, Program Manager, and PSM. He will be required to implement safety corrective actions through training and reinforced awareness.

3.5 CORE FIELD TEAM

A WESTON Core Field Team will assist with managing daily progress, technical issues, coordinating subcontractors and vendors, resolving issues associated with the project. The Core Field Team will include at a minimum, the QC Manager, Senior UXO Supervisor, Site Safety Officer, QC Officer, and Project Engineer.
3.6 COMPETENT PERSON

At a minimum, according to OSHA Regulation 29 CFR 1926.32, site personnel will include a Competent Person (i.e., a person 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 the authorization to take prompt corrective measures to eliminate them). A list of competent person requirements and regulatory references is presented in Table 3-1.

The qualifications of all site-specific personnel will be maintained on-site. The certifications and overall qualifications of all WESTON personnel are maintained in a database supported by WESTON.

**Table 3-1 Competent Person Requirements**

<table>
<thead>
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<th>Competent Person Requirement</th>
<th>Regulatory Reference</th>
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<td>EM 385-1-1 Sec. 01.A.17</td>
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<td>Hazardous Waste Operations and Emergency Response</td>
<td>29 CFR 1926.65</td>
<td>All Field Personnel</td>
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<td>General Inspections of Construction Sites</td>
<td>29 CFR 1926.20</td>
<td>SSHO</td>
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<tr>
<td>Unsanitary Conditions</td>
<td>29 CFR 1926.27</td>
<td>SSHO</td>
</tr>
<tr>
<td>Hearing Protection</td>
<td>29 CFR 1926.101</td>
<td>SSHO</td>
</tr>
<tr>
<td>Respiratory Protection</td>
<td>29 CFR 1926.103</td>
<td>SSHO</td>
</tr>
<tr>
<td>Mechanized Equipment</td>
<td>29 CFR 1926.600</td>
<td>SSHO</td>
</tr>
</tbody>
</table>


3.7 QUALIFIED PERSON

Site personnel will also include a Qualified Person. WESTON will permit only those employees qualified by training or experience to operate equipment and machinery in compliance with OSHA 29 CFR 1926.20(b)(4). According to OSHA 29 CFR 1926.32, “Qualified” means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project. Table 3-2 contains a qualified person’s requirement list.
Table 3-2 Qualified Person Requirement

<table>
<thead>
<tr>
<th>Qualified Person Requirement</th>
<th>Project Applicability</th>
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</thead>
<tbody>
<tr>
<td>Hazardous Waste Operations and Emergency Response</td>
<td>X</td>
</tr>
<tr>
<td>Equipment Operators – General</td>
<td>X</td>
</tr>
<tr>
<td>UXO Technicians</td>
<td>X</td>
</tr>
</tbody>
</table>

For hazardous waste operations and emergency response a “qualified person” means a person with specific training, knowledge, and experience in the area for which the person has the responsibility and the authority to control. The site qualified person(s) will be identified on Figure 3-1.

The qualifications of all site-specific personnel will be maintained on-site. The certifications and overall qualifications of all WESTON personnel are maintained in a database supported by WESTON.

3.8 WESTON SUBCONTRACTORS

Qualified subcontractors and associate personnel may be brought on-site for specialty services that may include, but are not limited to: surveying, MEC identification and removal, site clearing, and geophysical investigation and mapping. These subcontractors will be under the ultimate direction of the Technical Manager and are required to adhere to all aspects of the APP/SSHP.

3.9 PERSONNEL ASSIGNED TO THE PROJECT

All WESTON and subcontractor personnel who will be involved in on-site activities are responsible for the following:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees, and being alert to potentially harmful situations;
- Performing only those tasks that they believe they can do safely and have been trained to do;
- Notifying the SSHO of any special medical conditions (i.e., allergies, contact lenses, diabetes);

- Notifying the SSHO of any prescription and/or nonprescription medication, which the worker may be taking, that might cause drowsiness, anxiety, or other unfavorable side effects;

- Preventing spillage and splashing of materials to the greatest extent possible;

- Practicing good housekeeping by keeping the work area neat, clean, and orderly;

- Immediately reporting all injuries to the SSHO; and

- Complying with the APP/SSHP and all safety and health recommendations and precautions, properly using PPE as determined by the APP/SSHP and/or the SSHO.
Figure 3-1 Project Health and Safety Organization

- **National Guard Bureau**
  - Pennsylvania Army National Guard

- **Project Manager**
  - Gregory Daloisio, PMP

- **MMRP Technical Manager**
  - John Gerhard

- **SUXOS**
  - Marty Holmes

- **UXOSO/UXOQC**
  - Daniel Dorrell

- **Geophysical Team**
  - Senior Geophysicist
    - John Williams, P.G.
  - Project Geophysicist
  - Geophysical Survey Team

- **UXO Team**
  - UXO Technician III
  - UXO Technician II
  - UXO Technician I

- **MC Sampling Team**
  - Senior Scientist/Engineer
    - Stacie Popp, P.E., LEED® AP
  - Associate Engineer
4. SUBCONTRACTORS

Subcontractors to WESTON will be selected only after their safety and health program is thoroughly evaluated; they complete an EHS questionnaire, and meet specific safety and occupational health selection criteria.

4.1 SUBCONTRACTOR RESPONSIBILITIES

Subcontractors are responsible for:

- Providing on-site personnel with appropriate training and medical certification, and ensuring that personnel have read, understand, and will comply with this APP and the SSHP.
- Providing equipment that is safe for operations and free from any obvious hazards.
- Providing and documenting inspections of equipment and tasks as necessary to comply with applicable OSHA, NGB, USACE, WESTON, and local regulations.

Table 4-1 List of Subcontractors

<table>
<thead>
<tr>
<th>Subcontractor</th>
<th>Activity</th>
<th>EMR Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avatar</td>
<td>Risk Assessment</td>
<td>NA</td>
</tr>
<tr>
<td>Melham Associates</td>
<td>Surveyor</td>
<td>NA</td>
</tr>
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SECTION 5

TRAINING
5. TRAINING

5.1 GENERAL

All personnel assigned to or regularly entering a project site will have received the required training that is maintained by the WESTON Corporate EHS database. As required by EM 385-1-1 and in accordance with 29 CFR 1910.120, elements of CFR 1926 and other OSHA regulations, applicable required training for all site workers shall be in accordance with the following sections.

5.2 NEW HIRE SAFETY ORIENTATION

New employees participate in WESTON’s orientation program. All personnel receive training on WESTON’s EHS Policy including environmental aspects, Behavior-Based Safety, and site/job specific training.

5.3 UNEXPLODED ORDNANCE PERSONNEL

All UXO technicians and personnel will meet the training requirements set forth by the Department of Defense Explosives Technical Paper 18.

5.4 BASIC OSHA TRAINING

All general site workers will have the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and 3 days of field experience under the direct supervision of a trained experienced supervisor. On-site management personnel (SM and/or SSHO) will have an additional 8 hours of specialized supervisory training. All workers must have initial training completed or refresher training (8 hours) within the past 12 months. All training will be documented.

5.5 OSHA CONSTRUCTION TRAINING

In compliance with USACE Health and Safety Requirements Manual (EM 385-1-1), 15 September 2008, all SSHOs, at a minimum, will have completed the 30-hour OSHA construction
safety class or equivalent training, and complete a minimum of 24 hours of formal safety coursework every four years.

5.6 FIRST AID AND CPR TRAINING

5.6.1 Training Requirements

At least two employees or subcontractors per site will be currently certified in first aid and CPR. The training shall be equivalent to that provided by the American Red Cross.

5.6.2 Bloodborne Pathogen Training

Personnel trained in first aid and expected to administer first aid will receive training in controlling exposures to bloodborne pathogens (BBP). This training will address the following topics:

- The bloodborne pathogen standards.
- Requirements of the Exposure Control Plan.
- Description of the risks of exposure and how BBP are transmitted.
- Management and employee responsibilities.
- Protection methods against exposure and decontamination procedures.
- Post-exposure procedures.
- Labeling and color-coding of infectious waste.

5.7 PROJECT SITE-SPECIFIC SAFETY AND HEALTH TRAINING

Project site-specific training will be provided to workers prior to on-site operations. This training will include:

- Training specific to other sections of EM 385-1-1 or OSHA standards in 29 CFR 1910 and 29 CFR 1926 that are applicable to site operations as discussed in Section 5.2.

- Training covering each element in the APP/SSHP, including the items listed in the following subsections.
5.7.1 Site-Specific Chemical and Physical Hazards

Site-specific health and safety training will be conducted prior to field activities at each site. In particular, the training will stress emergency response procedures and will cover the chemical and physical hazards of the site and site operations.

5.7.2 Hearing Conservation Training

All site personnel exposed to noise levels exceeding 85 dBA 8-hour time-weighted average (TWA) will be provided with training, which addresses the following topics:

- Physical and psychological effects of high noise exposure.
- Noise exposure limits.
- Elements of the Hearing Conservation Program.
- Selection, use, and limitations of hearing protection devices.

5.7.3 Respiratory Protection Training

In accordance with 29 CFR 1910.134, all site personnel required to use respiratory protection devices have received equipment-specific training. This training covers the use, limitations, inspection, maintenance, and cleaning of respiratory protection devices required for use at FIG. Daily site-specific briefing/training will reinforce knowledge as necessary.

5.7.4 Personal Protective Equipment

In accordance with OSHA 29 CFR 1910, Subpart I (Personal Protective Equipment), all PPE will be provided, used, and maintained in a sanitary and reliable condition. All PPE will be of construction, design, and material to provide employees protection against known or anticipated hazards. PPE will be selected that properly and appropriately fits the employee. WESTON employees have been provided with training in accordance with the standard. Any concerns regarding the use of appropriate PPE will be brought to the attention of the SHSO, who is directed to contact the SHM for assistance in evaluation of PPE as necessary.
Most work at FIG will be done in Level D PPE. If higher Levels of Protection are required an addendum to the APP/SSHP will be drafted and approved.

5.7.5 Buddy System Training

All work at FIG will be performed using the buddy system. Team members will keep in visual contact with each other at all times. Team members will be made aware of any slip, trip, and lifting hazards along with any potential exposure to chemical substances, heat or cold stress, and general hazards within their work area.

5.7.6 Visitor Training

All visitors will receive site-specific training to ensure that potential hazards and risks are identified. This training will consist of a safety briefing by the SSHO that will include:

- Location and description of potential hazards and risks.
- Required PPE.
- Areas of the site that are closed to visitors.
- The site evacuation plan and emergency procedures.
- Other topics as deemed appropriate.
SECTION 6

SAFETY AND HEALTH INSPECTIONS
6. SAFETY AND HEALTH INSPECTIONS

A competent person(s) will conduct and document all safety inspections.

- Daily and weekly safety and health inspections will be conducted and documented by the SSHO. The Environmental Safety and Health Inspection checklist is found as Attachment D.

- The PSM, DSM or his designee will audit all project sites at least quarterly.

- The PSM, DSM or his designee will audit higher-risk project sites monthly.
SECTION 7

ACCIDENT REPORTING
7. ACCIDENT REPORTING

WESTON investigates all incidents, including near incidents or “near misses.” All OSHA Recordable incidents, incidents involving more than $1,000 of property damage, and incidents involving lifting equipment are subject to a root cause assessment to determine the circumstances surrounding the event and the corrective actions. This process commences after the incident is recorded and reported.

Incidents and accidents will be recorded utilizing WESTON’s NOITrack incident reporting system. A copy of any Notice of Incident (NOI) pertaining to subcontracted employees will be forwarded to the subcontracted manager. The WESTON NOI reporting procedure is described below.

Accidents involving lost time, multiple hospitalizations, fatalities, and permanent or total disability will be reported in writing to the client using the USACE Form 3394 Accident Investigation Report. This form is provided in Attachment B.

All incidents, near incidents, spills, thefts, or other site issues will be reported to the WESTON Mid Atlantic DSM, the Federal Profit Center Safety Officer, or PHSM within 1 hour of the occurrence, or as soon as physically possible. The necessity for prompt notification is to ensure appropriate and adequate assistance to the site personnel. The USACE 3394 form and the WESTON NOI form must be submitted to the DSM within 24 hours of the incident.

7.1 NOITRACK PROCEDURE

In June 2009, WESTON’s Corporate EHS released a new NOI reporting system. NOITrack replaces the NOI Form for reporting incidents, although the form may still be used if access to a computer is unavailable. NOITrack can be accessed on the WESTON Portal, Environmental Health and Safety homepage; and the NOITrack information must be completed within 24 hours of the incident, accident, or near incident. The requirement and general procedure for reporting incidents did not change, only the method of submitting them, as described below. Anyone involved in the incident can complete an NOI.
The NOI must be utilized to report ALL incidents and near-incidents. Incidents include the following: employee accidents, injuries, auto accidents, property damage/loss, utility damage, information/data breaches, security concerns/breaches, break-ins, subcontractor injuries/accidents/events, OR any other liability situation or circumstance that could give rise to a claim. For example, spills/discharges resulting from the installation of equipment or systems by WESTON or our subcontractors should be reported using the NOITrack system. Basically, an NOI must be submitted if something happens on a project that was not intended and could result in liability for WESTON.

WESTON staff will use the following procedure to report an incident:

1. Notify the project chain of command (Site Manager, Project Manager), or the resource manager as soon as possible, regardless of the day or time. Immediately following notification of the Site Manager/Project Manager and direct chain of command as appropriate, please contact the Federal Team Safety Officer:

   Louise Kritzberger, 610-701-3618 (office); 484-571-9441 (cell)

   or Mid-Atlantic Division Safety Manager Larry Werts (215-815-6237)

For security related incidents, also contact William Irwin, Corporate Security Manager (610-701-5217) for guidance on the proper submittal of the NOI.

2. Gather the information required to complete the NOI and complete the NOI online, or ask the Federal Team Safety Officer to complete the NOI. When completing the NOI, please add both the Federal Team Safety Officer and the PC Manager to the “Additional Team Members” at the bottom of the Incident Info Page. This gives WESTON’s safety and management staff access to the NOI for review.

3. SAVE the NOI in the system.

   DO NOT click to submit the NOI at this point.

Saving the NOI will allow the Federal Team Safety Officer to review the information contained in the NOI and request more information if needed. The Federal Team Safety Officer will then submit the NOI or advise that the NOI can be submitted electronically.

If you have any questions, please do not hesitate to contact the Federal Team Safety Officer to assist you.
SECTION 8

SAFETY AND HEALTH EXPECTATIONS, INCENTIVE PROGRAMS, AND COMPLIANCE
8. SAFETY AND HEALTH EXPECTATIONS, INCENTIVE PROGRAMS, AND COMPLIANCE

Liberty Mutual, WESTON’s Insurance Carrier, has recognized WESTON’s Safety and Health Program as outstanding since 1999.

8.1 EXPECTATIONS

WESTON utilizes integrated EHS management systems to implement its corporate goal for Zero Accidents involving personnel and the environment.

8.2 INCENTIVE PROGRAMS

Project specific financial and other incentive plans are developed and integrated with Safety and Health goals as an overriding component.

8.2.1 Safety Solutions Program

Safety Solutions is a program that provides WESTON’s employees positive opportunities to become engaged in the Safety and Health Program. Employees are encouraged to utilize the Safety Solutions Program to report near inciden ces or to identify workplace hazards and their proposed solutions. The submitted Safety Solutions are evaluated and the authors of the most highly regarded solutions are eligible for a financial bonus and other rewards.

8.3 NONCOMPLIANCE

Although non-compliance is not expected, safety and health program violations can and will result in disciplinary action up to and including dismissal. All employees understand that safety is of the utmost importance in our company.
SECTION 9

FIELD ACTIVITIES
9. **FIELD ACTIVITIES**

The fieldwork will generally consist of mobilization, site preparation, surveying, brush clearing and staging, instrument aided visual surveys, digital geophysical mapping, intrusive investigations, sampling for munitions constituents, and demobilization. These major activities can be summarized as follows:

- **Activity 1. Mobilization:** This task will include setting up temporary facilities, mobilizing equipment and resources, and familiarizing project personnel with the site and the requirements for the work.

- **Activity 2. Site Preparation:** This task will include site surveying to delineate work areas, confirm existing control points, install new benchmark monuments, mark the inner and outer roadway limits, and establish site limits.

- **Activity 3. Brush Clearing Activities:** Areas directly impacting surface and geophysical surveys will be cleared of brush and vegetation.

- **Activity 4. Instrument Aided Visual Surveys:** A magnetometer-assisted surface survey will be conducted utilizing a Schonstedt GA-52cd Magnetic Locator following procedures established in the work plan.

- **Activity 5. Digital Geophysical Mapping:** DGM activities will be conducted utilizing a Geometrics G-858 Cesium vapor magnetometer/gradiometer and following procedures established in the work plan.

- **Activity 6. Intrusive Investigations:** This task will include the location, removal and destruction of MEC items encountered within the area. Once an item has been identified, its characteristics recorded and deemed safe for transport, the MEC item will be moved to the open detonation area on the Installation. WESTON anticipates disposing of all MEC items deemed “not safe to transport” on-site, primarily through the employment of blow-in-place (BIP) procedures.

- **Activity 7. Sampling for Munitions Constituents:** This task will include the collection and analysis of soil and sediment samples following the procedures established in Subsection 3.10 that is provided with the work plan.

- **Activity 8. Demobilization:** This task will include removing from the project site all equipment, temporary structures, and other items used during field activities.
SECTION 10

ACTIVITY HAZARD ANALYSIS
10. ACTIVITY HAZARD ANALYSIS

WESTON will ensure compliance with the requirements of EM 385-1-1, OSHA (29 CFR 1910 and 1926), and WESTON policy requirements through formal and site-specific training programs, as well as routine inspections with follow-up compliance. Specific criteria for this Site are included in the following subsections with information pertaining to suspected physical, chemical, biological, and radiological hazards associated with the work areas, tasks, and operations described in Section 2. As new data becomes available, this APP may need to be modified accordingly. An AHA Table for each task listed in Section 9 is presented in Table 10-1.

10.1 PRELIMINARY EVALUATION

Prior to work or specific tasks/activities, qualified personnel will perform a preliminary evaluation of the site’s characteristics. This preliminary evaluation includes the completion of an AHA Table, which identifies hazardous conditions, and aids in the selection of appropriate employee protection methods and PPE.

All known or potential physical and chemical hazards that may pose a threat to the safety and health of site workers must be identified to ensure workers are adequately protected. Emphasis is placed on identifying conditions that may cause death or serious harm. All site workers must be vigilant in identifying hazards in the work place and bringing them to the attention of supervisory personnel. Evaluation of work site characteristics and hazards will continue throughout the duration of the project.

While all personnel share responsibility to communicate and understand on-site hazards, the SSHO is responsible for thoroughly evaluating field operations with respect to potential hazards to personnel. These potential hazards and the specific procedures to be followed to help prevent or reduce exposure shall be reviewed and documented during the daily safety briefing.

The following sections contain general site safety information and OSHA regulatory requirements to be followed on-site. WESTON FLDs, contained in the CECHSP Manual maintained on-site, will also be followed. Where necessary, client requirements will be referenced or incorporated into the APP/SSHP.
Hazards due to normal site activities can be reduced by using common sense and following safe practices. The following practices are expressly forbidden:

- Running and horseplay.
- Use of tobacco products, eating, drinking, applying cosmetics, or chewing gum within the Restricted Access or EZ or any potentially contaminated area.
- Ignition of flammable materials in the work zone without the proper Hot-Work Permit. Equipment will be bonded, grounded, and explosion resistant, as appropriate.
- Performance of tasks in the restricted area individually (i.e., working alone).

Personnel must keep the following guidelines in mind when conducting field activities:

- Hazard assessment is a continuous process, personnel must be aware of their surroundings and constantly aware of the chemical and physical hazards that are or may potentially be present.
- The number of personnel in the support zone or EZ will be the minimum number necessary to perform work tasks in a safe and efficient manner. The use of the Buddy System is mandatory for EZ work.
- Team members will be familiar with the physical characteristics of each site including wind direction, site access, and the location of communication devices and safety equipment.
- The location of overhead power lines and underground utilities must be established prior to conducting excavation or drilling activities.

Team members will be familiar with emergency hand signals:

- Hand Gripping Throat: "Respirator or breathing problems, can't breathe."
- Thumbs up: "OK, I'm all right, I understand."
- Thumbs down: "No, negative."
- Hand(s) on top of head: "Need assistance."
- Grab buddy's wrist: "Evacuate site now, ask no questions."

10.2 PHYSICAL HAZARDS

Physical hazards that may be encountered during field activities include, but are not limited to: slip/trips/falls, cold stress, heat stress, flammable materials, hazards related to equipment handling, uneven/unstable surfaces, excessive noise, heavy equipment operation and
decontamination. Physical hazards specifically applicable to this Site are additionally identified by task in the AHA Tables and, when required, are addressed in plans as indicated in Section 9.

10.2.1 Rough Terrain

Rough terrain complicates work activities and adds to or increases risk and must be considered a physical hazard. Physical hazards associated with rough terrain include falling, slipping, and tripping. When working on foot, steep inclines and heavy or downed vegetation can hide holes or breaks in the terrain, increasing the risk of slips, trips, and falls. Personnel working on rough terrain should maintain a high level of physical conditioning due to increased body stress and exertion.

The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls. Boots should be ankle high or higher to provide additional support and stability. Work should be completed in adequate natural light or sufficient illumination will be maintained. Site personnel should conduct an initial walkover and the “buddy system” will be implemented. Warn others or flag locations of serious hazard.

10.2.2 Material Lifting

Many types of objects are handled in normal day-to-day operations. Care should be taken in lifting and handling heavy or bulky items because they are the cause of many back injuries. The following fundamentals address the proper lifting of materials to avoid back injuries:

- The size, shape, and weight of the object to be lifted must be considered. A worker shall not lift more than one person can handle comfortably.
- A firm grip on the object is essential; gloves shall be used if necessary, to protect the hands.
- The hands and object shall be free of oil, grease, and water, which might prevent a firm grip, and the fingers shall be kept away from any points that cause them to be pinched or crushed, especially when setting the object down.
- The item shall be inspected for metal slivers, jagged edges, burrs, rough or slippery surfaces, and pinch points.
The feet shall be placed far enough apart for good balance and stability. The footing surface should be firm.

The worker shall get as close to the load as possible. The legs shall be bent at the knees.

The back shall be kept as straight as possible.

To lift the object, the legs are straightened from their bending position.

A worker shall never carry a load that cannot be seen over or around.

When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees, back straight, and the object lowered.

In addition, relevant WESTON FLDs shall be followed. When two or more workers are required to handle an object, coordination is essential to ensure that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker, if possible, shall face the direction in which the object is being carried.

10.2.3 Hand Tools

Hand tools will be used according to OSHA Regulations and WESTON FLDs. Only tools that are in good condition shall be used. Improper and defective tools contribute to incidents. The following safe practices shall be observed when using hand tools:

- Use tools in the manner for which they were designed.
- Be sure of footing before using any tool.
- Do not use tools that have split handles, mushroom heads, worn jaws, or other defects.
- Do not use makeshift tools or other improper tools.
- Use spark proof tools where there are explosive vapors, gases, or residue.

During site preparation activities, use of hand tools for clearing and grubbing may be required. WESTON FLD 47 will be reviewed prior to task commencement and will be adhered to during all clearing and grubbing operations.
10.2.4 Traffic

FIG is an active installation, and care must be taken to avoid motor vehicle accidents during sampling. Speed limits will be obeyed at all times, and seat belts will be worn both on and off the base boundaries.

10.3 WEATHER HAZARDS

In the event of unseasonably warm weather, personnel should be closely monitored for signs of heat stress or heat stroke, particularly if PPE is required. During cold weather, it may be necessary to protect personnel from the effects of cold temperatures and wind, as well as wetting from field operations or precipitation. The SSHO is responsible for evaluating the conditions, work tasks, and requirements for PPE, and for implementing the requirements in Attachment C.

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments. Stop work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.

If you will be working on a windy day, you should be alert and protected. Wear eye protection to prevent dust and other particles from entering or striking your eyes. Keep your hard hat on at all times to prevent injuries from falling or flying objects. The likelihood of falls from heights is greatly increased by strong winds. Wear the necessary PPE to ensure your safety. Shut down outdoor activities involving work at elevation on ladders, scaffolding, aerial lifts, etc; handling large tarps and plastic sheeting when wind speeds exceed 25 mph.

Stay informed, with today’s modern technology available at the touch of a button, you should keep up to date with the latest local weather reports. Visit weatherbug.com or weather.gov to stay informed in case of wind warnings, watches, and advisories. Projects might have their own
weather radio on site to provide instant weather data. Use daily hazard assessments to determine if working conditions have changed or will change throughout the day.

10.4 HEAT AND COLD STRESS

10.4.1 Heat Stress

One of the most common types of stress that can affect field personnel is heat stress. In addition, heat stress can be a serious hazard to workers at waste sites because of the PPE required. Monitoring for heat stress will be implemented and performed in accordance with the American Conference of Governmental Industrial Hygienists (ACGIH) 2008 Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) Threshold Limit Values for Chemical Substances and Physical Agents, Heat Stress. WESTON FLD 5 – Heat Stress Prevention and Monitoring contains signs and symptoms, monitoring requirements, prevention and treatment procedures for heat rash, heat cramps, heat exhaustion, and heat stroke, and will be followed at all times.

10.4.2 Cold Stress

Personnel working outdoors are subject to cold stress at temperatures below 40 degrees. Exposure to extreme cold can cause skin injury or death if the core body temperature is unchecked and permitted to drop. Chemical-protective clothing does not provide protection against cold stress and may increase susceptibility. Monitoring for cold stress will be implemented and performed in accordance with the ACGIH 2008 TLVs and BEI TLVs for Chemical Substances and Physical Agents, Cold Stress. WESTON FLD 6 – Cold Stress contains signs and symptoms, monitoring requirements, prevention and treatment procedures for cold stress and will be followed at all times.

10.5 UXO/MEC AND MEC-RELATED DEBRIS

During MEC operations, which may include surveys, brush clearing, geophysical surveys, and intrusive activities, a site radio will be provided to each UXO team in order to maintain
communications with WESTON site personnel, subcontractors and FIG range control. Brush clearing and survey subcontractors will be escorted by a UXO technician during their activities.

Every effort will be made to identify a suspect MEC item. The MEC item will be visually examined for markings and other external features such as shape, size, and external fittings. If an unknown MEC item is encountered, the on-site representative will be notified immediately. Under no circumstances will any fused UXO be moved in an attempt to make a definitive identification.

As a general rule, all fused MEC will be detonated in the original position found. This is the safest method to effect final disposition of munitions. Any item to be BIP will be sandbagged to mitigate blast effects and fragmentation projection.

Only UXO Technicians will handle MEC items, and only during daylight hours. Personnel who will be handling MEC items will not wear outer or inner garments having static-electricity-generating characteristics such as nylon.

All WESTON and subcontractor personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards associated with MEC items. All field personnel will be under the direct supervision of a UXO Technician III or higher.

General MEC safety guidelines are listed below:

- Projectiles containing base-detonating fuses are to be considered armed if the round is fired.
- Arming wires and pop out pins on unarmed fuses should be secured prior to moving MEC items.
- Do not depress plungers, turn vanes, or rotate spindles, levers, setting rings, or other external fittings on MEC items.
- Do not attempt to remove or dismantle any components of MEC items.
- MEC personnel will render inert any unmovable MEC items found on-site.
- Safely movable MEC items will be taken from the found location to the FIG range.
Consider MEC items, which may have been exposed to fire and detonation, as extremely hazardous.

Do not rely on the color-coding of MEC items for definitive identification.

Assume that a practice MEC item contains a live charge until investigation proves otherwise.

Do not approach a smoking munition.

The approved Explosives Site Plan (ESP) and the Explosives Management Plan (EMP) will be adhered to at all times.

10.6 WORKING NEAR WATER

There is the potential to work around streams that flow through the work area. Precautions described in WESTON FLD 19, Working Over or Near Water will be followed.

10.7 EQUIPMENT OPERATION

Before any machinery or mechanized equipment is placed in use, it will be inspected, tested, and certified to be in safe operating condition in strict accordance with the manufacturer’s directions and applicable OSHA regulations. Safety inspections and equipment calibration will be required at the beginning of each work day. Any machinery or equipment found to be unsafe will be staged outside the work zone, and its use prohibited until unsafe conditions have been corrected. Only qualified personnel will operate machinery and mechanized equipment or instrumentation. Equipment deficiencies observed on any item that could affect its safe operation will be corrected before continuing operation; otherwise, the item will be tagged out-of-use.

10.8 CHEMICAL HAZARDS

The presence of chemical hazards creates potential personnel exposure via inhalation, ingestion, absorption, or contact with contaminants present in liquids, soil, or air. In preparation of the APP/SSHP, an evaluation of known or suspect contaminants has been made to ensure all chemical hazards have been addressed. The list of chemicals to which workers may be exposed will be developed through the use of several information sources, including archival research data and previous site characterization data.
Site personnel will comply with the storage, handling, and use requirements stated on the Material Safety Data Sheet (MSDS) for each chemical brought on-site by WESTON or its subcontractors. An inventory of all chemicals brought on-site and an MSDS for each will be maintained at the site. All subcontractors shall inform WESTON of any chemical materials brought on-site, and the location of their MSDSs.

In addition, chemicals contained in MEC may be encountered on-site. Activity No. 6 in Table 10-1 will be followed in the event MEC items are identified. A Site-Specific Hazard Communication Program is contained in Attachment F.

10.8.1 Hazard Communication

As noted above in the opening for Section 10, compliance with the OSHA HCS 29 CFR 1910.1200 is mandatory and a Site-Specific Hazard Communication Program is included as Attachment F.

10.9 BIOLOGICAL HAZARDS

Biological hazards which may be encountered in the field include poisonous plants, wild and/or rabid animals, snakes, ticks, and insects. The degree of hazard can range from annoyance to death from bites or anaphylactic shock. Recognition and avoidance are critical in maintaining a safe work site.

10.9.1 Tick Bites

The Center for Disease Control has noted the increase of Lyme disease and Rocky Mountain Spotted Fever, which are caused by bites from infected ticks that live in and near wooded areas, tall grass, and brush. Ticks are small, ranging from the size of a comma (,) up to about one-quarter inch. They are sometimes difficult to see. The tick season extends from spring through summer.

Lyme disease has occurred in almost all states and is caused by ticks infected with a type of spirochete bacteria. Deer ticks are about one-quarter inch in size, and black or brick red in color.
Male deer ticks are smaller and all black. The deer tick larva are extremely small, approximately the size of a period (\).

Rocky Mountain Spotted Fever has occurred in over one-half of the states, with the heaviest concentrations in Oklahoma, North Carolina, South Carolina, and Virginia. It is caused by Rocky Mountain wood ticks and dog ticks that have become infected with rickettsia bacteria. Both are black or tan in color.

Standard field gear (work boots, socks, and light-colored clothing or coveralls) provide good protection against tick bites, particularly if the joints are taped. However, even when wearing appropriate field gear, the following precautions should be taken when working in areas that might be infested with ticks:

- When in the field, check yourself often for ticks, particularly on your lower legs and areas covered with hair. Look for "a freckle that moves".
- Spray outer clothing, particularly your pant legs, crotch, boots, and socks, but not your skin, with an insect repellent that contains permethrin or permance.
- Follow manufacturer’s instructions if using an insect repellant on the skin. For sampling activities be aware of potential cross contamination of samples.
- When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible.
- If you suspect that a tick is present, remove it with tweezers only, and not with matches or a lit cigarette. Grasp the tick near the head with the tweezers and pull gently. Do not use nail polish or any other type of chemical. Be sure to remove all parts of the tick's body. Once removed, disinfect the area with alcohol or a similar antiseptic. Report the incident to the SSHO.
- Look for signs of the onset of Lyme disease, such as a rash that looks like a bullseye or an expanding red circle surrounding a light area, frequently with a small welt in the center. This rash can appear from several days to several weeks after the tick bite.
- Also look for signs of the onset of Rocky Mountain Spotted Fever, an inflammation which is visible in the form of a rash comprised of many red spots under the skin, which appears 3 to 10 days after the tick bite. The rash frequently occurs on the ankles and wrists.
- The first symptoms of either disease are flu like chills, fever, headache, dizziness, fatigue, stiff neck, and bone pain. If immediately treated by a physician, most
individuals recover fully in a short period of time. If not treated, more serious symptoms can occur.

If any of the signs and symptoms noted above appears, contact the SSHO.

All employees and/or visitors to the Site are subject to an initial Site Safety and Health Briefing as discussed in Subsection 6.3. During these discussions, ticks shall be addressed in full including how to identify a tick (multiple species are addressed), the provisions to be taken on-site for avoidance, actions to be taken in case of a bite, and identification of subsequent infection and/or disease transmission.

10.9.2 Snakes

Various types of snakes are common at FIG, including rattlesnakes. WESTON FLDs 43 and 43A contain information regarding identification of poisonous animals. If bitten by a snake, remain calm and keep the affected area below the level of the heart and walk, do not run, to the nearest aid station for assistance. The SSHO will immediately transport the victim to the closest medical facility for treatment or send for appropriate medical assistance, whichever is faster.

The use of snakebite kits is not authorized. If possible, the snake should be identified to ensure prompt medical treatment by the physician.

10.9.3 Poisonous Plants

Site personnel will need to be alert to the presence of poisonous plants. The most common types of poisonous plant are poison ivy, poison oak, and poison sumac. Skin contact with these plants can cause skin sensitization resulting in reddening, swelling, and itching of the affected areas. Skin exposure can result from either direct contact with the plant or contact with clothing or equipment previously exposed to the plant.

Site personnel will receive training in the recognition of poisonous plants and methods for preventing exposure during the site-specific safety briefing.
10.9.4 Animal or Insect Bites

Animal bites or stings are usually nuisances (localized swelling, itching, and minor pain) that can be handled by First Aid treatment. The bites of certain snakes, lizards, spiders, and scorpions contain sufficient poison to warrant medical attention. In addition, there are several species of caterpillars that contain stinging hairs that may cause a rash on contact or respiratory distress if the hairs are inhaled.

There are diseases that can be transmitted by insect and animal bites (e.g., Rocky Mountain Spotted Fever, Lyme disease [tick], rabies [mainly dogs, skunks, raccoons, and foxes], malaria, and equine encephalitis [mosquitoes]). The greatest hazard and most-common cause of fatalities from animal bites, particularly bees, wasps, and spiders is from a sensitivity reaction. Shock due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous systems, which also can result in death.

If an assigned employee has a history of allergic reactions to bites, they will be required to have their prescribed treatment with them, and the SSHO personnel will know where it is located. All stings or bites will be taken seriously. Anyone stung or bitten will be required to stop work while that person is observed for signs of severe swelling, shortness of breath, nausea, or shock. If there is any doubt, medical attention will be obtained.

All wild animals are to be avoided, particularly wild animals that are unusually passive or aggressive. Any such animals will be reported to appropriate site personnel. Skunks, raccoons, foxes, and bats are wild animals most frequently found to be infected with rabies; however, any warm-blooded animal could be infected. If an individual is bitten by an animal suspected of rabies infection, an attempt will be made to keep the animal under surveillance until appropriate assistance is called to take care of the animal. The animal should then be tested. A dead animal suspected of infection should also be preserved and tested. Health departments are often sources of testing or obtaining information about where testing can be done.

The bite area should be washed with soap and water and disinfected with 70% alcohol as quickly as possible, followed by treatment by a doctor or emergency room.
Rabies is preventable, even after being bitten, if treatment is begun soon enough. Hence, prompt medical attention and determining whether the animal that has bitten you is infected are very important. Rabies is not curable once symptoms or signs appear.

10.10 RADIOLOGICAL HAZARDS

Both ionizing and non-ionizing radiation may present problems on specific sites. While ionizing radiation is commonly due to waste disposal practices, there are areas in which naturally occurring radiation may be an issue. Based on previous work at the Site and site history, encountering ionizing radiation hazards is not anticipated.

Non-ionizing radiation hazards exist during periods of exposure to the sun. Exposure to UV radiation from the sun will be controlled by the use of proper PPE as described in Table 10-1. Personnel will be instructed in appropriate PPE and/or procedures to follow in the event that non-ionizing radiation creates a concern.
### Table 10-1 Activity Hazard Analysis

#### Activities 1 and 2 - Mobilization and Site Preparation

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization of manpower and equipment, establish work zones, locate utilities, install erosion controls, locate existing benchmarks, provide survey control, and install new monuments.</td>
<td>Chemical Hazards—Non-intrusive activities, therefore, the risk level of exposure to site contaminants during this activity is low. Focus on hazard awareness and change of conditions. Ordnance- The area will be surveyed for any munitions Physical Hazards—Slips, trips, falls, tools, terrain, or vegetation; uneven walking surfaces; weather hazards, such as snow and ice; and poor visibility. Manual lifting</td>
<td>No intrusive measures allowed during this activity. Wear appropriate PPE for skin protection and to prevent dermal contact. Avoid liquid pools and stained areas if possible. An initial visual survey will be conducted to confirm the levels of protection are correct for the activity. Any ordnance items will be positively identified. GPS coordinates will be taken of the item, and it will be left in place. Surface MEC/UXO Sweeps generally only clear to 2 feet BGS so any surface clearing activities will require clearance in 2 foot increments. A UXO Technician II or higher will escort the survey crew and conduct a magnetometer assisted visual survey to screen for metal debris in area of intrusive work. The work area shall be visually inspected. Housekeeping - Slip, trip, and fall hazards shall be either removed or marked and barricaded. Materials will be stored to prevent intrusion into the work areas. Work areas will be kept organized; and ice, snow, and mud will be cleared from steps to reduce slip hazards. Work to be completed in adequate natural light or assure sufficient illumination is maintained. Site personnel shall conduct an initial walkover, and the “buddy system” will be implemented. Fall protection (railing or Fall Arrest Systems) will be installed if work is to be conducted at a level higher than 6 feet. See FLD 02, FLD 11, FLD 12, and FLD 39. Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10. Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 ft of the fuel storage area, in construction equipment, and strategically in the construction area. See FLD 31 and 32.</td>
</tr>
<tr>
<td>Fire</td>
<td>Fire Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 ft of the fuel storage area, in construction equipment, and strategically in the construction area. See FLD 31 and 32.</td>
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</table>
### Table 10-1 Activity Hazard Analysis (Continued)

#### Activities 1 and 2 – Mobilization and Site Preparation (continued)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Hands or fingers caught between objects; abrasions and lacerations.</td>
<td>Personnel shall be made aware of the hazard and asked to coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for rough or sharp edges, and appropriate precautions shall be taken to avoid contact. Personnel shall wear work gloves and avoid placing hands between objects.</td>
<td></td>
</tr>
<tr>
<td>Electric hazards</td>
<td>Generators will be grounded unless self-grounded. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 ft from overhead electric lines. Electrical installations will be made by qualified electricians. A lockout/tagout program consistent with FLD 42 will be used for equipment maintenance. Also refer to FLDs 34, 35 and 38.</td>
<td></td>
</tr>
<tr>
<td>Moving/heavy equipment operations.</td>
<td>Only trained, experienced operators will operate equipment. Equipment will be inspected daily. Personnel shall be made aware of the hazard and will coordinate carefully during handling equipment operations. Personnel restricted in area of operation. Back up alarms functional. Stay out of the swing area of all equipment and from under loads. No personnel will ride on the equipment unless seats are provided. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. Always use appropriate PPE. See FLDs 20, 22, 23, and 24.</td>
<td></td>
</tr>
<tr>
<td>Hand tools, manual and power.</td>
<td>Tools shall be inspected prior to use. Damaged tools will be tagged out of service until repair can be performed by a qualified person. Use tools properly and for their intended purpose. All power circuits used for hand tools will be protected by a ground fault circuit interrupter. All personnel will be trained on the proper use of all power tools. Lockout/ tagout procedures will be implemented per FLD 42 and 29 Occupational Safety and Health Administration (OSHA) 1910. Also see FLD 38.</td>
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</tbody>
</table>
### Table 10-1 Activity Hazard Analysis (Continued)

**Activities 1 and 2 – Mobilization and Site Preparation (continued)**

<table>
<thead>
<tr>
<th>Activity</th>
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<tbody>
<tr>
<td>Caught in/between/struck by or against an object.</td>
<td>Workers shall stay out of the swing area of all equipment and will not walk, work or stand near equipment being loaded or unloaded. No personnel shall ride on the equipment unless seats are provided. See FLDs 20, 23, and 24. Ground personnel near operating heavy equipment will wear hard hats and traffic vests. The handling and placement of heavy equipment will be carefully coordinated. Materials and objects will be inspected for rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. Backup alarms will be in operable condition. Unnecessary backing will be avoided. Safety toe footwear will be required. Tools will be properly used. Due to the remote nature of the site, it is anticipated that reflective vests will not be required (due to limited traffic); however, this shall be monitored by the SSHO and revised if necessary.</td>
<td></td>
</tr>
<tr>
<td>Inclement weather, heat/cold stress</td>
<td>Workers shall be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to American Conference of Governmental Industrial Hygienists (ACGIH), National Institute for Occupational Safety and Health (NIOSH) guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the SSHO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.</td>
<td></td>
</tr>
<tr>
<td>Traffic</td>
<td>Work areas will be clearly barricaded using existing gates and appropriate signs displayed. Traffic will be rerouted as necessary. Persons working in traffic area, near roadways or directing traffic will wear high visibility (reflective) vests. Posted speed limit of 15 mph. See FLD 20.</td>
<td></td>
</tr>
<tr>
<td>Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.</td>
<td>Use appropriate insect repellants. Training to avoid poisonous plants and avoid contact. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43, 44.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 10-1 Activity Hazard Analysis (Continued)

Activities 1 and 2 – Mobilization and Site Preparation (continued)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation—Potential sun burn/sun poisoning hazard on bright, sunny days.</td>
<td>Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 10-1 Activity Hazard Analysis (Continued)

#### Activity 3 — Brush Clearing Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areas will be cleared of brush, trees under 2” diameter and vegetation for preparation of the IAV and DGM Surveys.</td>
<td>Chemical Hazards—The potential for exposure to petroleum and diesel products exist for this task.</td>
<td>Vehicles will not be over-filled, and caution will be used whenever refueling. Refueling will not be conducted within 100 ft of an open flame.</td>
</tr>
<tr>
<td>Ordnance- The area will be surveyed for munitions</td>
<td></td>
<td>Any ordnance items will be positively identified. GPS coordinates will be taken of the item, and it will be left in place. Surface MEC/UXO Sweeps generally only clear to 2 feet BGS so any surface clearing activities will require clearance in 2 foot increments. A UXO Technician II or higher will escort the clearing crew and conduct a magnetometer assisted visual survey to screen for metal debris in area of brush clearing work.</td>
</tr>
<tr>
<td>Physical Hazards—Slip, trips, falls; tools, terrain or vegetation, uneven walking surfaces; weather hazards; poor visibility.</td>
<td></td>
<td>The work area shall be visually inspected. Housekeeping - Slip, trip, and fall hazards shall be either removed or marked and barricaded. Materials will be stored to prevent intrusion into the work areas. Work areas will be kept organized and ice, snow and mud will be cleared from steps to reduce slip hazards. Work to be completed in adequate natural light or assure sufficient illumination is maintained. Site personnel shall conduct an initial walkover, and the “buddy system” will be implemented. Fall protection (railing or Fall Arrest Systems) will be installed if work is to be conducted at a level higher than 6 feet. See FLD 02, FLD 11, FLD 12, FLD 39.</td>
</tr>
<tr>
<td>Hand Tools, Manual and Power</td>
<td></td>
<td>Tools shall be inspected prior to use. Damaged tools will be tagged out of service until repair can be performed by a qualified person. Tools will be used properly and for their intended purpose. All power circuits used for hand tools will be protected by a ground fault circuit interrupter. All personnel will be trained on the proper use of all tools. Factory supplied safety features shall not be altered. Wear appropriate PPE including safety glasses/face shield, leg guards, hand protection, foot protection. Follow FLD 38, 47.</td>
</tr>
</tbody>
</table>
## Table 10-1 Activity Hazard Analysis (Continued)

### Activity 3 — Brush Clearing Activities (Continued)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual lifting</td>
<td>Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10.</td>
<td></td>
</tr>
<tr>
<td>Inclement weather, heat/cold stress</td>
<td>Personnel shall be dressed according to weather conditions. Workers shall be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, NIOSH guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the SSHO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.</td>
<td></td>
</tr>
<tr>
<td>Hands or fingers caught between objects; abrasions and lacerations.</td>
<td>Personnel shall be made aware of potential hazards and will coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for ice and rough or sharp edges, and appropriate precautions shall be taken to avoid contact. Personnel shall wear work gloves and avoid placing hands between objects. See FLD 10.</td>
<td></td>
</tr>
<tr>
<td>Fire</td>
<td>Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 ft of the fuel storage area, in construction equipment, and strategically in the construction area. See FLDs 31 and 32.</td>
<td>Use appropriate insect repellants. Training to avoid poisonous plants and avoid contact. Adhere to FLD 43, Biological Hazards and FLD 44, WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures.</td>
</tr>
<tr>
<td>Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.</td>
<td>Use appropriate insect repellants. Training to avoid poisonous plants and avoid contact. Adhere to FLD 43, Biological Hazards and FLD 44, WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures.</td>
<td>Use appropriate insect repellants. Training to avoid poisonous plants and avoid contact. Adhere to FLD 43, Biological Hazards and FLD 44, WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures.</td>
</tr>
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</table>
### Table 10-1 Activity Hazard Analysis (Continued)

Activity 3 — Brush Clearing Activities (Continued)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation</td>
<td>There are no radiological hazards expected because past uses do not indicate the use of radioactive material. Potential sun burn/sun poisoning hazard on bright, sunny days.</td>
<td>Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.</td>
</tr>
</tbody>
</table>
## Table 10-1  Activity Hazard Analysis (Continued)

**Activities 4 and 5 — Instrument Aided Visual Surveys and Digital Geophysical Mapping**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>A magnetometer-assisted visual survey</td>
<td>Chemical Hazards—The potential for exposure is present while conducting these activities because the soil and sediment may be contaminated. The risk level associated with these activities is moderate. Ordnance— The area will be surveyed for any munition. Physical Hazards—Slip, trips, falls, equipment, materials, tools, terrain, uneven walking surfaces; weather hazards; poor visibility.</td>
<td>Engineering controls will be utilized as necessary. Avoid direct contact with soil and sediment and also spills and splash of water. Appropriate PPE will be utilized during these activities. It is not anticipated that air monitoring will be required since minimal intrusive activity is required. Any ordnance items will be positively identified. GPS coordinates will be taken of the item, and it will be left in place. Surface MEC/UXO Sweeps generally only clear to 2 feet BGS so any surface clearing activities will require clearance in 2 foot increments. The work area will be visually inspected by UXO technicians prior to the start of mapping activities. Housekeeping - Slip, trip, and fall hazards shall be either removed or marked and barricaded. Geophysical teams will be dealing with uneven terrain. Slips, trips, and fall hazards will be the most prevalent. Sufficient illumination shall be maintained to ensure a safe working environment and weather conditions to be continuously monitored. The “buddy system” will be implemented. See FLD 02, FLD 11, FLD 12, FLD 39. Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10. Personnel shall be dressed according to weather conditions. Workers shall be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, NIOSH guidelines and FLD 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the SSHO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.</td>
</tr>
</tbody>
</table>
### Table 10-1 Activity Hazard Analysis (Continued)

#### Activities 4 and 5 — Instrument Aided Visual Surveys and Digital Geophysical Mapping (Continued)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hands or fingers caught between objects; abrasions and lacerations.</td>
<td>Personnel shall be made aware of the hazard and will coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for rough or sharp edges, and appropriate precautions shall be taken to avoid contact. Personnel shall wear work gloves and avoid placing hands between objects. See FLD 10.</td>
</tr>
<tr>
<td>Hand Tools, Manual and Power</td>
<td></td>
<td>Tools shall be inspected prior to use. Damaged tools will be tagged out of service until repair can be performed by a qualified person. Tools will be used properly and for their intended purpose. All power circuits used for hand tools will be protected by a ground fault circuit interrupter. All personnel will be trained on the proper use of all tools. Factory supplied safety features shall not be altered. Wear appropriate PPE including safety glasses/face shield, leg guards, hand protection, foot protection). Follow FLD 38, 33.</td>
</tr>
<tr>
<td>Fire</td>
<td>Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 ft of the fuel storage area, in construction equipment, and strategically in the construction area. See FLDs 31 and 32.</td>
<td></td>
</tr>
<tr>
<td>Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.</td>
<td>Use appropriate insect repellants. Training to avoid and identify poisonous plants, insects and snakes. Poison ivy is abundant in the work zone. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43.</td>
<td></td>
</tr>
<tr>
<td>Radiation—There are no radiological hazards expected because past uses do not indicate the use of radioactive material. Potential sun burn/sun poisoning hazard on bright, sunny days.</td>
<td>Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.</td>
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</table>
### Activity 6—Intrusive Investigations

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
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</thead>
<tbody>
<tr>
<td>Selected anomalies will be investigated by excavation using hand-methods. Depths of excavations will not exceed four (4) feet.</td>
<td>Ordnance- The munition with the greatest fragmentation distance (MGFD) is 105-mm HE (M1) with a maximum fragment distance of 1,939 feet and a hazard fragment distance of 341 feet.</td>
<td>All ordnance items will be positively identified prior to movement. Positively identify any fuzing associated with munition item. If found fuzed, do not handle. If unfuzed, may be moved to central location with approval of UXO Safety Officer and the USACE OE SS. MEC operations will be conducted during daylight hours only. If an unknown ordnance item is found, the USACE OE Specialist will be notified. Do not approach a smoking white phosphorous munition, the burning white phosphorous may detonate the explosive burster at any time. Do not transport white phosphorous munitions unless they are immersed in water, mud, or wet sand. The approved ESP will be adhered to at all times.</td>
</tr>
<tr>
<td>Demolition Operations- Unintentional Detonations.</td>
<td>Chemical Hazards— White Phosphorous, Explosives</td>
<td>All demolition activities will be performed in accordance with 60A-1-1-31.</td>
</tr>
<tr>
<td>Physical Hazards—Slip, trips, falls, equipment, materials, tools, terrain, uneven walking surfaces; weather hazards; poor visibility.</td>
<td>Manual lifting.</td>
<td>Avoid movement of a white phosphorous munition. Avoid inhalation of and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The work area will be visually inspected. Housekeeping – Slip, trip, and fall hazards shall be either removed or marked and barricaded. Geophysical teams will be dealing with uneven terrain. Slips, trips, and fall hazards will be the most prevalent. Sufficient illumination shall be maintained to ensure a safe working environment and weather conditions to be continuously monitored. The “buddy system” will be implemented. See FLD 02, FLD 11, FLD 12, FLD 39. Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10.</td>
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</table>
### Activity Hazard Analysis (Continued)

**Activity 6—Intrusive Investigations (Continued)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclement weather, heat/cold stress.</td>
<td></td>
<td>Personnel shall be dressed according to weather conditions. Workers shall be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, NIOSH guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the SSHO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.</td>
</tr>
<tr>
<td>Moving/heavy equipment operations</td>
<td></td>
<td>Only trained, experienced operators will operate equipment. Equipment will be inspected daily. Personnel shall be made aware of the hazard and will coordinate carefully during handling equipment operations. Personnel restricted in area of operation. Back up alarms functional. Stay out of the swing area of all equipment and from under loads. No personnel will ride on the equipment unless seats are provided. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. Always use appropriate PPE. See FLDs 20, 22, 23, and 24.</td>
</tr>
<tr>
<td>Hands or fingers caught between objects; abrasions and lacerations.</td>
<td></td>
<td>Personnel shall be made aware of the hazard and will coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for rough or sharp edges, and appropriate precautions shall be taken to avoid contact. Personnel shall wear work gloves and avoid placing hands between objects. See FLD 10.</td>
</tr>
<tr>
<td>Noise exposure</td>
<td></td>
<td>High noise areas will be identified. Hearing protection will be provided as appropriate. The latest ACGIH TLVs will be used. Personnel operating chainsaws will use hearing protection. Hearing control program, which consists of audiometric examination; training; use of hearing protection; and sound level pressure monitoring when and where necessary. See FLD 01.</td>
</tr>
</tbody>
</table>
## Table 10-1 Activity Hazard Analysis (Continued)

### Activity 6—Intrusive Investigations (Continued)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire</td>
<td>Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 ft of the fuel storage area, in construction equipment, and strategically in the construction area. See FLDs 31 and 32.</td>
<td></td>
</tr>
<tr>
<td>Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.</td>
<td>Use appropriate insect repellants. Training to avoid and identify poisonous plants, insects and snakes. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43.</td>
<td></td>
</tr>
<tr>
<td>Radiation—There are no radiological hazards expected because past uses do not indicate the use of radioactive material. Potential sun burn/sun poisoning hazard on bright, sunny days.</td>
<td>Use sun block as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.</td>
<td></td>
</tr>
</tbody>
</table>
### Activity 7—Sampling for Munitions Constituents

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil samples will be collected in accordance with the SAP and analyzed for munitions constituents.</td>
<td>Chemical Hazards—Munitions constituents. Based on anticipated low concentrations, the risk level associated with these activities is low. Ordnance- The area will be surveyed for any munition. Physical Hazards—Slip, trips, falls, equipment, materials, tools, terrain, uneven walking surfaces; weather hazards; poor visibility.</td>
<td>Wear appropriate PPE for skin protection and to prevent dermal contact. Avoid liquid pools and stained areas if possible. An initial visual survey will be conducted to confirm the levels of protection are correct for the activity. Use engineering controls to minimize dust levels. Any ordnance items will be positively identified. GPS coordinates will be taken of the item, and it will be left in place. Surface MEC/UXO Sweeps generally only clear to 2 feet BGS so any surface clearing activities will require clearance in 2 foot increments. A UXO Technician II or higher will escort the clearing crew and conduct a magnetometer assisted visual survey to screen for metal debris in area of sampling. The work area will be visually inspected. Housekeeping – Slip, trip, and fall hazards shall be either removed or marked and barricaded. Geophysical teams will be dealing with uneven terrain. Slips, trips, and fall hazards will be the most prevalent. Sufficient illumination shall be maintained to ensure a safe working environment and weather conditions to be continuously monitored. The “buddy system” will be implemented. See FLD 02, FLD 11, FLD 12, FLD 39.</td>
</tr>
<tr>
<td>Caught in/between/struck by or against an object.</td>
<td>Workers shall stay out of the swing area of all equipment and will not walk, work or stand near equipment being loaded or unloaded. No personnel shall ride on the equipment unless seats are provided. See FLD 20, 23, and 24. Workers operating equipment and/or exposed to traffic hazards will wear traffic/reflectorized vests and hard hats. The handling and placement of heavy equipment will be carefully coordinated. A traffic control system for positioning and moving haul vehicles will be established. Heavy vehicle operators may remain in their vehicles only if they have cab over protection. If operators must check loads, loading will cease until the operator is back in the cabin or away from the vehicles in a safe location. Materials and objects will be inspected for rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. Backup alarms will be in operable condition. Unnecessary backing will be avoided. Safety toe footwear will be required. Tools will be properly used. Due to the remote nature of the sites, it is anticipated that vests will not be required; however, this shall be monitored by the SSHO.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 10-1 Activity Hazard Analysis (Continued)

**Activity 7—Sampling for Munitions Constituents (Continued)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire</td>
<td>Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 ft of the fuel storage area, in construction equipment, and strategically in the construction area. See FLDs 31 and 32.</td>
<td></td>
</tr>
<tr>
<td>Traffic</td>
<td>Work areas will be clearly barricaded using existing gates and appropriate signs displayed. Traffic will be rerouted as necessary. Persons working in traffic area, near roadways or directing traffic will wear high visibility (reflective) vests. Posted speed limit of 15 miles per hour. See FLD 20.</td>
<td></td>
</tr>
<tr>
<td>Inclement weather, heat/cold stress.</td>
<td>Personnel shall be dressed according to weather conditions. Workers shall be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, NIOSH guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the SSHO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.</td>
<td></td>
</tr>
<tr>
<td>Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.</td>
<td>Use appropriate insect repellants. Training to avoid and identify poisonous plants, insects and snakes. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43.</td>
<td></td>
</tr>
<tr>
<td>Radiation—There are no radiological hazards expected because past uses do not indicate the use of radioactive material. Potential sun burn/sun poisoning hazard on bright, sunny days.</td>
<td>Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time.</td>
<td></td>
</tr>
</tbody>
</table>
### Activity 8—Demobilization

<table>
<thead>
<tr>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>All equipment, materials, and personnel and temporary facilities will be removed from the site.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Hazards—Contaminated source areas will have been removed, therefore, the risk level associated with these activities is low.</td>
</tr>
<tr>
<td>Physical Hazards—Slip, trips, falls, equipment, materials, tools, terrain, uneven walking surfaces; weather hazards; poor visibility.</td>
</tr>
<tr>
<td>Caught in/between/struck by or against an object.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>No intrusive measures allowed during this activity. Wear appropriate PPE for skin protection and to prevent dermal contact. Avoid liquid pools and stained areas if possible. An initial visual survey will be conducted to confirm the levels of protection are correct for the activity.</td>
</tr>
<tr>
<td>The work area will be visually inspected. Housekeeping – Slip, trip, and fall hazards shall be either removed or marked and barricaded. Geophysical teams will be dealing with uneven terrain. Slips, trips, and fall hazards will be the most prevalent. Sufficient illumination shall be maintained to ensure a safe working environment and weather conditions to be continuously monitored. The “buddy system” will be implemented. See FLD 02, FLD 11, FLD 12, FLD 39.</td>
</tr>
<tr>
<td>Workers shall stay out of the swing area of all equipment and will not walk, work or stand near equipment being loaded or unloaded. No personnel shall ride on the equipment unless seats are provided. See FLD 20, 23, and 24. Workers operating equipment and/or exposed to traffic hazards will wear traffic/reflectorized vests and hard hats. The handling and placement of heavy equipment will be carefully coordinated. A traffic control system for positioning and moving haul vehicles will be established. Heavy vehicle operators may remain in their vehicles only if they have cab over protection. If operators must check loads, loading will cease until the operator is back in the cabin or away from the vehicles in a safe location. Materials and objects will be inspected for rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. Backup alarms will be in operable condition. Unnecessary backing will be avoided. Safety toe footwear will be required. Tools will be properly used. Due to the remote nature of the sites, it is anticipated that vests will not be required; however, this shall be monitored by the SSHO.</td>
</tr>
</tbody>
</table>
### Table 10-1 Activity Hazard Analysis (Continued)

**Activity 8—Demobilization (Continued)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving/heavy equipment operations.</td>
<td>Only trained, experienced operators will operate equipment. Equipment will be inspected daily. Personnel shall be made aware of the hazard and will coordinate carefully during handling equipment operations. Personnel restricted in area of operation. Back-up alarms functional. Stay out of the swing area of all equipment and from under loads. No personnel will ride on the equipment unless seats are provided. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. Always use appropriate PPE. See FLDs 20, 22, 23, and 24.</td>
<td></td>
</tr>
<tr>
<td>Fire</td>
<td>Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 ft of the fuel storage area, in construction equipment, and strategically in the construction area. See FLDs 31 and 32.</td>
<td></td>
</tr>
<tr>
<td>Noise exposure</td>
<td>High noise areas will be identified. Hearing protection will be provided as appropriate. The latest ACGIH TLVs will be used. Personnel operating chainsaws will use hearing protection. Hearing control program, which consists of audiometric examination; training; use of hearing protection; and sound level pressure monitoring when and where necessary. See FLD 01.</td>
<td></td>
</tr>
<tr>
<td>Traffic</td>
<td>Work areas will be clearly barricaded using existing gates and appropriate signs displayed. Traffic will be rerouted as necessary. Persons working in traffic area, near roadways or directing traffic will wear high visibility (reflective) vests. Posted speed limit of 15 miles per hour. See FLD 20.</td>
<td></td>
</tr>
<tr>
<td>Electric hazards</td>
<td>Generators will be grounded unless self-grounded. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 ft from overhead electric lines. Electrical installations will be made by qualified electricians. A lockout/tagout program consistent with FLD 42 will be used for equipment maintenance. Also refer to FLDs 34, 35 and 38.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 10-1 Activity Hazard Analysis (Continued)

**Activity 8—Demobilization (Continued)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards</th>
<th>Hazard Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inclement weather, heat/cold stress.</td>
<td>Personnel shall be dressed according to weather conditions. Workers shall be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, NIOSH guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the SSHO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.</td>
</tr>
<tr>
<td></td>
<td>Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.</td>
<td>Use appropriate insect repellants. Training to avoid and identify poisonous plants, insects and snakes. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43.</td>
</tr>
<tr>
<td></td>
<td>Radiation—There are no radiological hazards expected because past uses do not indicate the use of radioactive material. Potential sun burn/sun poisoning hazard on bright, sunny days.</td>
<td>Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time.</td>
</tr>
</tbody>
</table>
Table 10-2 Equipment and Training Requirements

<table>
<thead>
<tr>
<th>Task/Activity</th>
<th>Equipment</th>
<th>Inspection</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization/Demobilization and Site Preparation</td>
<td>Equipment to be brought by subcontractor.</td>
<td>The subcontractor shall be required to conduct daily inspections and necessary maintenance for the equipment. Follow WESTON Inspection requirements per WESTON Health and Safety Program.</td>
<td>Equipment will be operated by qualified operators. An initial site-specific training will be conducted. Daily safety meetings will be conducted before beginning the work. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of Material Safety Data Sheet (MSDS).</td>
</tr>
<tr>
<td>Brush Clearing</td>
<td>Hand saws. Brush-cutter, Trailer Dump</td>
<td>Equipment inspected daily and maintained based on use. Personnel will wear safety glasses, hand protection, American National Standards Institute (ANSI)-approved footwear.</td>
<td>Workers involved in the clearing operation will be qualified and conduct activities in accordance with OSHA 29 CFR-1910.266, COE EM 385-1-1 Section 31 and FLD47. Daily safety meetings will be conducted stressing the importance of conducting the clearing activities in a safe manner.</td>
</tr>
<tr>
<td>Instrument Aided Visual Surveys/Digital Geophysical Mapping</td>
<td>Schonstedt GA52; Geometrics G-858</td>
<td>As above.</td>
<td>Equipment will be operated by qualified operators with 40-hr training with 8-hr refresher course. An initial site-specific training will be conducted. Daily safety meetings will be conducted before beginning the work. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of MSDS.</td>
</tr>
<tr>
<td>Intrusive Investigations</td>
<td>Schonstedt GA52; Geometrics G-858; Hand Tools; Vehicles</td>
<td>Equipment and tools inspected daily and maintained based on use. Personnel will wear safety glasses, hand protection, American National Standards Institute (ANSI)-approved footwear.</td>
<td>Equipment will be operated by qualified operators with 40-hr training with 8-hr refresher course. An initial site-specific training will be conducted. Daily safety meetings will be conducted before beginning the work. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of MSDS.</td>
</tr>
</tbody>
</table>
### Table 10-2 Equipment and Training Requirements (Continued)

<table>
<thead>
<tr>
<th>Task/Activity</th>
<th>Equipment</th>
<th>Inspection</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling for MC</td>
<td>Sample Equipment, Tools,</td>
<td>Equipment, PPE and tools inspected daily and maintained based on use.</td>
<td>Equipment will be operated by qualified operators with 40-hr training</td>
</tr>
<tr>
<td>Constituents</td>
<td>Vehicles</td>
<td>personnel will wear safety glasses, hand protection, American National</td>
<td>with 8-hr refresher course. An initial site-specific training will be</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standards Institute (ANSI)-approved footwear</td>
<td>conducted. Daily safety meetings will be conducted before</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>beginning the work. Safe work practices and good housekeeping will be</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>followed. Personnel will be informed of the contaminants and chemicals at</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the site and availability of MSDS.</td>
</tr>
<tr>
<td>Demobilization</td>
<td>Not Applicable</td>
<td>As above.</td>
<td>As above.</td>
</tr>
</tbody>
</table>

SECTION 11

ACTION LEVELS
11. ACTION LEVELS

Personal protective equipment will be required as described in Section 12 (Levels of Protection).

Hazard awareness, identification, and notification of potential UXO/MEC items will be conducted as described in Section 10 (Activity Hazard Analysis).

It is not expected that any airborne contaminants or nuisance dust level thresholds will be exceeded due to the nature of the investigation activities, i.e., manual intrusive operations. As a result, no air monitoring will be performed.
SECTION 12

LEVELS OF PROTECTION
12. LEVELS OF PROTECTION

All personnel performing operations on-site shall be required to use the appropriate level of protection. The minimum level of protection required to begin each activity of this project is shown in Table 12-1. If hazards are identified requiring a lower or a higher level of protection, then this APP/SSHP will be re-evaluated and the level of protection upgraded or downgraded prior to re-entry to the site.

Table 12-1

Minimum Level of Protection Requirements

<table>
<thead>
<tr>
<th>Activity</th>
<th>Level of Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization/Demobilization/Site Preparation</td>
<td>Level D or Modified Level D</td>
</tr>
<tr>
<td>Brush Clearing Activities</td>
<td>Level D</td>
</tr>
<tr>
<td>Instrument Aided Visual Surveys/Digital Geophysical Mapping</td>
<td>Level D</td>
</tr>
<tr>
<td>Intrusive Investigations</td>
<td>Level D or Modified Level D</td>
</tr>
<tr>
<td>Sampling for Munitions Constituents</td>
<td>Level D or Modified Level D</td>
</tr>
</tbody>
</table>

12.1 LEVEL D PERSONAL PROTECTION EQUIPMENT

Level D PPE will be worn during site mobilization/demobilization and other non-intrusive activities where no known contamination is present. Level D PPE consists of:

- Work clothes such as coveralls, long pants, shirts with sleeves, etc.
- Clothing under coveralls.
- Work gloves – leather or cotton as necessary for physical hazards.
- Polyvinyl chloride or latex surgical/ lightweight gloves when sampling or handling potentially contaminated surface items.
- Boots, certified according to ANSI.
- Safety glasses or safety goggles (as necessary).
- Hard hat (as necessary).
12.2 MODIFIED LEVEL D PERSONAL PROTECTION EQUIPMENT

Modified Level D PPE will be worn when conducting activities with known or potential contact with minimally contaminated materials. For this site, contaminants could include explosives or UXO items. In addition to Level D components, Modified Level D consists of:

- Chemical-resistant outer clothing.
- Disposable chemical resistant boot covers.
- Gloves – nitrile or latex inner; chemical-resistant outer.
- Flash protective garments such as Nomex or equivalent (as necessary).

Note: Modified Level D may be necessary in the event equipment requires decontamination as a result of intrusive operations, i.e., setting survey monuments, verifying target anomalies.
SECTION 13

MEDICAL SUPPORT
13. MEDICAL SUPPORT

13.1 MEDICAL SUPPORT FUNCTIONS

Since 1980, WESTON has utilized a comprehensive Occupational Health Program (OHP) that complies with all OSHA and USACE requirements. All site personnel and subcontractors who enter the site during operations that are being conducted must comply with a comparable OHP.

13.1.1 Occupational Health Program

To comply with OSHA requirements, WESTON has designated Dr. Peter Greaney, of Work Care to oversee the site-specific medical surveillance and OHP. Dr. Greaney is a board-certified physician in internal and occupational medicine. Dr. Greaney can be reached during regular business hours at (800) 455-6155.

The purpose of the OHP is to ensure suitable job placement of employees, to monitor the health effects of hazards encountered in the work place, and to maintain and promote good health through preventative measures. Medical examination criteria are established by Work Care in compliance with 29 CFR 1910.120.

13.1.1.1 Occupational Health Services

WESTON will provide the following occupational health services (OHS) for its employees:

- Initial and Periodic Medical Testing and Certification—Upon assignment to field work and periodically, generally annually, as appropriate and determined by WESTON’s Medical Director, WESTON employees will be examined by qualified medical facilities and certified as able to work on hazardous sites and to wear respiratory protection. Copies of certifications will be maintained by the SSHO. Subcontractors are required to provide certifications proving employees have medical clearance to work at a HTRW site.

- Site Specific Medical Tests—To be determined, as necessary for each SSHP.
- **Termination Examination**—Upon termination of employment, WESTON personnel who have worked continuously at a hazardous waste project site for more than 6 months will be given the opportunity to undergo a termination examination equivalent to the baseline health assessment. All personnel who terminate employment within a 6-month period will undergo an examination based upon their exposure at the site. The physician will determine specific examination tests.

- **Supplemental Examination**—Any worker receiving a potentially harmful level of exposure to hazardous chemical/biological material or exhibiting signs or symptoms of possible exposure will undergo a supplemental examination. The physician will certify in writing that the employee is fit to return to work. If necessary, activity restrictions will also be specified in writing. Additional tests will be conducted if contaminants/potential exposures so dictate and will be determined by the examining physician.

**13.1.1.2 Health Care Administrative Services**

Medical records will be established and maintained by Work Care in support of the WESTON Medical Monitoring Program. These records will be treated as private and confidential information and will be complete enough to provide data for use in health maintenance, treatment, and epidemiologic studies, and in helping WESTON with program evaluation and improvement. The medical record will contain sufficient information to identify the patient, support the diagnosis, justify the treatment, and document additional follow-up treatment or referrals. The physician’s written opinion for all medical examinations will be as specified in 29 CFR 1910.120, Subpart (f)(7).

**13.2 FIRST AID**

Two appropriately trained WESTON or subcontractor personnel will provide on-site first aid/CPR support. In the event specialized/elevated care is necessary, either WESTON or the on-call EMT/ambulance service will transport the injured person to the appropriate medical facility. There is a secondary medical facility listed that should be used for non-emergency injuries or illnesses.
13.2.1 Medical Supplies

Medical supplies required to be on-site are in Table 13-1. The minimum requirements of ANSI Z308.1-1998 and EM 385-1-1, November 2008, Section 03.B, Table 3-1, will be met.
### Table 13-1 Contents for First Responder Kit 6626

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Description</th>
<th>Qty Max/Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia Inhalants 10/Un</td>
<td>1 ea</td>
<td>Adhesive Strip, 7/8”x 3”</td>
<td>50/20</td>
</tr>
<tr>
<td>Bandage, Elastic, 3” x 5 yds</td>
<td>2 ea</td>
<td>Adhesive Strip, 7/8”x 1-1/2”</td>
<td>50/10</td>
</tr>
<tr>
<td>Bandage, Kerlix, Sterile, 4-1/2” x 4-1/2 yds</td>
<td>4 ea</td>
<td>Adhesive 1”</td>
<td>2/1</td>
</tr>
<tr>
<td>Bandage, Triangular 40” N/S 1/Un</td>
<td>3 ea</td>
<td>Gauze (Roll type - Kerlix), 2” and 4”</td>
<td>2/1</td>
</tr>
<tr>
<td>Clean Wipes, Alcohol Swabs 10/Un</td>
<td>1 ea</td>
<td>ACE Bandage</td>
<td>2/1</td>
</tr>
<tr>
<td>Clcams, Multi Trauma Ster 10”x 30”</td>
<td>2 ea</td>
<td>3”x 3”</td>
<td>20/10</td>
</tr>
<tr>
<td>Disposable Plastic Emergency Blanket</td>
<td>1 ea</td>
<td>Eye</td>
<td>20/10</td>
</tr>
<tr>
<td>Elastic Roller Gauze N/S 3” x 4.5 Yd</td>
<td>3 ea</td>
<td>Burn Gel</td>
<td>10/5</td>
</tr>
<tr>
<td>Emergency First Aid Pocket Guide</td>
<td>1 ea</td>
<td>Sterile Eyewash Solution</td>
<td>1/0</td>
</tr>
<tr>
<td>Eye Pads w/Adhesive Strips, 4/Unit</td>
<td>2 ea</td>
<td>Antiseptic Swabs and/or Betadine Swabs, Box/10</td>
<td>2/1</td>
</tr>
<tr>
<td>Gauze Pads 4” x 4”, 10/Bx (Zee)</td>
<td>2 bx</td>
<td>Ammonia Ampules</td>
<td>5/2</td>
</tr>
<tr>
<td>Ice Pack, Deluxe, Small (Zee)</td>
<td>2 ea</td>
<td>Gloves, Surgical (Pr.)</td>
<td>5/2</td>
</tr>
<tr>
<td>Nitrile Gloves, Large, 2 pairs</td>
<td>1 ea</td>
<td>CPR Shield</td>
<td>2/1</td>
</tr>
<tr>
<td>PAM (Protective Airway Mask)</td>
<td>1 ea</td>
<td>Non-Aspirin</td>
<td>25/10</td>
</tr>
<tr>
<td>Penlight, Medical Disposable</td>
<td>1 ea</td>
<td>Insect Sting Kit (crushable ampules)</td>
<td>2/1</td>
</tr>
<tr>
<td>Scissors, Emergency</td>
<td>1 ea</td>
<td>Alcohol-Foam Scrub - can</td>
<td>1/1</td>
</tr>
<tr>
<td>Sheer Strip 1”, 100/Box</td>
<td>1 bx</td>
<td>Goggles (Uvex Ultraspec 1000 or similar) pair</td>
<td>1/1</td>
</tr>
<tr>
<td>Sheer Strip Bandages XLG, 25/Box</td>
<td>1 bx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sterile Dressing 5” x 9”</td>
<td>5 ea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tape, 1” x 10 Yd. Spool (Zee)</td>
<td>2 ea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tape, 2” x 5 Yd. 3 Cut Spool (Zee)</td>
<td>2 ea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water-Jel Burn Jel 6/Bx</td>
<td>1 ea</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION 14

EMERGENCY RESPONSE
14. EMERGENCY PROCEDURES

The SSHO will respond to all emergencies. In the event that the SSHO is involved in the emergency, a designee will assume responsibility. Specific reporting responsibilities are as follows:

- Notify appropriate individuals, authorities, and/or health care facilities of the activities and hazards of the emergency.

To prepare for an emergency and to minimize the impacts, the SSHO will:

- Ensure that the following safety equipment is available at the site: eyewash station, first aid supplies, and fire extinguishers.
- Have working knowledge of all safety equipment available at the site.
- Ensure that a map which details the most direct route to the hospital is prominently posted with all necessary telephone numbers.

14.1 MEDICAL EMERGENCY AND PERSONAL INJURY

The first worker who notices that a medical emergency or personal injury has occurred shall immediately make a subjective decision whether the emergency is life-threatening and/or otherwise serious and will then proceed as described in the following subsections.

14.1.1.1 Life-Threatening and/or Otherwise Serious Incident

If a life-threatening incident occurs, emergency medical assistance will be immediately requested. If an apparent life-threatening and/or otherwise serious incident has occurred, the first person who identifies the situation will summon the SSHO or SM. The SSHO or the Field Supervisor/Site Manager, whoever arrives first, will assume the role of Emergency Coordinator (EC). The EC shall be apprised of the situation and told where the victim(s) is/are located. As the EC proceeds to the accident scene, communications channels shall be opened and kept on standby until the EC has surveyed the scene and performed a primary survey of the victim.

The EC shall then determine if emergency assistance should be summoned and the information that must be relayed, and shall provide emergency action principles that are consistent with the injury. The EC shall appoint a staff person or persons who will meet the emergency responders
and take them quickly to the victim. If necessary, decontamination of the individual shall be performed at the direction of the EC.

14.1.1.2 Non-Life-Threatening Incident

If it is determined that no threat to life is present, the worker shall assist the injured person to a safe location and contact the SSHO. The injured person will then be treated and monitored in accordance with standard first aid procedures and the APP/SSHP.

14.1.2 First Aid Procedure

A first aid kit will be provided on-site complying with the criteria contained in ANSI Z308.1-1998. A list of items contained in the kit is found in Table 13-1.

- For minor injuries, routine first aid procedures will be used.
- For major injuries, an ambulance will be called immediately and the appropriate first aid administered while awaiting the arrival of the ambulance.
- Trained personnel will use approved measures for treatment based on the training they have received.

14.1.3 Emergency Response

During an emergency, the following actions will be taken, with some actions conducted concurrently. No one will attempt emergency response/rescue until the situation has been assessed and the appropriate response outlined. The following procedures are for any emergency response:

- Fire or explosion and prevention.
- Spills and spill prevention.
- Inclement weather.
- Evacuation planning.

Rescue/response may include the following:

Assessment: Assess existing and potential hazards to site personnel and the off-site population.
Determine:

- Whether and how to respond.
- The need for evacuation of site personnel and off-site population.
- The resources needed for evacuation and response.

Survey Casualties:

- Locate all victims and assess their condition.
- Determine resources needed for stabilization and transport.

Request Aid: Contact the required off-site/on-site personnel or facilities, such as the ambulance, fire department, and/or police.

Allocate Resources: Allocate on-site personnel and equipment to rescue and initiate incident response operations.

Extricate: Remove or assist victims from the area, using appropriate PPE equipment and procedures.

Control: As trained, and as determined safe, assist in bringing the hazardous situation under complete or temporary control and use measures to prevent the spread of the emergency.

Decontaminate: Use established procedures to decontaminate personnel in the decontamination area. If the emergency makes this area unsafe, establish a new decontamination area at an appropriate distance. Decontaminate victims before or after stabilization as their medical condition indicates. Decontamination may be delayed if the injuries suffered by the victim pose an immediate threat to the victim’s life or health. The victim should, instead, be placed on a tarp or sheet of plastic to allow handling of the victim without the threat of contaminating support personnel until the victim is stabilized.

Stabilize: Administer any medical procedures that are necessary before the victim(s) can be moved. Stabilize or permanently fix the hazardous condition. Attend to what caused the emergency and anything damaged or endangered by the emergency (i.e., drums, tanks).
Transport: No one will be transported without being decontaminated or protected from contaminating others. Take measures to minimize chemical contamination of the transport vehicle, ambulance, and hospital personnel.

Casualty Logging: Record who, time, destination, and condition upon transport.

Evacuate:

- Move site personnel to a safe distance upwind of the incident.
- Monitor the incident for significant changes. The hazards may diminish, permitting personnel to re-enter the site, or hazards may increase and require public evacuation.

Casualty Tracking: Record disposition, condition, and location.

14.1.4 Worker Injury or Illness

The SSHO will be responsible for monitoring the general health of site workers. Site illnesses, conditions, or injuries that can be expected given the working conditions include hypothermia, frostbite, exposure to chemicals found at the site, construction-related injuries, insect bites, and injuries due to slips, trips, and falls.

These conditions will be prevented by properly training site workers in the appropriate use of health and safety equipment, dressing appropriately, monitoring the breathing zone atmosphere, and maintaining good housekeeping procedures. These activities are discussed in more detail throughout this APP/SSHP.

The specific response to an injury or illness will depend on its type and severity, but in general, first aid will be administered in the field by the SSHO, who will be trained in first aid and CPR. The worker may then be transported to the hospital designated in this APP/SSHP. General guidelines for first aid are as follows:

- For minor injuries, routine first aid procedures will be used.
- For major injuries, an ambulance will be called immediately and the appropriate first aid administered while awaiting arrival of the ambulance.
Trained personnel will use approved measures for treatment based on the training they have received.

14.2 EMERGENCY CONTACTS

The emergency telephone numbers listed in Table 14-1 shall be prominently posted in WESTON’s field office and vehicles.

In the event of an emergency requiring outside emergency services, WESTON personnel will immediately dial 911 to contact the appropriate organization. Following the phone call, WESTON personnel will contact on-site personnel to inform them that emergency service personnel and equipment will be entering the work area. Subsequent to these notifications, appropriate FIG and WESTON personnel will be contacted and informed regarding the situation.

14.2.1 Site and Emergency Communications

Portable telephones and/or two-way radios will be available for site and emergency communications (WESTON project office, PM, SM, SSHO, and field staff). In addition, equipment spotters will have emergency air horns available to alert all personnel to stop work immediately. Emergency communications and signals are described in FLD 41 – Hand and Emergency Signals/Radio Communication. All field personnel will be trained on site emergency signals.

The hospital route and map are presented in this section. This emergency information along with Table 14-1 will be maintained at the site in vehicles with each work team, and will also be posted at the WESTON project office during site operations.

Emergency service personnel (police/fire/ambulance) will be summoned by requesting support from the Department of Emergency Services personnel.
## Table 14-1 Emergency Contact Numbers

<table>
<thead>
<tr>
<th>Service</th>
<th>Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Emergency Services (Ambulance, Fire, Police)</td>
<td>911</td>
</tr>
<tr>
<td>FIG Police (non-emergency)</td>
<td>(717) 861-2727</td>
</tr>
<tr>
<td>FIG Fire Department (non-emergency)</td>
<td>(717) 861-2111</td>
</tr>
<tr>
<td>PA State Police</td>
<td>911</td>
</tr>
<tr>
<td>Spill Response- CHEMTREC</td>
<td>(800) 424-9300</td>
</tr>
<tr>
<td>National Response Center</td>
<td>(800) 424-8802</td>
</tr>
<tr>
<td>Poison Control Center</td>
<td>(800) 962-1253</td>
</tr>
<tr>
<td>PADEP Emergency Response</td>
<td>(717) 705-4741</td>
</tr>
<tr>
<td>Hospital:</td>
<td></td>
</tr>
<tr>
<td>Hershey Medical Center</td>
<td></td>
</tr>
<tr>
<td>500 University Drive</td>
<td>(800) 243-1455</td>
</tr>
<tr>
<td>Hershey, PA 17033</td>
<td>(717) 531-8521</td>
</tr>
<tr>
<td>Non-Emergency Medical:</td>
<td></td>
</tr>
<tr>
<td>Good Samaritan Hospital</td>
<td>(717) 270-7500</td>
</tr>
<tr>
<td>233 S. 4th Street</td>
<td></td>
</tr>
<tr>
<td>Lebanon, PA 17042</td>
<td></td>
</tr>
<tr>
<td>NGB COR – Kim Harriz</td>
<td>(703) 607-7991</td>
</tr>
<tr>
<td>PAARNG – Joan Anderson</td>
<td>(717) 861-9414</td>
</tr>
<tr>
<td>WESTON Project Manager – Greg Daloisio</td>
<td>(610) 701-3786 office</td>
</tr>
<tr>
<td>WESTON CIH - George Crawford</td>
<td>(484) 437-5976 cell</td>
</tr>
<tr>
<td>WESTON Mid Atlantic DSM Larry Werts</td>
<td>(215) 815-6237 cell</td>
</tr>
<tr>
<td>WESTON Mid-Atlantic Federal Team Safety Officer:</td>
<td></td>
</tr>
<tr>
<td>Louise Kritzberger</td>
<td>(610) 701-3618</td>
</tr>
<tr>
<td>(484) 571-9441 (Cell)</td>
<td></td>
</tr>
<tr>
<td>WESTON Corporate EHS Director</td>
<td></td>
</tr>
<tr>
<td>Owen B. Douglass, Jr.</td>
<td>(610) 701-3065</td>
</tr>
<tr>
<td>(610) 506-5392 cell</td>
<td></td>
</tr>
<tr>
<td>WESTON Medical Programs Manager</td>
<td>(610) 701-3065</td>
</tr>
<tr>
<td>Owen B. Douglass, Jr.</td>
<td>(610) 506-5392 cell</td>
</tr>
<tr>
<td>WorkCare WESTON Medical Director</td>
<td></td>
</tr>
<tr>
<td>Dr. Peter Greaney</td>
<td>From 06:00 to 16:30 Pacific Time call 800-455-6155 dial 0 or extension 175, Michelle Bui to request the on-call clinician</td>
</tr>
<tr>
<td>WorkCare WESTON Program Director</td>
<td></td>
</tr>
<tr>
<td>Michelle Bui</td>
<td></td>
</tr>
<tr>
<td>After-Business Hours Contact (Emergency Only)</td>
<td>16:31 to 05:59 Pacific Time and weekends and Holidays call 800-455-6155 dial 3 to reach the after-hours answering service. Request that the service connect you with the on-call clinician or the on-call clinician will return your call within 30 minutes.</td>
</tr>
<tr>
<td>WESTON Emergency (24 hour) (West Chester)</td>
<td>(610) 701-3720</td>
</tr>
</tbody>
</table>
14.3 HOSPITAL ROUTE

The appropriate emergency vehicle will travel to the Hershey Medical Center located in Hershey, PA as shown on Figure 14-1. The non-emergency hospital route is shown on Figure 14-2.

14.4 EMERGENCY EQUIPMENT

The emergency equipment listed in Table 14-2 will be maintained in proper working order and frequently inspected for completeness during site operations. This list identifies the minimum equipment necessary.

Table 14-2 Emergency Equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Location</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Aid Kit</td>
<td>Support Vehicle(s)</td>
<td>All operations</td>
</tr>
<tr>
<td>BBP Kit</td>
<td>Support Vehicle(s)</td>
<td>All operations</td>
</tr>
<tr>
<td>Eye Wash</td>
<td>Support Vehicle(s)</td>
<td>All operations</td>
</tr>
<tr>
<td>Air Horn</td>
<td>Support Vehicle(s)</td>
<td>All operations</td>
</tr>
<tr>
<td>10 lb. Fire Extinguisher</td>
<td>Support Vehicle(s)</td>
<td>All operations</td>
</tr>
</tbody>
</table>

The size and number of first-aid kits will be sufficient to accommodate the maximum number of people (including visitors) on-site at any given time. The kits will be located at each work site and the location will be made known to all personnel. Kit locations will be provided with adequate water and other supplies necessary to cleanse and decontaminate burns, or other wounds.
14.5 FIRE EXTINGUISHERS

A dry-chemical type 4A:20B:C fire extinguisher will be available at each individual work site and in the site office. Dry chemical fire extinguishers will be provided at any other site location where flammable materials may present a fire risk. Additionally, a fire extinguisher rated at least 2A:10B:C will be located in each vehicle and piece of heavy equipment onsite. The Project Safety Supervisor, Project Manager, POC, and Project Officer will be notified immediately after any fire incident occurring during site activities. All regulations governing approved areas for smoking and spark generation will be strictly adhered to.

14.6 SPILLS

The following procedures comprise the spill containment program in place for activities at the site.

14.6.1 Measures for Preventing Fuel Spills

- Care shall be taken when transferring fuels
- A containment dike around fuel storage tanks shall be constructed
- Inspect all fuel storage tanks and containment structures for leaks daily
- Where spills, leaks, or ruptures may occur, adequate quantities of spill containment equipment (e.g. absorbent, pillow, shovels, etc.) will be stationed in the immediate area. The spill containment equipment must be sufficient to contain and isolate the entire volume of fuel being transferred.
- Fire extinguishing equipment meeting 29 CFR Part 1926, Subpart F, shall be on hand and ready for use to control fires.

14.6.2 Fuel Spills Greater than Five Gallons

The following response procedures shall be followed for spills of flammable fuels greater than five gallons in volume:
- Shut down operation in area immediately.
- Limit ignition sources.
- Suppress vapors as required.
- Survey area with CGI; don protective equipment as necessary.
- Pump liquids into drums.
- Recover contaminated solids and place in containers.
- Finish cleanup of residues.

### 14.6.3 Notification

In the event of a spill or release, WESTON will immediately notify 911.

The SSHO or his designee will be immediately notified and will respond according to the seriousness of the injury. The WESTON Project Manager and DSM will be informed of any injuries, minor or serious.

An incident report will be filed by the WESTON SSHO within 24 hours from the time of the accident.

Accidents resulting in a fatality, lost-time injury or illness, hospitalization of three or more personnel, due to the same incident, or property damage to government or WESTON property (which occurred during performance of the task order) equal to or exceeding $1,000 must be reported to WESTON Federal Team Safety Officer and the COR as soon as possible, but not later than 2 hours after occurrence, and reported in writing within 5 days of occurrence on the form provided in Attachment B.

Accidents resulting in fatalities or the hospitalization of three or more personnel must be reported to the regional OSHA Office no later than 8 hours after occurrence.
Figure 14-1
Hospital Route to
Hershey Medical Center
Hershey, PA (from FIG)

Take I-81 SOUTH - go 8.4 mi
Take the PA-39 exit towards HERSHEY/MANADA HILL, exit #77 - go 0.3 mi
Bear Left towards (I-81 S) - go < 0.1 mi
Turn Left on LINGLESTOWN RD - go 0.4 mi
Continue on N HERSHEY RD - go 0.9 mi
Continue on S HERSHEY RD - go 2.0 mi
S HERSHEY RD becomes HERSHEY RD - go 2.6 mi
Bear Right on a local road - go < 0.1 mi
Bear Right on HERSHEY PARK DR - go 2.1 mi
Continue towards HERSHEY - go 0.2 mi
Continue on US-422 EAST - go 0.8 mi
Arrive at 500 UNIVERSITY DR, HERSHEY
Start on FISHER AVE going towards SMATHERS RD - go 3.4 mi
Turn Right on PA-72 SOUTH - go 4.2 mi
Continue on PA-72 SOUTH/PA-72 N - go 2.7 mi
Continue on EBENEZER RD - go 0.9 mi
Continue on MAPLE ST - go < 0.1 mi
Continue on W MAPLE ST - go 1.0 mi
Continue on MAPLE ST - go 0.2 mi
Turn Right on N 10TH ST - go 0.7 mi
Continue on S 10TH ST - go 0.2 mi
Turn Left on WALNUT ST - go 0.5 mi
Turn Right on S 4TH ST - go 0.1 mi
Arrive at 233 S 4TH ST, LEBANON
SECTION 15

SECURITY PLAN
15. SECURITY PLAN

Site work will typically be conducted between the hours of 7:00 a.m. and 4:00 p.m. The site work schedule will be adjusted to account for available light to conduct activities. Personnel will follow WESTON’s Employee Schedule as outlined in FLD 60.

15.1 SITE ACCESS

Specific work zones will not be established for site access, however, the Field Team Leader and/or the SSHO will continuously monitor the sites where activities are in progress to ensure that no unauthorized personnel access the work locations.

Site control procedures will be established to ensure site access to unauthorized personnel is limited. This will prevent persons who may be unaware of site conditions from being exposed to inherent hazards. Potentially contaminated media will be containerized and secured in a central storage area to prevent unauthorized tampering. Any field equipment that may cause potential injury when left unattended will be removed from the site or otherwise rendered non-dangerous. The Field Team Leaders will be responsible to ensure that the specific work areas are secure during nonworking hours.

15.2 SITE CONTROL

The Ricochet Area MRS is located in State Game Land 211, to which the public has unrestricted access. A daily sign-in will be required for all project staff. Coordination with the Pennsylvania Game Commission will be required to restrict public access to active work areas.

15.3 THEFT

Project personnel shall make every effort to reduce the potential for thefts from vehicles by removing all equipment and valuable items. If it is necessary to have equipment inside the vehicle, it will be secured and kept out of obvious sight. Secure the vehicle, even if parking for brief periods. Make sure vehicle keys are with you at all times. Lock all vehicle doors and close all windows. Vehicles should be parked in a well-lit area.
In the event a theft does occur, local authorities will be promptly notified and appropriate WESTON personnel (Federal Team Safety Officer and DSM) will be notified. A NOI Report will be filed within 24 hours.

15.4 PERSONAL PROTECTION

Personnel will be observant of their surroundings. They should ensure their own safety and the safety of their co-workers and the public by not confronting or challenging aggressive perpetrators. Authorities should be contacted if personnel observe any unusual circumstances.
SECTION 16

MOTOR VEHICLE SAFETY
16. MOTOR VEHICLE SAFETY

Safety is of utmost importance at Weston Solutions, Inc. (WESTON®). Each employee must act responsibly every day to ensure the safety of themselves and others. This safety commitment extends to driving vehicles. It is a requirement of all employee drivers to operate vehicles safely, obeying federal, state, local laws, and Company policies. It is a privilege to drive, not a right.

16.1 EMPLOYEE REQUIREMENTS/RESPONSIBILITIES:

- Drivers of WESTON vehicles must possess a current, valid drivers’ license of the appropriate class required for their driving needs, e.g. class C, CDL.
- All driving duties and functions are to be performed in a safe, legal and professional manner.
- Employee drivers are to attend periodic defensive driving training and other driver safety meetings as scheduled through their local Safety Officers.
- Driving requires a high level of skill and alertness. When fatigue, illness, or medication impact alertness, reflexes, decision-making capabilities, an employee driver should cease driving until the situation improves or is corrected and contact his/her manager to discuss the situation.
- Compliance with all federal, state, and local laws is expected.
- Correct/repair or report unsafe vehicles and related equipment. Unsafe vehicles are not to be driven on WESTON business.
- Complete a NOI form to report any vehicle accident while on the job, or any accident occurring at any time if involving a company owned or insured “allowance” vehicle.
- Driver orientation program and/or driving evaluation tests may be required of drivers to assess overall driving skills.

16.2 COMPLIANCE ISSUES/DRIVING PRACTICES

16.2.1 Speed Limits

Drivers are required to obey posted speed limits and other traffic laws. Fines for any traffic violations are the employee’s responsibility.
16.2.2 Seat Belts

WESTON drivers and their passengers are required to wear seat belts at all times while the vehicle is in operation.

16.2.3 Distracted Driving

It is recognized that distracted driving can contribute to accidents. Accordingly, WESTON employees are to exercise caution and good judgment when driving. Reading maps, eating, placing or receiving a call on a cell phone, and other activities that may contribute to an accident should be kept to a minimum. Cell phone use while driving, including the use of hands-free devices, creates a distraction and driver inattention. The following basic guidelines should always be observed:

- Make out-going calls after you have pulled over to a safe area.
- Let in-coming calls go to voice mail, or if answering phone is necessary, make sure the caller knows you are driving and keep call short.

At all times, drivers are to operate vehicles in a safe, legal, and professional manner.

16.2.4 Transporting Weapons

Transporting weapons (such as firearms, large knives) or dangerous property (significant or placardable quantities of regulated hazardous materials or substances) is prohibited, unless specifically authorized.

16.2.5 Other Issues

Additional safety procedures may be established at a particular job site or within a Division. WESTON employees are responsible for compliance with any additional safety procedures and safety solutions that apply, or that may be identified.
16.3 ACCIDENT REVIEW

Any accident that occurs while an employee is driving on Company business, or operating a WESTON-owned, leased, rental or allowance vehicle at any time will be reviewed and investigated. Drug and/or alcohol testing will be conducted in a timely manner in accordance with WESTON Drug and Alcohol Testing Operating Practice (11-09-001). The accident review is intended to determine if the accident was “preventable” as defined by the National Safety Council. The investigation will also look at citations issued, if any, and specifics of the accident to determine appropriate consequences, if any. Investigation may result in outcomes such as: recommendation for driver training programs, changes or modifications to vehicle/equipment, suspension of driving privileges, employee termination. Typically auto accident investigations will be coordinated on a divisional level, similar to protocols established by Corporate EHS and divisions for other root cause investigations. Risk Management will provide input and guidance and serve as liaison with insurance carriers, as needed.
SECTION 17

LOGS, REPORTS, AUDITS, INSPECTIONS, AND RECORDKEEPING
17. LOGS, REPORTS, AUDITS, INSPECTIONS AND RECORDKEEPING

WESTON has a well-established Health and Safety Program as defined by a series of programs and Field Operating Procedures (FLDs) contained in WESTON’s EHS Program (see Attachment A). The FLDs are a collection of safety standard operating procedures (SOPs), engineering controls, and work practices designed to minimize the health and safety hazards associated with any project that involves WESTON personnel. Some examples of the subjects that the EHS Program covers are excavations, scaffolding, medical and first-aid requirements, sanitation, PPE, fire prevention and protection, machinery and mechanized equipment, electrical and hazardous energy safety, public safety requirements; and chemical, physical agent, and biological occupational exposure prevention and protection requirements.

This manual is a key component of every APP/SSHP and is maintained on-site by the SSHO.

17.1 SAFETY LOG

The SSHO will maintain a Safety Log of all safety-related activities. The SSHO is responsible for ensuring that health and safety activities for the day, as well as safety meeting minutes, are included within the log or filed appropriately.

17.2 TRAINING LOG

The SSHO is responsible for ensuring that all training conducted relative to job site activities is documented appropriately.

17.3 SITE CONTROL LOG

A log of all personnel visiting, entering, or working on the site will be maintained. The log will include the following: date, name, agency or company, and the time entering and exiting the site. This information, including dates, will be recorded in the site control log.
17.4 INSPECTION FORMS

Daily safety and health inspections will be conducted by the SSHO with the results recorded in the Safety Log. The Program Health and Safety Manager will conduct periodic safety and health audits to ensure site personnel are performing the tasks in accordance with the Work Plan and this APP/SSHP.

17.5 FEDERAL, STATE, LOCAL REGULATORY AGENCY INSPECTIONS

Occupational Safety and Health Administration (OSHA), Federal Aviation Administration (FAA), U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA) and other regulatory agency inspections occur from time to time.

It is WESTON’s practice to cooperate with investigations. Information that is requested should be provided. Requests for copies of documents, health and safety plans, training records, etc. should not be provided without first obtaining approval from WESTON’s Law Department. Under no circumstances should any attempt be made to mislead the inspector. If the inspection is on a client site, WESTON will refer to the client’s written procedures for handling regulatory agency inspections. If the client’s procedures differ significantly from WESTON’s procedures, the Site Manager in consultation and agreement with the DSM and Corporate Counsel will document site-specific procedures and ensure that site personnel and client contacts are aware of these modifications. A list of procedures is presented in FLD48.
SECTION 18

PLANS REQUIRED BY EM 385-1-1
18. PLANS REQUIRED BY EM 385-1-1

WESTON has a well-established Safety and Health Program as defined by a series of programs and FLDs contained in the WESTON Corporate EHS Program. The FLDs are a collection of standard operating safety procedures, engineering controls, and work practices designed to minimize the safety and health hazards associated with any project that involves WESTON personnel. Some examples of the subjects that the EHS Program covers are: excavations; scaffolding; medical and first-aid requirements; sanitation; PPE; fire prevention and protection; machinery and mechanized equipment; electrical and hazardous energy safety; public safety requirements; and chemical, physical agent, and biological occupational exposure prevention and protection requirements.

This program is a key component of every APP/SSHP and is maintained on-site by the SSHO.

18.1 ACTIVITY HAZARD ANALYSIS

The AHA is the nucleus of all APPs/SSHPs. As previously mentioned, the AHA includes a list of detailed site-specific hazards and controls for each activity of a site operation. Each project is broken down into tasks; in turn, each task is subsequently analyzed for risk of potential exposure to chemical, physical, biological, and radiological hazards. Those potential risks are used to select PPE, engineering controls, and general safe site work practices.

18.2 LAYOUT PLANS

A site layout map is provided as Figure 1-1.

18.3 EMERGENCY RESPONSE PLAN

The emergency response plan is provided in Section 14 of this APP/SSHP.

18.4 PLAN FOR THE PREVENTION OF ALCOHOL AND DRUG ABUSE

The plan for the prevention of drug and alcohol abuse is presented in Section 1.5 of this APP/SSHP and in the WESTON Corporate EHS Program (Attachment A).
18.5 SITE SANITATION PLAN
Sanitation facilities will comply with EM385-1-1, Section 2.

18.6 ACCESS AND HAUL ROAD PLAN
No roads will be constructed for this project.

18.7 RESPIRATORY PROTECTION PLAN
WESTON’s respiratory protection program is presented in the Corporate EHS Program (Attachment A), Section 6, and Section 16 of this APP/SSHP.

18.8 HEALTH HAZARD CONTROL PROGRAM
Control of health hazards is described in Sections 10 through 15 of this APP/SSHP.

18.9 HAZARD COMMUNICATION PROGRAM
WESTON’s hazard communication program is presented in Section 4 of the Corporate EHS Program (Attachment A).

18.10 PROCESS SAFETY MANAGEMENT PLAN
A process safety management plan is not required for this project.

18.11 LEAD ABATEMENT PLAN
A lead abatement plan is not required for this project.

18.12 ASBESTOS ABATEMENT PLAN
An asbestos abatement plan is not required for this project.

18.13 RADIATION SAFETY PROGRAM
A radiation safety program is not required for this project.
18.14 ABRASIVE BLASTING
There will be no abrasive blasting on this project.

18.15 HEAT/COLD STRESS MONITORING PLAN
Heat and cold stress monitoring is addressed in the WESTON Corporate EHS Program, Attachment A, FLD 5 – Heat Stress Prevention and Monitoring and FLD 6 – Cold Stress.

18.16 CRYSTALLINE SILICA MONITORING PLAN
Monitoring for crystalline silica is not required for this project.

18.17 NIGHT OPERATIONS LIGHTING PLAN
Activities for this project are expected to be conducted during daylight hours.

18.18 FIRE PREVENTION PLAN
WESTON’s Fire Prevention Program is presented in the WESTON Corporate EHS Program (Attachment A), FLD 31 – Fire Prevention and FLD 32 – Fire Extinguishers required and Requirements.

18.19 WILD LAND FIRE MANAGEMENT PLAN
There is no potential for wild land fire at this project site.

18.20 HAZARDOUS ENERGY CONTROL PLAN
WESTON’s plan for the control of hazardous energy is presented in the Corporate EHS Program (Attachment A), FLD 42 – Lockout/Tagout.

18.21 CRITICAL LIFT PLAN
Cranes and hoists will not be used on this project. No critical lift plan is required.
18.22 CONTINGENCY PLAN FOR SEVERE WEATHER

WESTON’s contingency plan for severe weather is presented in the Corporate EHS Program (Attachment A), FLD 2 – Inclement Weather.

18.23 FLOAT PLAN

A float plan is not required for this project.

18.24 SITE-SPECIFIC FALL PROTECTION AND PREVENTION PLAN

There is no elevated work that will be conducted on this project.

18.25 DEMOLITION PLAN

There will be no demolition on this project.

18.26 EXCAVATION/TRENCHING PLAN

There will be no excavating or trenching on this project.

18.27 EMERGENCY RESCUE (TUNNELING)

There will be no underground construction on this project.

18.28 UNDERGROUND CONSTRUCTION FIRE PREVENTION AND PROTECTION PLAN

There will be no underground construction on this project.

18.29 COMPRESSED AIR PLAN

There will be no underground construction compressed air work on this project.

18.30 FORMWORK AND SHORING ERECTION AND REMOVAL PLANS

There will be no construction formwork, shoring, or bracing on this project.
18.31 PRECAST CONCRETE PLAN
There will be no precast concrete operations on this project.

18.32 LIFT SLAB PLAN
There will be no lift slab operations on this project.

18.33 STEEL ERECTION PLAN
There will be no steel erection on this project.

18.34 SITE SAFETY AND HEALTH PLAN FOR HTRW WORK
The Site Safety and Health Plan is integrated into this APP/SSHP.

18.35 BLASTING SAFETY PLAN
An ESP and the EMP are included as part of the Work Plan.

18.36 DIVING PLAN
There will be no diving on this project.

18.37 CONFINED SPACE ENTRY PLAN
There will be no Confined Space operations on this project.
**LIST OF ATTACHMENTS**

**ACCIDENT PREVENTION PLAN/SITE SAFETY AND HEALTH PLAN**

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WESTON SOLUTIONS, INC., CORPORATE ENVIRONMENTAL COMPLIANCE, HEALTH, AND SAFETY PROGRAM
Weston Solutions, Inc.
Corporate Environmental Compliance,
Health, and Safety Program
Manual

March 2009
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<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists</td>
</tr>
<tr>
<td>AHA</td>
<td>activity hazards analysis</td>
</tr>
<tr>
<td>AL</td>
<td>action level</td>
</tr>
<tr>
<td>ALARA</td>
<td>as low as reasonably achievable</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
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<tr>
<td>APP</td>
<td>Accident Prevention Plan</td>
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<tr>
<td>APR</td>
<td>air-purifying respirator</td>
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<tr>
<td>ASP</td>
<td>Associate Safety Professional</td>
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<tr>
<td>BBS</td>
<td>behavior-based safety</td>
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<tr>
<td>CAA</td>
<td>Clean Air Act</td>
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<tr>
<td>CBRN</td>
<td>chemical, biological, radiological, nuclear</td>
</tr>
<tr>
<td>CEH&amp;S</td>
<td>Corporate Environmental Health and Safety</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
</tr>
<tr>
<td>CHST</td>
<td>Construction Health and Safety Technician</td>
</tr>
<tr>
<td>CIH</td>
<td>Certified Industrial Hygienist</td>
</tr>
<tr>
<td>COO</td>
<td>Chief Operating Officer</td>
</tr>
<tr>
<td>CSP</td>
<td>Certified Safety Professional</td>
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<tr>
<td>CPR</td>
<td>cardiopulmonary resuscitation</td>
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<tr>
<td>CWA</td>
<td>Clean Water Act</td>
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<tr>
<td>DEHSM</td>
<td>Division Environmental, Health, and Safety Manager</td>
</tr>
<tr>
<td>DM</td>
<td>Division Manager</td>
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<tr>
<td>DoD</td>
<td>Department of Defense</td>
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<tr>
<td>DOE</td>
<td>U.S. Department of Energy</td>
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<tr>
<td>DOT</td>
<td>U.S. Department of Transportation</td>
</tr>
<tr>
<td>EC</td>
<td>Environmental Compliance</td>
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<tr>
<td>EHS</td>
<td>Environmental Compliance, Health, and Safety</td>
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<tr>
<td>EMR</td>
<td>experience modification rate</td>
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<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
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<tr>
<td>ESA</td>
<td>Endangered Species Act</td>
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<tr>
<td>ESLI</td>
<td>End of Service Life Indicator</td>
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<tr>
<td>F&amp;I</td>
<td>Facilities and Infrastructure</td>
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<tr>
<td>FLD</td>
<td>field operation procedure</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>FSO</td>
<td>Field Safety Officer</td>
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<tr>
<td>HASP</td>
<td>health and safety plan (site-specific)</td>
</tr>
<tr>
<td>HAZWOPER</td>
<td>hazardous waste operations and emergency response</td>
</tr>
<tr>
<td>HCP</td>
<td>Hearing Conservation Program</td>
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<td>HCS</td>
<td>Hazard Communication Standard</td>
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<td>HMIS</td>
<td>Hazardous Material Identification System</td>
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<tr>
<td>HPD</td>
<td>hearing protection device</td>
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<tr>
<td>ICS</td>
<td>Incident Command System</td>
</tr>
<tr>
<td>IDLH</td>
<td>immediately dangerous to life or health</td>
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<tr>
<td>ISMS</td>
<td>integrated safety management system</td>
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<tr>
<td>LOP</td>
<td>levels of protection</td>
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<td>MEC</td>
<td>munitions and explosives of concern</td>
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<tr>
<td>MSDS</td>
<td>material safety data sheet</td>
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<tr>
<td>MSO</td>
<td>Medical Safety Officer</td>
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<tr>
<td>NEPA</td>
<td>National Environmental Policy Act</td>
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<tr>
<td>NESHAPs</td>
<td>National Emission Standards for Hazardous Air Pollutants</td>
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<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
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<tr>
<td>NHPA</td>
<td>National Historic Preservation Act</td>
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<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety and Health</td>
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<tr>
<td>NOI</td>
<td>Notice of Incident</td>
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<tr>
<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
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<tr>
<td>NPL</td>
<td>National Priority Site List (EPA)</td>
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<tr>
<td>NRR</td>
<td>noise reduction rating</td>
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<tr>
<td>OMP</td>
<td>Occupational Medical Provider</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<tr>
<td>OSO</td>
<td>Office Safety Officer</td>
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<tr>
<td>OTG</td>
<td>over-the-glass</td>
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<tr>
<td>OU</td>
<td>organization unit</td>
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<tr>
<td>PC</td>
<td>profit center</td>
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<tr>
<td>PDCA</td>
<td>plan, do, check, act</td>
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<tr>
<td>PEL</td>
<td>permissible exposure limit</td>
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<tr>
<td>PLC</td>
<td>project lifecycle</td>
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<tr>
<td>PPE</td>
<td>personal protective equipment</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>QA</td>
<td>quality assurance</td>
</tr>
<tr>
<td>QLFT</td>
<td>qualitative fit-test</td>
</tr>
<tr>
<td>QNFT</td>
<td>quantitative fit-test</td>
</tr>
<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
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<tr>
<td>REL</td>
<td>recommended exposure limit</td>
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<tr>
<td>RM</td>
<td>Risk Management</td>
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<tr>
<td>SARA</td>
<td>Superfund Amendments and Reauthorization Act</td>
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<tr>
<td>SCBA</td>
<td>self-contained breathing apparatus</td>
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<td>SDWA</td>
<td>Safe Drinking Water Act</td>
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<td>SL</td>
<td>Service Line</td>
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<td>STS</td>
<td>Safety Trained Supervisor</td>
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<tr>
<td>TSCA</td>
<td>Toxic Substances Control Act</td>
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<td>TLV</td>
<td>threshold limit value</td>
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<td>TRI</td>
<td>Toxic Release Inventory</td>
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<td>TSD</td>
<td>treatment, storage, disposal</td>
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<td>TWA</td>
<td>time-weighted average</td>
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<tr>
<td>USACE</td>
<td>U.S. Army Corps of Engineers</td>
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<tr>
<td>UST</td>
<td>underground storage tank</td>
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<tr>
<td>UXO</td>
<td>unexploded ordnance</td>
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<tr>
<td>WROP</td>
<td>WESTON Radiation Operating Procedures</td>
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EXECUTIVE SUMMARY

The safety record of Weston Solutions, Inc. (WESTON®) is world-class in delivering integrated, sustainable solutions for environmental restoration, property redevelopment, design/build construction, green buildings, renewable and clean energy, and natural resource conservation. Safety is one of our core values. We care for our co-workers, families, clients, and subcontractors and are focused on being safety leaders wherever we live and work. We thrive in a “safety first and all-the-time” culture and accept personal responsibility for creating a safe environment.

Due to the nature of WESTON’s work, it is essential that Environmental Compliance, Health, and Safety (EHS) needs be considered from starting points/planning to work execution and through completion. WESTON addresses safety throughout the project lifecycle and utilizes integrated EHS management systems to implement its corporate goal for all employees and subcontractors to work safely – 100% of the time in an environmentally responsible manner. Integrated EHS management systems provide a positive approach to compliance assurance and elevate opportunities for performance improvement.

WESTON’s EHS Group is proactive in assessing current EHS Programs and setting strategies for years ahead. WESTON implements this EHS Program to fulfill our commitment to employees and a diverse and dynamic range of clients to provide safe and healthy working conditions. Emphasis is also directed to continuous environmental compliance, continual improvement, and pollution prevention strategies.

This EHS Program is presented in three parts:

- Part 1 Health and Safety Program
- Part 2 Safety Manual
- Part 3 Environmental Protection Program

Referenced documents, procedures, forms, and guidance are available to WESTON personnel on-line through the WESTON Portal intranet.
Part 1
Health and Safety Program
1.0 INTRODUCTION

The health and safety of all employees, clients, and contractors is the vital non-negotiable element of all WESTON Solutions, Inc. (WESTON®) work activities. It is WESTON’s policy to assure that its employees are furnished a place of employment in which they are secure from recognized risks to their health and safety. In addition, WESTON’s employees are required to conduct work activities in compliance with applicable safety regulations, and in a manner that will allow WESTON to achieve its goal for all employees and subcontractors to work safely – 100% of the time in an environmentally responsible manner. WESTON is implementing a behavior-based safety (BBS) program where we are all responsible for each other, focusing on behaviors and intervention techniques to improve behavioral processes. Within BBS, our employees create high quality connections with one another, team members, and stakeholders to foster an active caring culture. Commitment is higher and we help each other be safe every minute of every day. By achieving this goal, we will achieve our expectation of zero incidents. All employees assume a safety leadership role and are responsible for the safety of coworkers, our team members, and stakeholders.

WESTON’s EHS Program incorporates principles of an integrated safety management system (ISMS). Under an ISMS, all accidents are preventable through close attention to work design detail, careful hazards assessment and control, and by focused attention to safe work practices. WESTON's ISMS is an integral part of the WESTON management philosophy and is the foundation for our commitment to safe performance during the execution of all contracts and projects. The ISMS is a dynamic system that supports worker, public, and environmental safety and close integration with subcontractors.

1.1 EHS MANAGEMENT SYSTEM ELEMENTS

WESTON’s EHS management system encompasses quality, environmental preservation, health, and safety to execute projects without harm to persons, property, or the environment. WESTON encourages the Plan, Do, Check, Act (PDCA) model for project planning and implementation as standard work practice for every job. The four elements of the PDCA model include:

- **Plan**: Plan ahead, analyze, and predict results.
- **Do**: Execute the plan, taking small steps in a controlled environment.
- **Check**: Review the results, compare against the plan.
- **Act**: Take action to maintain or improve.

These key elements are depicted in Figure 1-1 and described in detail in the remainder of this section.

1.1.1 Element 1 – Plan

Through planning, WESTON sets policies, objectives and strategies that state what we aim to achieve and identifies priorities, structure, job specifications, allocated responsibility, and accountability for resources.

1.1.1.1 Management Commitment

WESTON’s management approach to EHS concerns is one of commitment and involvement and “doing the right thing.” WESTON’s senior management is committed to operating projects in a manner consistent with controlling EHS legislative, regulatory requirements, client requirements, and other requirements administered by agencies such as:

- Occupational Safety and Health Administration (OSHA).
- U.S. Environmental Protection Agency (EPA).
- U.S. Department of Energy (DOE).
Department of Defense (DoD).
U.S. Department of Transportation (DOT).
U.S. Army Corps of Engineers (USACE).

Figure 1-1. Plan-Do-Check-Act Flywheel

These are considered minimum standards and are evaluated during the planning process. WESTON is committed to complying with the most protective of regulations and standards.

As exemplified by WESTON’s EHS policy, our high-level commitment sends a powerful message that the organization takes EHS concerns seriously.

As an international employer, when conducting work outside the United States (U.S.), WESTON will use the most protective of U.S. or local EHS regulations.

1.1.1.2 EHS Policy

Senior management communicates organizational goals and policy to all personnel, clients, contractors, and additional interested parties/stakeholders. In performing its mission, WESTON will conduct activities in a manner protecting human health and the environment:

- With commitment to working safely – 100% of the time and zero releases to the environment.
- With commitment to regulatory compliance and applicable requirements.
- In a manner protective of the worker, the public, and the environment.
- With pollution reduction goals and continual improvement targets in the foreground.
- Communicating EHS awareness and policy to all personnel.
- With incentives for positive EHS performance – going beyond compliance because we care.
- Making EHS policy available to the public.
- Seeking performance improvement input from stakeholders.
- Identifying environmental aspects with potential for significant impact.
- Prescribing remedies to offset impact potential.
WESTON commits to integrated EHS Programs that fully implement applicable and relevant regulatory requirements including federal, state and local environmental regulations, prescribed plans, permits, OSHA compliance requirements, and other controlling requirements.

### 1.1.1.3 Employee Involvement

WESTON employees are committed to the BBS approach for assurance of EHS performance. Safety is a core value for every employee. Employees focus on safe behavior as a key to preventing accidents and observe and coach their coworkers in regards to safety issues. Our BBS program emphasizes personal responsibility and empowers employees to promote a safe culture.

The management of site activities is guided by means of WESTON’s well-developed management system which integrates the Project Lifecycle (PLC) guidelines and tools to create a common approach for planning, tracking, and making key decisions for every project. The PLC creates a common approach for managing projects from client selection to project closeout across the company. During each of the PLC six phases, a management review is performed. The PLC is designed to generate discussion of project progress including safety and quality elements.

All work is controlled under the quality umbrella designed to meet project-specific needs and universal EHS management system elements. Operation of an integrated EHS management system is a useful tool in accomplishing ‘real-time’ project performance on a day-to-day basis.
Effective Project and Facility Planning

During the planning process, new projects will routinely be reviewed by EHS staff. The planning process elevates work to a task-specific hazards and risk review paired with appropriate review of every potential site hazard (physical, chemical, biological, radiological), and unique site condition. Environmental impact potential and significance are also reviewed in WESTON project planning. Significant environmental aspects are targeted for ‘best fit’ controls.

The hazards analysis is conducted before work starts. Hazards are identified, risks are assessed, and appropriate measures are taken to ensure that personnel and equipment are adequately protected as a result of the identified hazards. The site-specific Health and Safety Plan (also referenced as a HASP) will establish appropriate hazard mitigation through specification of engineering control, administrative or management control, work practice control, and/or the use of personal protective equipment (PPE).

Legal and other requirements controlling WESTON project activities are identified prior to job performance by comprehensive review by project EHS support personnel, with assistance from Division and Corporate resources as requested. Applicable and relevant requirements will be fully implemented on all WESTON projects (i.e., in the U.S., compliance with applicable federal, state, and local environmental regulations [40 CFR] including permits and site-specific plans and training requirements; OSHA [29 CFR 1910 and 1926] regulations, written plans and training requirements; DOE orders, [10 CFR] regulations, and training requirements; DOT regulations [49 CFR]; EPA’s MMR; USACE 385-1; plans (i.e., spill control), and applicable training requirements). The EHS support personnel will monitor new requirements throughout the life cycle of a WESTON project to ensure appropriate integration of relevant regulatory changes.

Applicable subset(s) of controlling requirements designated as ‘Other’ requirements will also be defined and implemented. Examples are client and best management practices; municipal, county, or State EHS regulations; as well as for work outside the U.S., applicable EHS standards, policies, directives, and operational procedure(s).

EHS goals and milestones will be developed with an implementation schedule for each relevant level and function of the organization. This EHS Program is designed and implemented to achieve WESTON’s EHS objectives and targets. Designation of responsibility for achieving objectives and milestones at each relevant function and level of the organization will be established in the work plan and/or site-specific HASP. Management will commit appropriate resources and schedule to ensure success.

Element 2 - Do

This EHS Program lays the foundation for accomplishing EHS objectives on WESTON projects. Employees and subcontractors are held accountable to the expectations prescribed in this EHS Program and site-specific work controlling criteria presented in the work plan, site-specific HASP, and other controlling site plans (e.g., Waste Management; Transportation; Site Treatment; Fall Protection; Resource Conservation and Recovery Act [RCRA] Contingency; Spill Prevention, Control and Countermeasures; Storm Water Management).

Element 3 - Check

WESTON will maintain and implement procedures to monitor and measure key characteristics of its operations and activities on a regular basis. This will include the recording of information to track performance, relevant operational controls (e.g., characteristics of newly generated waste, ambient monitoring, and facility inspections) and conformance with the organization’s EHS objectives and milestones.
Compliance assurance oversight is a scheduled task in WESTON projects. External audits, internal assessments, surveillance by line management, and inspections by line supervisors support the ongoing review process adopted to ensure continuous compliance performance.

WESTON will maintain procedures for defining responsibility and authority for handling and investigating nonconformance, taking action to mitigate impacts and for initiating and completing corrective action.

Corrective action will be taken to eliminate the root cause of nonconformance and will be appropriate to the magnitude of problems and commensurate with the impact.

1.1.4 Element 4 - Act

WESTON’s Senior Management Team directs overall performance and through continuing program evaluation, reviews the EHS management system on a scheduled basis to ensure continuing suitability, adequacy, and effectiveness. EHS management system reviews are documented. The Corporate Environmental, Health and Safety (CEH&S) Director will communicate status of EHS performance to management in regularly scheduled meetings.

WESTON’s Senior Management Team evaluates exception reports from audits and surveillance data to ensure appropriate attention to schedule and corrective action closure. Management also receives regularly scheduled compliance briefings and EHS performance reports. EHS performance is a line management responsibility that extends beyond compliance and embraces BBS concepts (e.g., active caring and personal ownership of Safety).

1.2 INTEGRATED SAFETY MANAGEMENT SYSTEM

WESTON personnel have been directly involved in translating EHS expectations into practical applications at project sites and facilities for over 50 years. WESTON has integrated this extensive familiarity and experience in implementing ISMS for WESTON internal and contract activities.

WESTON embraces the ISMS for implementing new projects review and planning for environmental impacts in parallel with job safety analyses reviews and hazards analyses. Our integrated EHS Program promotes efficiency, crosswalks to quality performance, and fully integrates staffing and funding requirements into project needs and goals.

WESTON senior managers support ISMS and recognize the value and importance of implementation starting “at the project level” (bottom-up) through continual attention, involvement, and complementary actions of work planning and execution teams. Through this approach, line management and workers are in an active partnership to perform work in the safest possible manner by:

- **Workers** – Being continually and actively involved from start to finish and follow-up.
- **Supervisors/Managers** – Enabling and empowering individual input regardless of job classification.
- **Technical Specialists** – Interacting with each other, learning to speak a common language, and interacting with managers, workers, and trades in a meaningful way.

WESTON’s ISMS emphasizes safety and excellence at the ground level and is based upon the following elements:
• **Defining the Scope(s) of Work** – WESTON contract missions will be translated into work by setting expectations, allocating resources, defining and prioritizing tasks.

• **Hazard Identification** – Hazards associated with the work are identified and analyzed to ensure that proper preventive safety controls are in place.

• **Standard Selection** – WESTON will select standards, requirements, and best practices that properly implement appropriate EHS controls and assure protection of the public, workers, and the environment.

• **Implementation** – WESTON believes the three elements above to be prerequisites to “WORKING SAFELY AND RESPONSIBLY.” These prerequisites are translated into contract-specific procedures governing site-specific activities. Worker involvement is a key success strategy in all implementation mechanisms.

• **Assessment** – WESTON will confirm readiness before operations begin. WESTON will also have mechanisms to confirm readiness throughout the projects’ life cycle. Self-assessments, management assessments, independent assessments, performance indicators, post job reviews, critiques and employee suggestions are examples of mechanisms used to collect data for analysis and feedback.

• **Evaluation** – Management evaluation will enable WESTON to analyze feedback information to measure performance against expectations and identify improvement opportunities.

These elements will be continually performed within a work culture and environment that incorporates ISMS Guiding Principles and strong worker involvement to optimize the continual emphasis on, and improvement in, the management of environment, safety, and health for WESTON operations. The WESTON ISMS consists of seven components:

1. The objective.
2. Guiding principles.
3. Core functions.
4. Worker involvement.
5. Mechanisms.
6. Responsibilities.
7. Implementation.

1.2.1 Component 1 – Objective

WESTON will systematically integrate EHS into management and work practices at all levels so that we accomplish our mission while protecting the public, the worker, and the environment. This is accomplished through effective integration of EHS management into all facets of work planning and execution. The overall management of safety functions and activities is an integral part of our mission.

1.2.2 Component 2 – Guiding Principles

These guiding principles mirror the fundamental policies intended to guide WESTON and subcontractor actions, from development of EHS directives to performance of work.

• **Line Management Responsibility for Safety**, Line management is directly responsible for the protection of our employees, the environment, and the public.

• **Clear Roles and Responsibilities**, Clear and unambiguous lines of authority and responsibility exist for ensuring EHS protection is established and maintained at all organizational levels within WESTON.
- **Competence Commensurate with Responsibilities.** WESTON personnel possess the experience, knowledge, skills, and abilities necessary to discharge their responsibilities.

- **Balanced Priorities.** WESTON resources are effectively allocated to address EHS, quality, programmatic, and operational considerations. Protecting the workers, the public, and the environment is a core value whenever activities are planned and performed.

- **Identification of EHS Standards and Requirements.** Before work is performed, the associated hazards are evaluated and an agreed-upon set of standards, requirements, and best practices are established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.

- **Hazard Controls Tailored to Work Being Performed.** WESTON incorporates the hierarchy of controls in the following descending order (elimination, substitution, engineering, administrative, and lastly, PPE) tailored to the work being performed and associated hazards to prevent harm and mitigate hazards and risk.

- **Operations Authorization.** The conditions and requirements to be satisfied for operations to be initiated and conducted are clearly established and agreed-upon.

### 1.2.3 Component 3 – Core Functions

The following five core safety management functions provide the necessary structure for WESTON work activities that could potentially affect the public, the workers, and the environment. The functions are applied as a continuous cycle with the degree of rigor appropriate to address the type of work activity and the hazards involved.

- **Define the Scope of Work.** The WESTON mission is translated into work, expectations are set, tasks are identified and prioritized, and resources are allocated.

- **Analyze the Hazards and Risks.** Hazards associated with WESTON’s work are identified, analyzed and categorized.

- **Develop and Implement Hazard Controls.** Applicable standards, requirements, and best practices are identified and agreed-upon, controls to prevent/mitigate hazards and risks are identified, the safety envelope is established, and controls are implemented.

- **Perform Work within Controls.** Readiness is confirmed and work is performed safely.

- **Provide Feedback and Continuous Improvement.** Feedback information on the adequacy of controls is gathered, opportunities for improving the definition and planning of work are identified and implemented, line and independent oversight is conducted, and, if necessary, regulatory enforcement actions occur.

### 1.2.4 Component 4 – Worker Involvement

WESTON and its employee-owners (workers) are committed to Safety First, every minute of every day, at work and at home. We actively care for the well being of ourselves, our coworkers, our families, our clients, and our subcontractors. We will never compromise on safety—it is our first thought. We enable a safety first—and all-the-time—culture wherever we live and work around the globe. We are able to do this because we have embraced the principles of behavior-based safety, or BBS.

BBS empowers all WESTON employee-owners—regardless of hierarchy—to use supportive intervention to show that we truly care about one another by correcting unsafe behaviors and thereby preventing injuries. One of the most powerful tenets of BBS is that true leadership is not about hierarchy or assuming that correcting unsafe behaviors is someone else’s responsibility. BBS enables WESTON employee-
owners to apply the leadership in all of us, and assume responsibility for the safety and well being of one another, because we care for our fellow employee-owners, and know that they in turn care for us.

The effectiveness of our ISMS is substantially dependent on the involvement of the WESTON employees performing the work. All project work at WESTON shall have employees/workers involved in the planning process. To the maximum extent possible, the workers who were involved in the planning activities should be used in the work execution.

The involvement of the workers should take place during the following Project Activities:

- Review Scope & Major Activities.
- Site Walk Downs.
- Planning Meetings to Break Down Activities and Identify Hazards.
- Comprehensive Site-Specific Hazard Analysis.
- Revising Work Plans, HASP, and hazards analysis.
- Review of Documentation.
- Reviewing Revisions and Schedules.
- Pre-Job Briefings.
- Work Execution.
- Post-Job Reviews.

The involvement of the workers should also take place during technical support and maintenance work. Some functional work may require the use of integrated work control program controls, while other tasks may be routine ‘skill of the craft’ type work. Regardless of the type of work, worker input should be used for the following activities:

- Define Scope.
- Analyze Hazards.
- Develop Controls.
- Pre-Job Briefings.
- Work Execution.
- Minor Field Changes.
- Major Field Changes and/or Feedback.
- Work Close-out.

When workers are changed or alternates used, the new workers shall be briefed on the work planning process. The involvement of the workers is a key component of the ISMS and shall be a routine part of all work planning at WESTON. The involvement of the workers is a key component of ISMS and shall be a routine part of WESTON work planning. The involvement of workers enables several vital ISMS activities:

- Hazards are more accurately identified and evaluated with direct input from those individuals with practical knowledge of actual performance of the work.
- Hazard identification and analysis, as well as the development of hazard controls benefits from varied technical and practical experience as workers interact with, and supply active input into processes involving technical (functional) support professionals.
- Up-front and continual worker involvement also increases level of understanding of all job participants and effectiveness of troubleshooting activities prior to work execution of work – this increases safety, quality and productivity.
1.2.5 Component 5 – Mechanisms

ISMS mechanisms define how the core WESTON EHS management functions are performed. The mechanisms are tailored to facilities and activities based on the hazards and the work being performed, and are described in site-specific plans/documents. WESTON’s expectations are expressed through written directives (e.g., OSHA, EPA and other Federal Agency standards and guidance documents, WESTON Field Operation Procedures [FLDs], as well as defined Operating Practices [OPs]) and contract-specific clauses. Expectations are also expressed in HASPs, Activity Hazard Analyses (AHAs), Chemical Hygiene Plans, and Process Hazard Analyses established to implement EHS activities at all WESTON work and office locations.

1.2.6 Component 6 – Responsibilities

WESTON EHS responsibilities must be clearly defined in documents appropriate to the activity, and detailed in the contract and site-specific procedures. For each management mechanism employed to satisfy a safety management principle or function, the associated approval authority has been established. The review and approval levels vary commensurate with the type of work and the hazards involved.

1.2.7 Component 7 – Implementation

WESTON ISMS implementation involves project-, job-, or site-specific instances of work definition and planning, hazards identifications and analysis, definition and implementation of hazard controls, performance of work, developing and implementing operating procedures, and monitoring and assessing performance for improvement. This is accomplished by development of office, activity and job or site-specific HASPs or accident prevention plans (APPs), work plans, quality assurance (QA) plans, and environmental compliance plans and assignment of appropriate trained and experienced personnel to implement these plans. These plans are universally recognized as baseline documents and being flexible and designed to address changes to scope of work, hazards and risks.

1.3 HEALTH AND SAFETY POLICIES

WESTON personnel operate in a culture where safety, health, and protection of personnel and the environment take precedence over expediency. A fundamental premise of BBS is that accidents are preventable through choosing safe proactive behaviors. WESTON’s policy on Health and Safety emphasizes several important points:

- WESTON has established a goal of working safely 100% of the time (employees and contractors) with the expected outcome being zero incidents that result in injuries, illnesses, property damage or environmental damage or contamination.
- All managers and workers accept as their responsibility a concerted and sustained effort to achieve a goal of Safety Every Minute of Every Day.
- All managers and workers assume a safety leadership role.
- All managers and workers take action for safety, coach peers in safe practices, and share experiences, successes, and failures.
- Workers are involved in the identification and control of workplace hazards during work planning, work execution, and feedback activities.
- Management is committed to a work environment that allows free and open expression of safety concerns, and where workers fear no reprisals or retaliation.
Workers are our most important assets to WESTON and critical resources for establishing, implementing, and observing safe work practices.

1.3.1 100% Safe Work and Stop Work Policy Statement

For each activity and contract under which WESTON performs work, a policy will be implemented clearly stating that WESTON employees have the responsibility and right to stop or curtail any work they perceive to be unsafe (a threat to public health, the safety and health of workers, or the environment). Employees must be free to voice concerns about safety and health without fear of reprisal, retaliation, or harassment. This policy will be implemented by a clear, straightforward contract-specific procedure as part of the WESTON ISMS.

To support the WESTON goal of all employees and subcontractors working safely – 100% of the time, all managers will utilize every available resource to maintain safe, hazard-controlled work environments characterized by a vigorous emphasis on accident prevention. Standards, requirements and best practices will be implemented in a manner that maximizes the prevention of accidents. Managers will assure that all employees are knowledgeable of those standards, requirements, and best practices that pertain to their safety.

WESTON managers and supervisors are held directly accountable for the health and safety of their employees, subcontractor activities and other resources employed to maintain employee health and safety, and the continual communication of hazards and hazard controls to the workforce.

The environmental policy statement is provided in Section 12, Environmental Protection Program.

1.4 INTERNATIONAL WORK ASSIGNMENTS

All projects that are completed in non-U.S. locations will be subject to the same regulatory requirements that are applicable in the U.S. as well as any applicable laws and regulations of the Sovereign Nation in which work is being completed. When work is being completed in a non-U.S. location, the Sovereign Nation’s local rules, regulations, and cultural practices will be observed to the extent possible. WESTON and our representatives will make every effort to ensure all employees and subcontractors are protected from recognized hazards within the workplace in accordance with the spirit and intent of U.S. regulations and contractual requirements, as well as the active caring tenets of our BBS culture using whichever regulations and procedures are most protective and align with our core values.
2.0 ROLES AND RESPONSIBILITIES

WESTON ensures that ownership, responsibility, and the goal of everyone working safely – 100% of the time is achieved by bringing in a fully institutionalized, clearly understood set of EHS roles and responsibilities within the framework of our EHS Program and ISMS.

WESTON can only successfully perform mission and daily operations through the participation of workers, line managers, and senior managers as an engaged and committed team. As is the case with a truly “integrated” system, effective EHS during the course of project work is a responsibility shared by all WESTON employees and subcontractors. The WESTON ISMS is founded on this shared responsibility, and empowerment of each employee to participate in the oversight and continual improvement of the system.

WESTON recognizes that an organized system operates most effectively when participants have a clear understanding of:

1. What they are expected to do within the system.
2. How they are expected to perform those actions.
3. Who they are supposed to involve and communicate with while performing those actions.
4. Where the lines of responsibility for the outcomes of the actions exist.

These necessary points of understanding collectively add up to an individual’s roles and responsibilities within the system. This EHS Program has been developed and is implemented by WESTON to fully integrate environment, safety, and health into all work performed.

WESTON is a matrix organization that provides administrative and functional EHS support to project managers who, in turn, are responsible for execution of the project. This system ensures the practical integration of EHS into the planning and execution of work at the project level, while generating a variety of roles and responsibilities for individuals from similar technical functions. Therefore, roles and responsibilities are defined at several levels within the WESTON organization.

WESTON EHS roles and responsibilities must be clearly defined in documents appropriate to the activity, and detailed in the contract, regulations, and/or activity-specific procedures. For each mechanism employed to satisfy a safety management principle or function, the associated approval authority has been established. The review and approval levels vary commensurate with the type of work and the hazards involved.

This EHS Program reflects the program that is in effect upon approval of this document. Organizational and procedural changes have been implemented to achieve the following five objectives:

1. EHS staff, resources, and procedures are provided as necessary and used in an efficient and cost-effective manner to establish a safe work environment for WESTON employees, subcontractors, clients, and the general public.
2. Compliance with environmental, health and safety regulations is assured, and risk is managed and minimized for all employees, as well as the corporation.
3. Management involvement is established and maintained within the EHS Program.
4. Clear lines of reporting, authorities, responsibilities, and performance expectations are established.

5. Attain world-class EHS culture at our places of employment, in our homes and in our communities through the elimination of at-risk behavior and achievement of zero incidents.

The WESTON Environmental Compliance and Health and Safety Organization is depicted in Figure 2-1. The roles for executives, senior managers, operation divisions, staff, and overhead support groups are described in this section. Specific tasks that are described in the following text include some items that are not required by law but are considered necessary to maintain WESTON’s current outstanding EHS performance.

![Figure 2-1. WESTON Environmental Compliance and Health & Safety Organization](image-url)

### 2.1 PRESIDENT AND CHIEF EXECUTIVE OFFICER

The President and Chief Executive Officer (CEO) is ultimately responsible for the development and implementation of the corporation’s EHS Program, and is accountable to the Board of Directors for the corporation’s EHS performance.
2.2 SENIOR MANAGERS

EHS responsibility flows in a direct line from WESTON Senior Managers to their line managers. Under this responsibility Senior Managers are:

- Responsible for ensuring that line managers involve employees in work planning; hazard identification and analysis; development and implementation of hazard controls; monitoring and ensuring job-site safety; the development of lessons learned (good and bad), feedback, and improvement.

- Responsible for assigning clear EHS roles and responsibilities, clearly communicating to line managers, and ensuring that line managers and their workers are knowledgeable of their roles and responsibilities.

- Responsible for ensuring that all line managers and employees are competent (trained, qualified, and experienced) commensurate with their roles and responsibilities, and that they are trained and knowledgeable of this EHS Program and their roles and responsibilities.

- Responsible for knowing their roles and responsibilities; being able to identify and discuss them with workers, subcontractors, and assessors; and for knowing where they are formally documented.

- Committed to an effective ISMS that involves line managers and employees in the performance of safe and efficient work. These managers are, in their own right, engaged and active participants in the WESTON ISMS.

2.3 CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY DEPARTMENT

The CEH&S Department reports to the Senior Vice President of Human Resources and is responsible for the development and implementation of the EHS Program, developing and managing support systems (such as an employee field certification database and an occupational medical surveillance program), overseeing regulatory required EHS Program elements, and reporting to executive management on the status of the programs.

The role of WESTON’s CEH&S Department is to maintain and oversee the basic function of the corporation’s EHS Programs. The CEH&S Department, using input from the Division EHS Managers (DEHSMs), Office Safety Officers (OSOs), and Field Safety Officers (FSOs) develops and maintains program components and systems that support EHS activities such as safety training and occupational medical monitoring, and offer the greatest overall benefit and efficiency to the programs. The CEH&S Department provides written guidance for the EHS Program and activities and interacts with the Operating Division EHS staff and managers as well as the Project Managers. The CEH&S Department may acquire assistance from the technical resources of the Operating Divisions when necessary to complete technical aspects of the EHS Program. In addition, the CEH&S Department monitors program implementation and reports the results to senior management. Work activities in the CEH&S Department are charged to corporate overhead.

Specific responsibilities of the CEH&S Department include the following:

- Develop/implement/maintain this written EHS Program in compliance with applicable regulatory requirements, as well as best practices with input from DEHSMs, and Operations Management.

- Develop/implement/maintain effective protocols and/or procedures or checklists to monitor, audit, and review implementation and compliance with EHS policies and programs.
- Provide assistance to Division Managers (DMs) (on an as-needed basis), Profit Center (PC) Managers, Project Managers and DEHSMs in conducting project EHS reviews. Perform evaluations, inspections and audits as necessary to provide information and recommendations to WESTON management regarding the status of the corporation’s EHS Program.
- Provide guidance to, and acquire feedback from Operations/DEHSMs via regularly scheduled meetings to address current and/or emerging EHS issues.
- Maintain EHS campaign (hard copy information, company awareness articles, contests, incentives, etc.) to foster/promote a world-class EHS culture.
- Develop/implement/maintain corporate EHS training courses and support systems (e.g., course listings, sign-ups, invoicing, certificates, instructor mentoring, course materials, web-based reference materials, etc.). Convert EHS training courses to Web-accessible on-line formats whenever feasible to increase learning opportunities for all WESTON personnel.
- Develop/maintain occupational medical monitoring program including medical consultant selection, management, oversight; policy development, invoicing and payment, systems for appointments, certification tracking.
- Maintain and oversee the use of the on-line EHS Track system to track medical certifications and environmental health and safety training for field staff.
- Coordinate with Risk Management (RM) on all EHS loss prevention issues and concerns; including accident and incident reporting procedures and data/trend analysis.
- Provide input to the DM in selecting individuals to fill DEHSM and OSO positions.
- Provide support as-needed to CEH&S Committee.

2.4 ROLES AND RESPONSIBILITIES OF OPERATING DIVISIONS AND GROUPS

2.4.1 Division Managers

Each DM reports through the Chief Operating Officer (COO) to the President and CEO and is responsible for the oversight, management, and daily implementation of the EHS Program in his/her respective division. DMs are accountable for the results of any OSHA (or other government or state agency) inspections that are conducted in their Division, the workers compensation expenses in their division that contribute to the corporation’s experience modification rate (EMR), and the OSHA-recordable incident rate for their division.

The DMs will assign employees in the roles of the DEHSMs and ensure that they are provided the appropriate support, training, time, and resources to fully implement and maintain the EHS Program.

Specific responsibilities for the DMs include the following:

- Participate actively on the CEH&S Committee.
- Distribute policies, guidelines, and information from the CEH&S Department to the DEHSMs, and assign priorities to the DEHSM’s activities.
- Acquire input from the DEHSMs regarding the EHS Program and provide recommendations to CEH&S for revising the programs or developing new policies and documents.
- Manage the activities of the DEHSMs. Establish and oversee the deliverables, deadlines, and budgets for the DEHSMs. Conduct annual performance reviews for the DEHSMs.
- Provide input to the CEH&S Department and RM Department regarding the EHS Program and loss prevention issues.

### 2.4.2 Profit Center Managers

The PC Managers report to the DMs for safety-related activities and are responsible for the oversight, management, and implementation of the EHS Program in their respective offices. The PC Managers, with concurrence from the DEHSM, will assign an appropriately qualified employee in the role of the OSO, and will ensure adequate administrative support is provided to allow efficient use of the OSO’s time and skills. The PC Manager is also responsible for ensuring that the OSO and support staff has the time and resources necessary to complete EHS tasks as a primary responsibility. Specific responsibilities for the PC Managers include the following:

- Identify, with assistance from the DEHSM, an appropriately qualified safety professional that has the appropriate experience, training, and personal desire to serve as the OSO. Ensure stability and efficiency in the programs by minimizing turnover in the OSO position.
- Distribute policies, guidelines, and information from the CEH&S Department and DEHSMs to the OSOs, and assign priorities to the OSOs’ activities.
- Supervise the day-to-day operations of the OSOs in their offices. Establish reporting requirements and monitor progress reports from the OSOs. Establish and track budgets and schedules for office EHS Programs. Conduct the professional development and annual reviews of the OSOs, as appropriate.
- Oversee accident/injury reports and investigations for incidents in their office. Ensure timely reporting, resolution, and implementation of corrective actions for each incident. Ensure that effective incident investigations are conducted. Manage the workers’ compensation issues in their office with support from the RM Department.
- Provide input to the CEH&S Department and RM Department regarding the EHS Program and loss prevention issues, respectively.
- Halt work activities in the office and in the field that are determined to represent an imminent hazard.

### 2.4.3 Service Line Program Managers

Service Line (SL) Program Managers will be selected by the DM sponsoring the Initiative (e.g., Fuels, Facilities and Infrastructure [F&I], and International Assignments/Contracts). The SL Program Manager is responsible for ensuring that all applicable and relevant EHS Program requirements are implemented at each project work location. The SL Program Manager is supported by an EHS Manager that is selected by the sponsoring DM. The EHS Manager is responsible for the development and implementation of Environmental Compliance and Health and Safety Program elements for all activities needed to accomplish the business objectives and is supported by local OSOs and FSOs. The EHS Manager will report to the sponsoring DM. Specific EHS responsibilities of the SL Program Managers include the following:

- Participate in the development and implementation of policies, guidelines and information necessary to ensure environmental compliance and the health and safety of all employees assigned to SL projects.

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Maintain frequent and open dialogue with the EHS Manager regarding the EHS program status and provide positive reinforcement of EHS program goals and policies to project managers.

Provide input for EHS Manager annual performance review.

### 2.5 DIVISION ENVIRONMENTAL, HEALTH, AND SAFETY MANAGERS (AND SERVICE LINE EHS MANAGERS)

The DEHSM position is established to provide the daily supervision and EHS Program leadership for the Division. The primary responsibilities of the DEHSMs are leading, managing, and implementing the EHS Program. Project work and utilization goals may be assigned to them based on their available time after fulfilling their primary EHS responsibilities.

DEHSMs will be designated by the DM, with concurrence from the CEH&S Director. The role of the DEHSM will be to ensure that the EHS Program is implemented in the specific offices and work locations in their designated divisions. DEHSMs will report to the DM and will supervise and establish reporting requirements for the OSOs and FSOs, and manage the schedules and budgets associated with the EHS Program. Safety tasks that are specific to a project will be charged to the appropriate project charge number. Tasks related to the corporate programs or those that are not project-specific will be charged to the appropriate overhead numbers. Specific responsibilities of DEHSMs include the following:

- Assist the DM to ensure appropriate interpretation and implementation of the EHS Program based on guidance and policies from the CEH&S Department.
- Distribute safety policies, guidelines, and information to the OSOs from the DM, and the CEH&S and RM Departments.
- Oversee the day-to-day operations of the OSOs in their divisions. Establish reporting requirements and monitor progress reports from the OSOs. Establish and track budgets and schedules for the EHS Program. Provide input to the professional development and annual reviews of the OSOs, as appropriate.
- Conduct and/or coordinate project EHS inspections and EHS program reviews within their divisions to ensure that programs and commitments are implemented in each work location and to ensure that HASP requirements are implemented on projects. Project inspections may be conducted by the DEHSMs, the OSOs, or other qualified safety professionals. Program reviews are conducted or coordinated by the DEHSM, with concurrence from the DM and CEH&S Director.
- Provide copies of HASPs/Accident Prevention Plans (APPs), project EHS reviews, and any of other relevant information to the appropriate EHS Manager.
- Conduct annual EHS reviews of all PCs within their area of responsibility. Conduct a follow up review of the same to ensure timely and appropriate corrective actions are implemented.
- Serve as the Division Environmental Compliance Manager.
- Serve as the technical lead for environmental, health, safety, hazardous materials shipping, and security issues and to provide technical training and guidance to the OSOs.
- Advise the DMs of the EHS Program activities and accomplishments in their division in a timely manner.
- Provide indoctrination, coaching, and training to new OSOs.
- Manage and direct activities, as appropriate, during any regulatory inspections.
- Review HASPs for field projects/initiatives requiring specialized skills or certifications. Ensure the technical adequacy of project HASP reviews by safety personnel or technical experts with safety specialty skills.
- Oversee accident/injury reports and investigations for incidents in their division. Ensure timely reporting, resolution, and implementation of corrective actions for each incident. Ensure that effective incident investigations are conducted. Ensure that all appropriate cross-over DEHSMs, CSMs, and initiative EHS Managers receive copies of the notice of incident (NOI). Manage the workers’ compensation issues in their division with support from the RM Department.
- Monitor division EHS training needs and provide or assist with training.
- Establish and participate in health and safety committees in the division offices.
- Assist and advise CEH&S in the development, maintenance, and implementation of the EHS Program, policies, and documents.
- Provide input to the CEH&S Department and RM Department regarding EHS Programs and loss prevention issues.
- Provide feedback to the DM on the status of the EHS Program.
- Oversee the activities of the OSOs and work with the PC Managers to establish OSO utilization goals.
- Establish and manage the deliverables, deadlines, and budgets for the OSOs as appropriate. Conduct annual performance supplemental reviews for the OSOs.
- Serve as back-up support for the OSOs in their division and for other DEHSMs.
- Halt work activities that are determined to represent an imminent hazard.

### 2.6 OFFICE SAFETY OFFICERS, MEDICAL SAFETY OFFICERS, AND ADMINISTRATIVE OFFICE SAFETY SUPPORT STAFF

The role of the OSO, medical safety officer (MSO) support, and administrative safety support staff is to complete the day-to-day tasks required to implement the EHS Program and provide related information to employees. OSOs are designated by the PC Managers in each Division. Administrative safety support staff, including the MSO, is selected from the available support personnel in each office to complete tasks that do not require the technical abilities of the OSOs. The safety tasks will comprise a part-time assignment supplemented by the other work activities for each OSO and administrative support person. The EHS tasks that are specific to a project will be charged to the appropriate project charge number. Tasks related to corporate programs or those that are not project-specific will be charged to the appropriate overhead numbers.

Qualifications for the OSO include safety experience that is relevant to the operations of the office.

### 2.7 FIELD SAFETY OFFICER RESPONSIBILITIES

The FSO for both hazardous waste operations and emergency response (HAZWOPER) and hazardous project sites will serve as a technical lead to the project and site management in an effort to ensure all WESTON and regulatory procedures and regulations are implemented and maintained. The FSO will receive training in areas of competency where required by regulation to complete project tasks such as excavation, working at elevation, and confined space entry. Additional training requirements and supervisor acknowledgement will be required before the FSO receives initial field assignment as an FSO.
WESTON management recognizes that field projects may require varying degrees of EHS experience and training depending on the complexity of tasks to be completed and project cost. It is also recognized that a new employee may need a designated period of time as a WESTON employee to fully understand the EHS responsibilities. Further, it is recommended that the FSOs be actively enrolled in the associated EHS career paths maintained by the Human Resource department. The following sections provide a suggested FSO hierarchy developed as a “management guide” to meet the different project needs.

2.7.1 Field Safety Officer Assignments

WESTON utilizes a tiered approach when assigning FSOs to a project. A project’s anticipated/potential EHS hazards, as well as level of complexity/ scope of activities define the nature of EHS control and procedures necessary to properly and safely execute a specific project. The Project Manager is responsible for ensuring that the FSO’s qualifications and experience are commensurate with the project/site requirements. Project Managers should also arrange for appropriate mentoring to support FSOs who may require additional on-the-job training.

2.7.2 Field Safety Officer/Site Manager Qualifications and Experience Hierarchy

A FSO shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for WESTON and subcontractors unless otherwise stated within the applicable HASP. Depending on the size and complexity of a project, the FSO and Site Manager responsibilities will usually be divided between two qualified employees. On smaller projects these responsibilities may be combined and accomplished by one qualified employee. It is highly recommended that the appropriate DEHSM be consulted for advice and guidance in selecting the most appropriate qualifications and experience level needed for a particular project assignment. The EHS personnel tiered qualification requirements are provided in Section 3.0.

2.8 PROJECT MANAGERS

The Project Manager has overall responsibility for ensuring that project personnel (including subcontractor personnel) comply with EHS regulations, program requirements, and procedures. Specific EHS responsibilities of Project Managers include the following:

- Ensure development and implementation of project HASPs and approve final plans after required EHS reviews.
- Ensure project personnel meet applicable safety certification requirements, such as medical certifications and training.
- Ensure adequate project support is acquired from appropriately qualified safety personnel such as DEHSM, FSO, OSOs, industrial hygienists, and health physicists.
- Ensure project personnel comply with applicable EHS regulations and corporate or client procedures. Halt any project work activities that are determined to represent an imminent hazard.
- Ensure appropriate safety equipment and materials are provided to project personnel.
- Ensure timely and accurate reporting and investigation of incidents, accident, or injuries involving project personnel, with support from the RM Department and the DEHSM. Ensure corrective actions are implemented completely.
- Ensure proper response and internal notification regarding inspections by regulatory agencies.
- Ensure all project personnel have met the site-specific experience and training requirements as outlined in Section 3.
2.9 LINE MANAGERS

Line Managers are responsible for work at the "project execution" level. WESTON Line Managers may include the Project, PC, and Organizational Unit Managers. WESTON Line Managers are directly responsible for EHS at the site. Line Managers are responsible for:

- Ensuring that employees are involved in work planning; hazard identification and analysis; development and implementation of hazard controls; monitoring and ensuring job-site safety; development of lessons learned (good and bad), feedback, and improvement.
- Assigning clear EHS roles and responsibilities to their workers, and assuring that those workers are knowledgeable of their roles and responsibilities, using Job Evaluation Descriptions, Project Quality Plans, Management Plans and/or other specific, readily identifiable documentation.
- Ensuring that their employees are competent (trained, qualified, and experienced) commensurate with their roles and responsibilities, and that those employees are trained and knowledgeable of the EHS Program and their roles and responsibilities within it.
- Knowing their own roles and responsibilities; being able to identify and discuss them with workers and subcontractors; and knowing where they are formally documented.

Line Managers are not alone in their EHS responsibilities. WESTON workers are empowered to work safely, and stop work if unsafe conditions are perceived on the job site. Responsibility also flows up the line to senior managers who remain responsible for the implementation and maintenance of an effective EHS Program and ISMS. WESTON senior managers must rely on line managers as vital agents to the effectiveness of the ISMS due to their immediacy to the work and the people expected to plan and perform it.

2.10 WORKERS

The term “worker” is used to describe anyone engaged in the direct performance of work within the WESTON organization. While it is often used to refer to hourly employees and direct project work, it also describes salaried employees, task/activity managers, administrative personnel engaged in office work.

Workers are responsible for complying with EHS regulations, program requirements, and procedures. They are also responsible for maintaining the EHS certifications required to perform work activities on projects to which they are assigned.

The effectiveness of the WESTON ISMS is dependent on the involvement of the workers performing the work across the site. Work requires the involvement of workers in the planning process. To the maximum extent possible, the workers involved in the planning of activities will be used in the work execution.

The success of WESTON operations relies on our staff and team members. A substantial measure of success is the maintenance of the highest achievable EHS performance during any and all work at the site. The overriding emphasis in work planning and performance is that the work be performed in a manner that provides maximum protection to our workers as well as the environment and the community.

2.11 ROLES AND RESPONSIBILITIES OF OVERHEAD GROUPS

2.11.1 Risk Management Department

The RM Department reports to the Senior Vice President – General Counsel. RM supports the EHS Program by establishing and overseeing the accident reporting procedures, and establishing and
maintaining the workers’ compensation insurance programs, and managing self-insured accidents. Specific responsibilities in supporting the EHS Program include the following:

- Select and manage the workers’ compensation insurance carrier, and oversee the injury case management program.
- Maintain the corporation’s accident statistics and records to ensure compliance with OSHA and workers’ compensation regulations.
- Supply DMs, DEHSMS, CEH&S Department, and senior management with accurate and timely incident and loss statistics, including WESTON’s EMR.
- Inform the DEHSMS of the incident reporting procedures and report to them any problems with implementation.
- Assist in identification of significant loss trends associated with safety issues.
- Assist in the development and implementation of appropriate loss prevention techniques to reduce incident and accident frequency and severity.
- Solicit input from the CEH&S Department and the DMs regarding loss prevention issues, techniques, and ideas.

2.11.2 Human Resources Department

The Human Resources (HR) Department defines, manages and provides leadership for systems, policies, and procedures that permit WESTON’s internal clients to attract, develop, and retain quality employees in pursuit of meeting their clients’ emerging priorities. These services are flexible enough to adapt to an ever-changing client environment, applicable to the appropriate country, and appropriate for related entities such as LLCs and Joint Ventures. HR develops fringe benefit strategies that maximize value while providing a competitive overall package and provides EHS as well as Security Leadership to support ongoing and developing operations.

2.11.3 Law Department

The Law Department provides advice and counsel to WESTON employees in order to ensure compliance with legal requirements; successful negotiation and documentation of the Company’s business transactions; and successful resolution of litigation and other disputes. The Law Department provides routine advice and guidance to the RM and CEH&S Departments.
3.0 TRAINING AND QUALIFICATIONS

WESTON has developed and implements an on-line system, EHS Track, to allow rapid access and reporting to ensure WESTON can track current EHS status of all WESTON offices that manage EHS and the personnel assigned to each safety officer. Safety officers use EHS Track to update EHS contact information and view EHS personnel training certifications and medical clearances. WESTON personnel use EHS Track to track the status of training and medical certifications and register for training classes. EHS Track also provides lists of DEHSMs, Safety Officers, and MSOs; calendars of training classes; and applications to develop reports.

3.1 PERSONNEL TRAINING

WESTON identifies all training needs associated with a project prior to commencement of work. Qualifications, including training, experience, and competencies, are specified in the site-specific EHS Plan or HASP. New employees participate in WESTON’s Orientation Program. All personnel receive training on WESTON’s EHS policy including environmental aspects, BBS, and additional site-specific/job-specific training. WESTON personnel operating machinery and equipment will possess all necessary qualifications, experience and training to safely perform their assignments. Safety training also covers potential consequences for non-compliance with established polices, practices and procedures.

Employee training is a key element to successfully completing a job safely and in accordance with the work requirements. Training provides the means to attain:

- Job safety.
- Job effectiveness.
- Compliance with applicable laws and regulations covering the work.

Table 3-1 identifies some of the key types of training that apply to site workers. Additional training requirements are specified in the Hazard Communication Program (Section 4.0), Personal Protective Equipment Program (Section 5.0), and Respiratory Protection Program (Section 6.0). Site-specific training requirements are specified in the HASP or other site-specific document.

Table 3-1
Types of Training That Apply to Site Work

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA 40-Hour</td>
<td>Law requires OSHA 40-hour training for anyone working at a hazardous waste site. Annual 8-hour refresher course is required to ensure that knowledge of OSHA requirements is current.</td>
</tr>
<tr>
<td>OSHA Supervisor</td>
<td>This training is required for supervisors of others working with hazardous materials, and focuses on the responsibilities that supervisors must implement.</td>
</tr>
<tr>
<td>RCRA Training</td>
<td>RCRA 24-hour training is required for people working with RCRA-regulated materials. The training requirement can be met by taking the OSHA 40-hour training course. Additional RCRA training is needed for the shipping, transportation, and disposal of RCRA-regulated materials.</td>
</tr>
<tr>
<td>Site-Specific</td>
<td>Specific training orient workers about specific conditions at the site.</td>
</tr>
<tr>
<td>Job-Specific</td>
<td>Job-specific training is conducted before workers start work on a new or different assignment that is complex or specialized, or that has special work requirements or safety precautions.</td>
</tr>
<tr>
<td>Toolbox Safety</td>
<td>Weekly toolbox safety meetings are conducted with all workers at the site to discuss general safety, health, or environmental topics. The meeting is also an opportunity to share “lessons learned.”</td>
</tr>
</tbody>
</table>

Note: This list is not all-inclusive, but representative of the training required in the performance of project assignments.
### Table 3-1 Types of Training That Apply to Site Work (Continued)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos</td>
<td>Special training is required under OSHA and the Clean Air Act for anyone with asbestos. The training teaches about asbestos hazards and protection that is required when working with asbestos.</td>
</tr>
<tr>
<td>First Aid/CPR</td>
<td>At least one person who has been trained and certified in first aid and cardiopulmonary resuscitation (CPR) must be present during site operations.</td>
</tr>
<tr>
<td>Fall Protection</td>
<td>Fall protection principles and current OSHA requirements and policies. Components, demonstration, and limitations of fall arrest systems.</td>
</tr>
<tr>
<td>Confined Space</td>
<td>Recognition and evaluation of confined space hazards, including prevention and abatement of associated safety and health hazards. Covers instrumentation used to evaluate atmospheric hazards and ventilation techniques.</td>
</tr>
<tr>
<td>Excavation/Trenching</td>
<td>OSHA standards and safety aspects of excavation/trenching. Covers stability of shored and unshored slopes and walls of excavations and various types of shoring. Instrument use (such as penetrometers, torvane, shears, engineering rods).</td>
</tr>
<tr>
<td>10-Hr/30-Hr OSHA</td>
<td>OSHA policies, procedures, and standards, and construction safety and health principles. Topics include scope and application of the OSHA standards. Special emphasis is placed on those areas most hazardous.</td>
</tr>
<tr>
<td>UXO/OE</td>
<td>Special training is required when working at sites with the possibility of encountering UXO/OE.</td>
</tr>
</tbody>
</table>

### 3.2 EHS PERSONNEL QUALIFICATIONS

Job descriptions for all EHS personnel are developed to ensure accountability. WESTON established the following tiered FSO qualifications with example project descriptions. Lower-level FSOs may function as FSOs at higher level sites with approval and appropriate EHS Review by a Division EHS Manager or designee. WESTON is currently following the 2008 Version of EM 395-1-1. Older Contracts may be subject to the 2003 version of EM 385-1-1 2003 and will need Division EHS Manager Review to allow for differing requirements.

#### Level 1 (e.g., Small, non-hazardous service or maintenance projects)

<table>
<thead>
<tr>
<th>Level 1 General Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worked for WESTON for at least 1 year unless determined by program management that the employee possesses the necessary skills and is under the direct supervision of an active EHS mentor.</td>
</tr>
<tr>
<td>Desire to work as FSO.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Specific Requirements</th>
</tr>
</thead>
</table>
| **HAZWOPER**

- One year of experience.
- 40-hour HAZWOPER.
- 8-hr HAZWOPER Refresher annually.
- Weston 8-hour HAZWOPER FSO Course
- Competent Person Training as required.
- 24 hours of supervised work at HAZWOPER site in the project-specified level of Protection (D or C)

**Construction/USACE**

- Demonstrated proficiency on similar projects.
- 5 years Construction (safety) experience
- 30-hour OSHA construction safety class or equivalent
- 24 Hours formal safety, health, or competency training every 4 years
- 8-hr Construction Site Safety Officer or HAZWOPER Site Supervisor Course
- Competent Person training as needed.

---

a. A HAZWOPER Project subject to EM 385-1-1 would require the FSO/SSHO to have all of the above requirements.
Level 2 (e.g., Minor construction, service or maintenance contracts. Typical dollar value less than $200,000)

<table>
<thead>
<tr>
<th>Level 2 General Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worked for WESTON for at least 1 year unless determined by program management that the employee possesses the necessary skills and is under the direct supervision of an active EHS mentor.</td>
</tr>
<tr>
<td>Desire to work as FSO.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Specific Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HAZWOPER</strong>(^a)</td>
</tr>
<tr>
<td>• Three years of experience.</td>
</tr>
<tr>
<td>• 40-hour HAZWOPER.</td>
</tr>
<tr>
<td>• 8-hr HAZWOPER Refresher annually.</td>
</tr>
<tr>
<td>• Weston 8-hour HAZWOPER FSO Course.</td>
</tr>
<tr>
<td>• Competent Person Training as required.</td>
</tr>
<tr>
<td>• 24 hours of supervised work at HAZWOPER site in the project-specified level of Protection (D or C)</td>
</tr>
<tr>
<td>a. A HAZWOPER Project subject to EM 385-1-1 would require the FSO/SSHO to have all of the above requirements.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 3 (e.g., Small to mid-size construction projects with limited potential for serious injury/illness. Typical value less than $2 million).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worked for WESTON for at least 1 year unless determined by program management that the employee possesses the necessary skills and is under the direct supervision of an active EHS mentor.</td>
</tr>
<tr>
<td>Desire to work as FSO.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Specific Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HAZWOPER</strong>(^a)</td>
</tr>
<tr>
<td>• Five years of experience.</td>
</tr>
<tr>
<td>• 40-hour HAZWOPER.</td>
</tr>
<tr>
<td>• 8-hr HAZWOPER Refresher annually.</td>
</tr>
<tr>
<td>• Weston 8-hour HAZWOPER FSO Course.</td>
</tr>
<tr>
<td>• Competent Person Training as required.</td>
</tr>
<tr>
<td>• 24 hours of supervised work at HAZWOPER site in project-specified level of Protection (D, C or B)</td>
</tr>
<tr>
<td>• 24-hours of formal safety training during the past 4 years.</td>
</tr>
</tbody>
</table>

a. A HAZWOPER Project subject to EM 385-1-1 would require the FSO/SSHO to have all of the above requirements.  
U = UFGS 01 35 26 Requirement
Level 4 (e.g., Construction projects with potential for risk to life and/or serious injury/illness. Typical value less than $15 million).

<table>
<thead>
<tr>
<th>Level 4 General Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worked for WESTON for at least 1 year unless determined by program management that the employee possesses the necessary skills and is under the direct supervision of an active EHS mentor.</td>
</tr>
<tr>
<td>Desire to work as FSO.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Specific Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAZWOPER³</td>
</tr>
<tr>
<td>• 10 Years of experience.</td>
</tr>
<tr>
<td>• 40-hour HAZWOPER.</td>
</tr>
<tr>
<td>• 8-hr HAZWOPER Refresher annually.</td>
</tr>
<tr>
<td>• Weston 8-hour HAZWOPER FSO Course.</td>
</tr>
<tr>
<td>• Competent Person Training as required.</td>
</tr>
<tr>
<td>• 24 hours of supervised work at HAZWOPER site in project-specified level of Protection (D, C or B)</td>
</tr>
<tr>
<td>• 24-hours of formal safety training during the past 4 years.</td>
</tr>
</tbody>
</table>

³. A HAZWOPER Project subject to EM 385-1-1 would require the FSO/SSH to have all of the above requirements.

U = UFGS 01 35 26 Requirement

Level 5 (e.g., Medium to large construction projects. Potential for loss of life or serious injury/illness, or environmental damage/risk).

<table>
<thead>
<tr>
<th>Level 5 General Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worked for WESTON for at least 1 year unless determined by program management that the employee possesses the necessary skills and is under the direct supervision of an active EHS mentor.</td>
</tr>
<tr>
<td>Desire to work as FSO.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Specific Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAZWOPER³</td>
</tr>
<tr>
<td>• Occupational Health and Safety Technologist (OHST) or Certified Associate Industrial Hygienist (CAIH) Certified Safety Trained Supervisor (STS) – Construction</td>
</tr>
<tr>
<td>• 40-hour HAZWOPER.</td>
</tr>
<tr>
<td>• 8-hr HAZWOPER Refresher annually.</td>
</tr>
<tr>
<td>• 24 hours of supervised work at HAZWOPER site in project-specified level of Protection (D, C, B or A)</td>
</tr>
<tr>
<td>• Weston 8-hour HAZWOPER FSO Course.</td>
</tr>
<tr>
<td>• Competent Person Training as required.</td>
</tr>
<tr>
<td>• An average of 24-hours of formal safety training annually.</td>
</tr>
</tbody>
</table>
### Level 5 General Requirements (Continued)

- 24 Hours formal safety, health, or competency training every 4 years
- 8-hr Construction Site Safety Officer or HAZWOPER Site Supervisor Course
- 24 Hours formal safety training each year
- Competent Person status for at least four of the following areas of competency:
  - Excavations/Trenching
  - Scaffolding
  - Fall Protection
  - Hazardous Energy
  - Confined Space Entry
  - Health Hazard Recognition, Evaluation and Control of Chemical, Physical and Biological Agents
  - PPE and Clothing to include selection, use and maintenance.

a. A HAZWOPER Project subject to EM 385-1-1 would require the FSO/SSHO to have all of the above requirements.

\[ U = \text{UFGS 01 35 26 Requirement} \]

### Level 6 (e.g., Large, complex and high hazard projects. Significant safety, health and environmental impact potential).

#### Level 6 General Requirements

**Worked for WESTON for at least 1 year unless determined by program management that the employee possesses the necessary skills and is under the direct supervision of an active EHS mentor.**

**Desire to work as FSO.**

**Work Specific Requirements**

<table>
<thead>
<tr>
<th>HAZWOPER(^\text{a} )</th>
<th>Construction/USACE(^\text{a} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP) or Certified Health Physicist (CHP).</td>
<td>Demonstrated proficiency on similar projects with minimum five years experience. Ten years experience of progressive nature experience.</td>
</tr>
<tr>
<td>40-hour HAZWOPER.</td>
<td>Certified Safety Professional (CSP) and/or Certified Industrial Hygienist (CIH).</td>
</tr>
<tr>
<td>8-hr HAZWOPER Refresher annually.</td>
<td>30-hour OSHA construction safety class or equivalent (must be within last 5 years if UFGS).</td>
</tr>
<tr>
<td>Weston 8-hour HAZWOPER FSO Course.</td>
<td>24 Hours formal safety, health, or competency training every 4 years</td>
</tr>
<tr>
<td>Competent Person Training as required.</td>
<td>8-hr Construction Site Safety Officer or HAZWOPER Site Supervisor Course</td>
</tr>
<tr>
<td>24 hours of supervised work at HAZWOPER site in project-specified level of Protection (D, C, B or A)</td>
<td>24 Hours formal safety training each year.</td>
</tr>
</tbody>
</table>
| An average of 24-hours of formal safety training annually. | Competent Person status for at least four of the following areas of competency:
  - Excavations/Trenching
  - Scaffolding
  - Fall Protection
  - Hazardous Energy
  - Confined Space Entry
  - Health Hazard Recognition, Evaluation and Control of Chemical, Physical and Biological Agents
  - PPE and Clothing to include selection, use and maintenance. |

a. A HAZWOPER Project subject to EM 385-1-1 would require the FSO/SSHO to have all of the above requirements.

\[ U = \text{UFGS 01 35 26 Requirement} \]
4.0 HAZARD COMMUNICATION PROGRAM

The OSHA Hazard Communication Standard (HCS) requires employers to establish programs that will transmit information on the hazards of chemicals to employees. This information is transmitted by means of labels, Material Safety Data Sheets (MSDS), and training programs. By implementing this Hazard Communication Program, WESTON is committed to ensure that all employees have the "right to know" the hazards and identities of the chemicals they work with or to which they are potentially exposed. This knowledge will reduce the incidence of chemically related occupational illness and injury and provide a safer working environment. This written program is available on-line on the WESTON EHS Portal to employees and other affected individuals and will be provided in hard copy or electronic media upon request.

Hazardous materials covered by this program are those referenced in the HCSs, 29 CFR 1910.1200 and 29 CFR 1926.59. Unless exempted from coverage by these standards, and/or as discussed within the context of this program, all hazardous chemicals in use at a site or facility and any hazardous chemical created by work activities conducted by WESTON (or by others which creates an exposure to WESTON personnel) must meet the requirements of the standard and of WESTON's Program. WESTON is not normally a manufacturer, importer, or distributor of hazardous materials. This program is intended, therefore, to address the regulatory requirements that apply to employers only. For purposes of the standard and of this program, exposure is defined to include any route of entry (inhalation, ingestion, skin contact, or absorption) and also includes potential (i.e., accidental or possible) exposure, including foreseeable emergencies. Foreseeable emergencies include, but are not limited to, employee exposures that may result from equipment failure, container rupture, or failure of control equipment that could cause an uncontrolled release of a hazardous chemical.

4.1 WORK CONTROLS FOR ACCIDENTS/INCIDENTS/INJURIES/ILLNESS PREVENTION AND DAMAGE TO PROPERTY AND EQUIPMENT

The site-specific HASP, AHAs, radiation work permits (RWPs), and/or EHS Program and FLDs provide procedures for conducting work safely while eliminating/minimizing accidents/incidents, injuries/illnesses, and damage to property and equipment. The site-specific document(s) will also reiterate the employee right and responsibility to report unsafe conditions and to interrupt or stop work without fear of reprisal.

As required, WESTON projects will maintain written site-specific hazard communication programs and a system within the program to maintain physical chemical inventories and MSDSs.

4.2 RESPONSIBILITY

Managers responsible for each facility, project, or site are responsible for ensuring that labels are placed where required, comparing MSDSs and other information with label information to ensure correctness, and maintaining the inventory of hazardous substances. All employees are responsible for ensuring and maintaining compliance with this program. Any questions or concerns should be directed to site or location management or the appropriate safety officer.

4.3 EMPLOYEES AFFECTED

This program applies to all WESTON employees and other individuals who may encounter a hazardous material in a WESTON work area. WESTON’s work activities cover a wide range of tasks that may involve hazardous materials from common household cleaners and office supplies to chemical reagents and hazardous wastes. The following categories of workers are identified to appropriately indicate how this program will apply to them.
4.3.1 Field Workers

Employees at field sites may encounter known, manufactured hazardous materials such as chemical reagents, as well as uncontrolled hazardous wastes that are not clearly identified or defined. This program will be strictly implemented for the former, and applied as appropriate and practical for the latter.

Before assignment to hazardous field operations, personnel are required to successfully complete a 40-Hour Indoctrination Health and Safety Training Course (or equivalent) that includes instruction in physical, biological, radiological, and toxic hazards of chemicals that are likely to be encountered in their work assignments. These required training programs are intended to minimize the risks associated with activities involving the uncontrolled hazardous wastes.

In addition, site-specific HASPs are developed prior to initiating work activities to evaluate and document site hazards. Parts of the HASPs provide a basis for acquiring and distributing information that would normally be provided in MSDSs and labeling on containers for manufactured substances. Regular safety meetings are scheduled to review or amend the HASP and to provide training on non-routine work assignments involving hazardous materials.

4.3.2 Non-field Personnel Working with Hazardous Materials

WESTON recognizes that personnel other than field personnel require Hazard Communication Training (e.g., laboratory, mail room, maintenance, graphics, office, and print shop employees). Training of these employees is accomplished during the Indoctrination Training for new employees and during section meetings or by attending job-specific training courses. Non-field activities will comply fully with requirements for MSDSs and container labeling.

4.3.3 Multi-Employer Work Sites, Subcontractors, and Clients

WESTON subcontractors, clients and client subcontractors whose employees could come in contact with WESTON controlled hazardous substances on any WESTON project site or location must be formally notified of the presence of those hazardous substances subject to the HCS.

Other employers, clients, or contractors whose employees could be exposed to hazardous chemicals used or stored by WESTON will be informed of the hazardous chemicals, the labeling system in use, and the location of MSDSs for the hazardous substances. Also, other parties or contractors using or storing hazardous chemicals to which WESTON employees could be exposed will be required to provide similar information and access to their MSDSs.

Subcontractors must have a Hazard Communication Program and implement that program fully at the work site. They must also inform WESTON’s site manager of any hazardous substances used in their work for WESTON, must have appropriate MSDSs on site, and must have containers correctly labeled.

Site Managers and Client Service Managers are responsible for ensuring that clients provide hazard communication information where exposure to hazardous substances subject to the HCS may occur.

4.4 LABELING REQUIREMENTS

All containers of hazardous materials subject to the HCS must be labeled with the chemical name (as cross-referenced with the MSDS listing) and appropriate hazard warnings (to include target organ effects, if known). Labels must be legible and prominently displayed.
The use of standard formats such as the Hazardous Material Identification System (HMIS) or the National Fire Protection Association (NFPA) 704M system may be used for in-plant containers. If used, information relative to the system use and definitions must be displayed in a prominent location. Additionally, affected personnel must receive training in the use of the system and in specifics of the chemicals, such as harmful effects and target organ effects.

Labels must not conflict with Hazardous Materials Transportation Act labeling requirements and must meet requirements of OSHA substance specific health standards if such regulated substances are present. Manufacturer's, importer's, distributor's, or employer's existing labels may be used (and are preferred), if the information is found to be correct and sufficient.

Workplace containers of hazardous chemicals filled from other containers must be labeled, tagged, or marked to indicate the identity of the hazardous chemical, and the appropriate hazard warnings (to include target organ effects). Labels are not required on portable containers filled from a correctly labeled container if only the worker filling the container uses the material from that container and the material is used immediately (before the end of the day). Labels must remain on containers and must remain legible until the contents no longer create a hazard.

Piping systems designed or routinely used by WESTON personnel are not considered to be containers for the purpose of this program. However, piping systems will be labeled to indicate the materials inside them for safety reasons.

4.5 MATERIAL SAFETY DATA SHEETS (MSDS)

To inform workers of the nature of hazardous chemicals that may be encountered on the job (including hazardous constituents or substances that may be inclusive to waste streams), WESTON provides training and safe handling procedures for these chemicals/materials and maintains MSDSs at each site for the hazardous chemicals at that site.

Each MSDS contains important information about a hazardous chemical that workers may encounter, including:

- Product identity.
- Hazardous ingredients.
- Physical and chemical characteristics.
- Fire and explosive hazard data.
- Reactivity data.
- Health hazard data.
- Precautions for safe handling and use.
- Employee protection and control measures.
- Special precautions.
- First aid/medical directions.

The MSDSs must be kept in an accessible place at the site, and site workers should know where they are located at all times. In addition to maintaining MSDSs in a central location at each site, they should be posted near the area in which hazardous chemicals are being handled for quick and easy reference while the work is conducted.

An employee that routinely orders and uses chemicals or hazardous substances is required to request an MSDS from the supplier or manufacturer if one is not supplied with the item. A record of requests for MSDSs must be maintained and may be documented simply by an entry in the site logbook. The MSDSs
will be maintained in the location in the workplace that is designated by the manager, and known and accessible to the employees.

MSDSs must be kept up-to-date. Upon receipt of new MSDS materials, the old form will be replaced with the new information. If review of the form indicates new hazard information (e.g., recent evaluation as a carcinogen) this information must be transmitted to affected personnel.

While the majority of chemicals used by WESTON will not contain trade secret information, the possibility remains that a material may be listed as a trade secret on the MSDS. If a WESTON site receives a MSDS that lists the components as trade secret, the responsible person must immediately make note that emergency information must be acquired directly from the manufacturer in case of an emergency.

4.6 INVENTORY/LISTING

A listing of hazardous substances must be kept in each location, office or site where hazardous materials are stored or used. The list must be kept up to date as chemicals are added, used, or deleted from the inventory.

The list of hazardous chemicals must be attached at the front of the MSDS file. For operations that have a site-specific HASP, the completed chemical hazard page of the HASP, with a reference to the MSDSs on-site and their location, will serve as the hazardous chemical list. The hazardous chemical list must use identities that are referenced on the appropriate MSDSs.

The MSDS list must be maintained in an acceptable manner, for example as part of the HASP that is maintained onsite; in a notebook maintained onsite; or within a computer system with site access. Affected employees must have access to these materials during the course of their work shifts. If computerized data are utilized, all affected personnel must know how to use the computer equipment in order to gain access to the needed information.

Safety plans for field site operations serve the purpose of hazard communication for contaminants present. Copies of the HASP must be available on field sites, must be identified at formal briefings or site safety meetings prior to field activity commencement, and must be available for review by site personnel. Typically, site personnel are required to review the HASP prior to commencing work at the site.

4.7 TRAINING

Information and training will be provided to employees regarding the chemical hazards in their work areas, including by-products and hazardous chemicals introduced by another employer. This training is necessary when those chemicals are known to be present in such a manner that WESTON employees may be exposed under normal conditions of use or in a foreseeable emergency. Attendance at training courses will be recorded and documented.

Initial Hazard Communication training will be conducted as a stand-alone course or in combination with other WESTON training programs such as those conducted under 29 CFR 1910.120 or 29 CFR 1926.21.

Training will be repeated for workers at a site whenever it is evident that personnel are not aware of the requirements of the HCS, or the procedures established to comply with this written program. For field personnel at hazardous waste sites, refresher training is provided as a natural progression of the annual training requirements under 29 CFR 1910.120.
Prior to beginning use of a new hazardous substance that is not commonly used and that may result in serious health impacts upon exposure, the supervisors will review MSDS and label information with employees who will be using the substance. Prior to beginning a new or non-routine task involving use of chemicals, a Safety Plan, Safety Plan Amendment, or Task Risk Assessment will be completed identifying the hazards of the substance, how the task will affect risk of exposure and any changes in protective measures, equipment or procedures.

4.8 LOCATION-SPECIFIC PROGRAMS

Location-specific Hazard Communication Programs will be developed for each WESTON Office or work location where employees have potential exposure (as defined in the standard) to hazardous chemicals. Each location-specific Hazard Communication Program will comply with the requirements of this document. A model for the location-specific Hazard Communication Program is provided on the WESTON EHS Portal.

4.9 PROGRAM AVAILABILITY

Information on the WESTON Hazard Communication Program, the HCS, or requirements for MSDSs and labeling is available from DEHSMs or CEH&S Department. Location-specific program information can be obtained through the respective manager or safety officer. Requests for information can be made during normal work hours. Emergency information may be obtained, as necessary, through the WESTON 24-hour On-Call Network.
5.0 PERSONAL PROTECTIVE EQUIPMENT PROGRAM

The objective of the PPE Program is to protect employees from the risk of injury by creating a barrier against workplace hazards. Personal protective equipment is not a substitute for good engineering or administrative controls or good work practices, but should be used in conjunction with these controls to ensure the safety and health of employees. Personal protective equipment will be provided, used, and maintained when it has been determined that its use is required and that such use will lessen the likelihood of occupational injury and/or illness.

The use of PPE can itself, create significant worker hazards, such as heat stress, physical and psychological stress, impaired vision, reduced mobility, and distorted communication. In general, the higher the level of PPE, the greater these risks. For any given situation, PPE must be selected to provide the appropriate level of protection without creating unnecessary risk to the wearer.

PPE selection shall be based on an evaluation of the performance characteristics of the PPE relative to the characteristics of the site, task-specific conditions, duration of exposure to those conditions and other safety hazards to which the employee is, or may be exposed. PPE requirements are to be discussed with each worker prior to the start of work. Employees will be trained in the proper use, maintenance, and care and cleaning of PPE. Defective and/or damaged PPE shall not be used.

This PPE program addresses eye, face, head, foot, and hearing and hand protection. A separate program addresses respiratory protection. Facility or Site Safety Plans will reference this program and will specify the PPE to be used in the performance of tasks outlined.

5.1 RESPONSIBILITIES

Supervisors, managers, employees, and EHS representatives are responsible for implementing this PPE Program. This section outlines specific responsibilities.

5.1.1 Supervisors and/or Project Management

Supervisors and Project Managers have the primary responsibility for implementation of the PPE Program in their work area. This involves:

- Providing appropriate PPE and making it available to employees.
- Ensuring employees are trained on the proper use, care, and cleaning of PPE.
- Supervising staff to ensure that the PPE Program elements are followed and that employees properly use and care for PPE.
- Seeking assistance from CEH&S or designees to evaluate hazards.
- Notifying CEH&S or designees when new hazards are introduced or when processes are added or changed.
- Ensuring defective or damaged equipment is immediately replaced.

5.1.2 Employees

The PPE user is responsible for following the requirements of the PPE Program. This involves:

- Wearing PPE as required.
- Attending required training sessions.
Caring for, cleaning, and maintaining PPE as required.
Informing the supervisor of the need to repair or replace PPE.

5.1.3 Safety Personnel
Safety personnel include the DEHSMs, OSOs, and FSOs. They are responsible for the technical implementation, and administration of the PPE Program. This involves:

- Assisting in or conducting workplace hazard assessments to determine the presence of hazards that necessitate the use of PPE.
- Conducting periodic workplace reassessments as requested by supervisors and/or as deemed necessary.
- Maintaining records of hazard assessments.
- Providing guidance to the Supervisor or Project Manager for the selection and purchase of approved PPE.
- Periodically reevaluating the suitability of previously selected PPE.

5.1.4 Corporate Environmental Health and Safety
CEH&S and designees are responsible for the development and communication of the PPE Program. This involves:

- Providing training and technical assistance to supervisors concerning the proper use, care, and cleaning of approved PPE.
- Providing technical guidance as necessary for the selection and purchase of approved PPE.
- Reviewing, updating, and evaluating the overall effectiveness of the PPE Program.

5.2 HAZARD ASSESSMENT FOR EQUIPMENT SELECTION
As required by OSHA, WESTON conducts inspections of all workplaces to determine the need for PPE and to select the proper PPE for each task performed. For each work site, a certification must be completed which lists the findings of the inspection and the specific protective equipment needed. The Hazard Assessment Certification Form is provided as Appendix 5-1.

Project Managers or designated Site Supervisors are responsible for ensuring that a survey is conducted for each work area to identify sources of hazards, including impact, penetration, compression, chemicals, heat, dust, electrical sources, material handling, and light radiation. Surveys will typically be documented in the appropriate section of the project HASP.

Selection of the most appropriate level of protection will depend upon:

- Hazards, known or potential.
- Properties such as toxicity, radioactivity, route of exposure and matrix (i.e., air, soil, water) in which the contaminants are known or suspected.
- Type and measured concentrations of contaminants.
- Potential for exposure based upon task.
- Physical hazards.
- Biological hazards.
- Chemical hazards.
- Radiological hazards.

Once the hazards of a workplace have been identified, the Supervisor or Project Manager (in consultation with the appropriate safety professionals) will re-evaluate the suitability of the PPE that was initially selected. New or additional protective equipment will be selected as conditions change to ensure a level of protection that will protect the employees from the hazards. Care will be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards.

### 5.2.1 PPE Selection Process (Hazard Assessment)

Steps to facilitate the selection of PPE and provide an effective hazard assessment include identifying the work area, the activity or task to be performed, and the corresponding PPE requirements. Assessment guidelines include:

- A walk-through survey to identify known or potential hazard categories: Impact, Penetration, Compression (roll-over), Chemical, Biological, Heat/Cold, Harmful dust, Light (Optical Radiation), Ionizing or Non-Ionizing Radiation.
- Sources of Hazards to be aware of include: Motion (i.e., machinery or processes or people), Temperature extremes (i.e., burns, ignition sources, cold or heat exposures), Types of Chemical exposure, Sources of Harmful Dusts, Sources of Radiation (i.e., welding, cutting, high intensity lights, non-ionizing, ionizing radiation), Sources of Falling objects or the potential for falls or for dropping objects, Sources of sharp objects, Sources of Rolling or Pinching Objects, Workplace layout, electrical hazards.
- Determine type of exposure for the work areas and specific work activities.
- Determine level of respiratory protection for the work areas and specific work activities (see Respiratory Protection Program, Section 6.0).
- Determine level of protective clothing for the work areas and specific activities.
- Evaluate the chemical-resistant characteristics needed for the potential exposures and select clothing with the appropriate protection factor.
- Evaluate potential physical hazards associated with the work areas and specific work activities (e.g., walking/working surfaces, electrical installations/lines, and noise exposure) and select PPE to mitigate identified hazards.
- Consider climatic conditions and select PPE to accommodate the conditions (e.g., cooling units, insulated clothing/footwear).
- Evaluate potential biological hazards (e.g., snakes, insects) and select PPE to mitigate identified hazards.
- Evaluate type and level of work (e.g., heavy, moderate, light) and select PPE for the work.
- Evaluate PPE for both chemical and radiological hazards when mixed waste is involved.

### 5.2.2 Hazardous Waste Operations and Emergency Response

Based on the results of the hazard assessment, PPE selection follows criteria established by EPA as Levels of Protection (LOP). These specific levels and the necessary components for each level have been
divided into four categories according to the degree of protection afforded. These LOPs and general guidelines for use are:

- Level A: Worn when the highest level of respiratory, skin, and eye protection is needed.
- Level B: Worn when the highest level of respiratory protection is needed, however contaminants do not create undue risk for skin exposure.
- Level C: Worn when the criteria for using air-purifying respirators are met. Skin protection is essentially the same as Level B.
- Level D: Refers to a general work uniform. No exposure to airborne or contact contaminants requiring the use of respiratory or advanced skin protection.
- Modified Level D: Worn on sites where minimal exposure to contaminants has been determined, levels of which do not create a respiratory hazard, but may create a minimal skin contact concern.

Table 5-1 provides detailed information relative to EPA LOP.

Table 5-1. Levels of Personal Protective Equipment (PPE)

<table>
<thead>
<tr>
<th>Type of Protection</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LEVEL A PPE</strong></td>
<td></td>
</tr>
<tr>
<td>Respiratory Protection</td>
<td>Level A respiratory protection is positive-pressure, full face-piece, self-contained breathing apparatus (SCBA), or full face-piece positive-pressure supplied air respirator (with escape bottle for immediately dangerous to life or health [IDLH] or potential IDLH atmosphere).</td>
</tr>
<tr>
<td>Protective Clothing</td>
<td>This protective clothing level is used when the potential exists for splash or immersion by chemicals or radiologically contaminated liquids or for exposure to vapors, fumes, gases, or particulates that are harmful to the skin or capable of being absorbed through the skin. This class of protection is acceptable for radiological work activities categorized as &quot;high&quot; involving pressurized or large volume liquids or the potential for a closed system breach. Level A protective clothing includes:</td>
</tr>
<tr>
<td></td>
<td>- A totally encapsulating, non-permeable, chemical-resistant suit.</td>
</tr>
<tr>
<td></td>
<td>- Coveralls inner suit.</td>
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<tr>
<td></td>
<td>- Clothing under coveralls (e.g., shorts and T-shirt/long underwear).</td>
</tr>
<tr>
<td></td>
<td>- Disposable gloves and boot covers (worn over fully encapsulating suit).</td>
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<tr>
<td></td>
<td>- Boots, chemical-resistant, ANSI-approved protective toe and shank (depending on suit construction, worn over or under suit boot).</td>
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<tr>
<td></td>
<td>- Hard hat (under suit), as needed.</td>
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<tr>
<td></td>
<td>- Hearing protection (as needed).</td>
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<tr>
<td></td>
<td>- Positive-pressure SCBA or positive-pressure air-line respirators equipped with an escape air supply are used when chemical exposure levels will create a substantial possibility of immediate death, immediate serious illness or injury, or will impair the ability to escape.</td>
</tr>
</tbody>
</table>

Totally encapsulating chemical protective suits are used in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate death, immediate serious illness or injury, or will impair the ability to escape.

The level of protection provided by the selected PPE shall be increased when additional information on site conditions indicates that increased protection is necessary to reduce worker exposure to below PELs and published exposure levels for hazardous substances and health hazards.

The level of worker protection provided may be decreased when additional information and/or site conditions demonstrate that decreased protection will not result in hazardous exposures to workers.
<table>
<thead>
<tr>
<th>Type of Protection</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totally Encapsulating Suits</td>
<td>Prior to the selection of a totally encapsulating suit, the following considerations are necessary:</td>
</tr>
<tr>
<td></td>
<td>• Reevaluating the technical approach to the task in favor of engineering controls rather than PPE.</td>
</tr>
<tr>
<td></td>
<td>• Assuring that totally encapsulating suits that are tested and capable of maintaining positive air pressure.</td>
</tr>
<tr>
<td></td>
<td>• Assuring that totally encapsulating suits that are tested and capable of preventing inward test gas leakage of no more than 0.5 percent (or within the most recent guidelines established by OSHA, NIOSH or NFPA).</td>
</tr>
<tr>
<td>Other Protective Apparatus</td>
<td>Other protective apparatus that must be considered include:</td>
</tr>
<tr>
<td></td>
<td>• A cooling unit/system.</td>
</tr>
<tr>
<td></td>
<td>• Two-way radio communications.</td>
</tr>
<tr>
<td></td>
<td>• Cold weather gear/clothing.</td>
</tr>
<tr>
<td></td>
<td>• Protection from biological hazards/pests.</td>
</tr>
<tr>
<td></td>
<td>• Flash Protective Garments (e.g., Nomex or equivalent) as necessary.</td>
</tr>
<tr>
<td></td>
<td>• Ballistic/EOD Gear.</td>
</tr>
<tr>
<td></td>
<td>• Chemical, Biological, Radiological, Nuclear (CBRN) Protection</td>
</tr>
</tbody>
</table>

**LEVEL B PPE**

<table>
<thead>
<tr>
<th>Respiratory Protection</th>
<th>Level B respiratory protection is positive-pressure, full face-piece SCBA, or a positive-pressure supplied air respirator (with escape bottle for IDLH or potential IDLH atmosphere).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective Clothing</td>
<td>Level B protective clothing provides a high level of skin protection. It is used when the potential exists for contact with chemicals and/or radiologically contaminated liquids that could saturate/penetrate cloth coveralls. Level B protective clothing includes:</td>
</tr>
<tr>
<td></td>
<td>• A hooded one-piece non-permeable, chemical resistant outer suit.</td>
</tr>
<tr>
<td></td>
<td>• Coveralls inner suit(s).</td>
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<tr>
<td></td>
<td>• Clothing under coveralls (e.g., cotton shorts and T-shirt/long underwear).</td>
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<tr>
<td></td>
<td>• Outer chemical-resistant work gloves (rated for contaminants) taped or secured to outer suit.</td>
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<tr>
<td></td>
<td>• Inner gloves of light-weight surgical-type latex rubber or nitrile rubber (cotton liners optional).</td>
</tr>
<tr>
<td></td>
<td>• Chemical-resistant ANSI-approved boots.</td>
</tr>
<tr>
<td></td>
<td>• Disposable outer boot covers (booties) taped to outer suit.</td>
</tr>
<tr>
<td></td>
<td>• Hard hat (as needed).</td>
</tr>
<tr>
<td></td>
<td>• Hearing protection (as needed)</td>
</tr>
<tr>
<td>Other Protective Apparatus</td>
<td>Other protective apparatus that must be considered include:</td>
</tr>
<tr>
<td></td>
<td>• A cooling unit/system.</td>
</tr>
<tr>
<td></td>
<td>• Two-way radio communications.</td>
</tr>
<tr>
<td></td>
<td>• Cold weather gear/clothing.</td>
</tr>
<tr>
<td></td>
<td>• Protection from biological hazards/pests.</td>
</tr>
<tr>
<td></td>
<td>• Flash Protective Garments (e.g., Nomex or equivalent) as necessary.</td>
</tr>
<tr>
<td></td>
<td>• Ballistic/EOD Gear.</td>
</tr>
<tr>
<td></td>
<td>• CBRN protection</td>
</tr>
<tr>
<td>Type of Protection</td>
<td>Requirement</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>LEVEL C PPE</strong></td>
<td></td>
</tr>
<tr>
<td>Respiratory Protection</td>
<td>Level C respiratory protection includes a NIOSH-approved air-purifying respirator, full-face or half-mask cartridge or canister-equipped.</td>
</tr>
</tbody>
</table>
| Protective Clothing | Level C protective clothing provides a high level of skin protection. It is used when the potential exists for contact with chemicals and/or radiologically contaminated liquids that could saturate/penetrate cloth coveralls. Level C protective clothing includes:  
  - Chemical Resistant outer suit.  
  - Coveralls.  
  - Absorbent undergarments (e.g., cotton shorts and T-shirt/long underwear).  
  - Chemical-resistant outer gloves rated for contaminant.  
  - Inner gloves of light-weight nitrile or latex rubber.  
  - Safety glasses or safety goggles (not required with full-face respirator).  
  - Face shield if splash hazard exists (as necessary with full-face respirator).  
  - ANSI-approved safety boots (chemical resistant as necessary).  
  - Outer disposable booties.  
  - Hard hat (as needed).  
  - Hearing protection (as needed) |
| Other Protective Apparatus | Other protective apparatus that must be considered include:  
  - A cooling unit/system.  
  - Two-way radio communications.  
  - Cold weather gear/clothing.  
  - Protection from biological hazards/pests.  
  - Flash Protective Garments (e.g., Nomex or equivalent) as necessary.  
  - Ballistic/EOD Gear  
  - CBRN protection |
| **LEVEL D PPE**    |             |
| Respiratory Protection | No respiratory protection is required. |
| Protective Clothing | Level D protective clothing provides a low level of skin protection. It is used when there is no potential for contact with hazardous levels of chemicals or radiological contamination. Level can, under certain conditions, be worn in the Exclusion Zone or the Contamination Reduction Zone. Level D protective clothing includes:  
  - Coveralls or appropriate work uniform (e.g., long pants, and shirts with sleeves).  
  - Clothing under coveralls.  
  - Work gloves where appropriate.  
  - PVC or latex rubber surgical/light-weight gloves when sampling or handling any potentially contaminated surface or item.  
  - Safety glasses or safety goggles.  
  - ANSI-approved safety boots.  
  - Hard hat (as needed) |
| Other Protective Apparatus | Other protective apparatus that must be considered for both Level D and Modified Level D include:  
  - A cooling unit/system.  
  - Two-way radio communications.  
  - Cold weather gear/clothing.  
  - Protection from biological hazards/pests.  
  - Flash Protective Garments (e.g., Nomex or equivalent) as necessary.  
  - Ballistic/EOD Gear |
<table>
<thead>
<tr>
<th>Type of Protection</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MODIFIED LEVEL D PPE</strong></td>
<td></td>
</tr>
<tr>
<td>Protective Clothing</td>
<td>Modified Level D provides protection in the form of Level D and includes:</td>
</tr>
<tr>
<td></td>
<td>• Chemical-resistant outer clothing and/or.</td>
</tr>
<tr>
<td></td>
<td>• Chemical resistant outer gloves (as necessary).</td>
</tr>
<tr>
<td></td>
<td>• Inner surgical-type latex or nitrile gloves (as necessary).</td>
</tr>
<tr>
<td></td>
<td>• Outer disposable boot covers (as necessary).</td>
</tr>
<tr>
<td></td>
<td>• Flash Protective Garments (e.g., Nomex or equivalent) as necessary.</td>
</tr>
<tr>
<td>Other Protective Apparatus</td>
<td>Other protective apparatus that must be considered for both Level D and Modified Level D include:</td>
</tr>
<tr>
<td></td>
<td>• A cooling unit/system.</td>
</tr>
<tr>
<td></td>
<td>• Two-way radio communications.</td>
</tr>
<tr>
<td></td>
<td>• Cold weather gear/clothing.</td>
</tr>
<tr>
<td></td>
<td>• Protection from biological hazards/pests.</td>
</tr>
<tr>
<td></td>
<td>• Flash Protective Garments (e.g., Nomex or equivalent) as necessary.</td>
</tr>
<tr>
<td></td>
<td>• Ballistic/EOD Gear</td>
</tr>
<tr>
<td></td>
<td>• CBRN</td>
</tr>
</tbody>
</table>

### 5.3 PROTECTIVE EQUIPMENT REQUIREMENTS

Working in protective clothing can increase the potential for heat or cold-induced illness. Refer to procedures for “Heat Stress Prevention and Monitoring” (FLD 05) and/or “Cold Stress” (FLD 06).

All personal protective clothing and equipment will be of safe design and construction for the work to be performed and shall be maintained in a sanitary and reliable condition. Only those items of protective clothing and equipment that meet National Institute for Occupational Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards will be procured or accepted for use. Newly purchased PPE must conform to the following ANSI standards (or those that supersede them) that have been incorporated into the OSHA PPE regulations:

- Eye and Face Protection: ANSI Z87.1.
- Head Protection: ANSI Z89.1.
- Foot Protection: ANSI Z41.1.
- Hand Protection: There are no ANSI standards for gloves at this time; however, selection must be based on the performance characteristics of the glove in relation to the tasks to be performed.

Careful consideration will be given to comfort and fit of PPE in order to ensure that it will be used. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

Employees needing this PPE should notify their supervisor for approval. Concerns or conflicts regarding the purchase and reimbursement of individual PPE should be brought to the attention of CEH&S.

Assistance in selecting PPE is available through various sources, including: Vendor glove or clothing selection guides, safety officers, and previous safety plan data. Additional information can be found on the NIOSH web site as Recommendations for Chemical Protective Clothing.
5.3.1 **Eye and Face Protection**

Prevention of eye injuries requires that all persons who may be in eye hazard areas wear protective eyewear. This includes employees, visitors, contractors, or others passing through an identified eye hazard area. To provide protection for these personnel, Site Management or Supervisors of such areas shall procure a sufficient quantity of goggles and/or plastic eye protectors that afford the maximum amount of protection possible. If these personnel wear prescription glasses, they shall be provided with a suitable eye protector to wear over them.

Suitable protectors shall be used when employees are exposed to hazards from flying particles, molten metal, acids or caustic liquids, chemical liquids, gases, or vapors, bioaerosols, or potentially injurious light radiation. Side protectors shall be used with standard safety glasses when there is a hazard from flying objects.

Equipment fitted with appropriate filter lenses shall be used to protect against light radiation (e.g., welding or cutting operations). See 29 CFR 1910.133(a)(5) for filter lens information. Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

**Safety Glasses**

Protective eyeglasses are made with safety frames, tempered glass or plastic lenses, temples, and side shields which provide eye protection from moderate impact and particles encountered in job tasks such as carpentry, woodworking, grinding, scaling, etc. Safety glasses are also available in prescription form for those persons who need corrective lenses.

**Prescription Safety Eyewear**

For employees who wear prescription lenses, eye protectors shall either incorporate the prescription in the design or fit properly over the prescription lenses (goggles, faceshields, over-the-glass [OTG] safety glasses, etc.). The proper position of the prescription lenses or the protective lenses must not be disturbed by the protective device. Personnel requiring prescription safety glasses must contact their Supervisor to have their request for prescription safety glasses processed.

Non-prescription safety glasses and appropriate frames for respirator inserts will be procured by WESTON through an outside supplier, at no cost to the employee. Employees needing prescription glasses or inserts may purchase appropriate glasses or inserts and be reimbursed after approval of their supervisor. For prescription glasses and respirator inserts, the employee will be responsible for providing a copy of his/her prescription that is less than 2 years old, and for any examination fee necessary to obtain such prescription. Requests for safety glasses (prescription) should be directed to the employee’s supervisor for review and approval. WESTON will not normally provide or pay for the cost of contact lenses.

Costs for prescription safety glasses and respirator inserts will be borne by the employee’s Operating Unit. Safety glasses damaged on the job will be replaced by WESTON. Prescription safety glasses or respirator inserts will be replaced by WESTON as needed, usually at intervals of at least 2 years. Requests for replacement at less than 2 year intervals will be considered if the employee’s prescription changes.

**Single Lens Goggles**

Vinyl framed goggles of soft pliable body design provide adequate eye protection from many hazards. These goggles are available with clear or tinted lenses, perforated, port vented, or non-vented frames.
Single lens goggles provide similar protection to spectacles and may be worn in combination with spectacles or corrective lenses to ensure protection along with proper vision.

**Welders/Chippers Goggles**

These goggles are available in rigid and soft frames to accommodate single or two eyepiece lenses.

Welder’s goggles provide protection from sparking, scaling, or splashing metals and harmful light rays. Lenses are impact resistant and are available in graduated shades of filtration.

Chippers/Grinders goggles provide eye protection from flying particles. The dual protective eye cups house impact resistant clear lenses with individual cover plates.

**Face Shields**

These normally consist of an adjustable headgear and face shield of tinted/transparent acetate or polycarbonate materials, or wire screen. Face shields are available in various sizes, tensile strength, impact/heat resistance and light ray filtering capacity.

Face shields shall be used when there is a hazard from chemical splash to protect both the eyes and the face. Face shields shall be used in operations when the entire face needs protection and should be worn to protect eyes and face against flying particles, metal sparks, and chemical/biological splash. Face shields shall only be worn over primary eye protection (e.g., safety glasses or goggles). Protectors shall be distinctly marked to identify the manufacturer.

**Welding Shields**

These shield assemblies consist of vulcanized fiber or glass fiber body, a ratchet/button type adjustable headgear or cap attachment and a filter and cover plate holder. These shields may also be incorporated as an attachment to respirator face pieces if appropriate. These shields will be provided to protect workers eyes and face from infrared or radiant light burns, flying sparks, metal spatter and slag chips encountered during welding, brazing, soldering, resistance welding, bare or shielded electric arc welding, and oxyacetylene welding and cutting operations.

**Emergency Eyewash Facilities**

Emergency eyewash facilities meeting the requirements of ANSI Z358.1 will be provided in all areas where the eyes of any employee may be exposed to corrosive materials. All such emergency facilities will be located where they are easily accessible in an emergency.

**5.3.2 Head Protection**

Head injuries are caused by falling or flying objects, or by bumping the head against a fixed object. Head protection must comply with ANSI Standard Z89.1. Head protection will be furnished to, and used by, all employees and contractors engaged in construction and other miscellaneous work (as defined in the HASP). Head protection is also required to be worn by inspectors and visitors at construction sites when hazards from falling or fixed overhead objects or electrical shock are present. Head protectors, in the form of protective hats, must resist penetration and absorb the shock of a blow. The shell of the protective hat is hard enough to resist the blow and the headband and crown straps keep the shell away from the wearer’s skull. Protective hats can also protect against electrical shock. Bump caps/skull guards will not be worn as substitutes for safety caps or hats because they do not afford protection from high impact forces or penetration by falling objects.

Inspection, maintenance, and replacement of hard hats will follow the requirements of the manufacturer.
5.3.3 Foot Protection

Safety toed shoes shall be worn on all field operations, construction sites, hazardous waste or emergency response operations, in warehouses, maintenance areas, and other areas as determined by documented procedures (e.g., Workplace Hazard Assessment) and the HASP. All safety footwear shall comply with the most current version of ANSI Z41, American National Standard for Personal Protection – Protective Footwear.

Safety shoes or boots with impact protection are required to be worn in work areas where carrying or handling materials such as packages, objects, parts or heavy tools that could be dropped, and for other activities where objects might fall or roll onto the feet. In the most basic form, a safety shoe or boot consists of a leather or synthetic upper strongly bonded to the sole with the toes protected by a cap meeting ANSI compression standards.

In the simplest form of safety shoe the entire toe box is protected with reinforced steel, aluminum or composite material. Safety shoes or boots with compression protection are required for work activities involving skid trucks (manual materials handling cars) or other activities in which materials or equipment could potentially roll over an employees feet.

Work activities must be evaluated to determine whether additional protection is needed.

**Metatarsal Protection**

Where more of the toe area of the foot may be affected, metatarsal guards which extend from the toe cap up the front of the foot may be required.

**Inclement Weather Protection**

Conditions must be evaluated to determine whether safety shoes must provide protection in temperature extremes.

**Puncture Protection**

The need to provide safety shoes or boots with puncture protection must be evaluated where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees potentially causing a foot injury. There are several strengths of puncture protection which need to be taken into account in evaluations. Puncture protection may slip in or be built in. Slip-in protectors can move and may not be as protective as built-in puncture protectors unless careful attention is placed on proper sizing.

**Chemical Protection**

Leather and synthetic leather materials may not provide sufficient protection from contact with chemical hazards. Selection of chemical protective materials must be made by persons experienced in evaluation and selection. Chemical protection may be provided in models of boot or shoes that slip over traditional safety shoes or in models which have built-in toe cap and puncture protection.

Protective footwear must be selected based on hazard and risk evaluation.

**Electrical Hazard Protection**

Where there is risk of developing static electricity or in working in electric fields, protective footwear must be selected to be anti-static, nonconductive, or insulated based on hazard evaluation. PPE for protection from electricity must meet OSHA 29 CFR 1910.137 standards or the most current and appropriate consensus standard.
**UXO, MEC, and Geophysical Survey**

Unexploded ordnance (UXO), munitions and explosives of concern (MEC), and geophysical survey personnel will not use footwear containing metal toe-caps.

**General**

One pair of appropriate safety shoes or boots (ankle protection, leather or equivalent, ANSI-approved, safety toe-cap) will be provided for each employee who is required to work in the field, for each maintenance employee, or as required based upon appropriate task hazard assessment. Requests must be approved by the employee’s supervisor or organization unit (OU) manager. Safety shoes or boots will be replaced as necessary (typically at intervals of 2 years), and as approved by the OU manager. Costs for safety shoes or boots will be borne by the employee’s OU.

There are many types and styles of protective footwear and it is important to realize that a particular job may require additional protection other than listed here. Footwear that meets established safety standards will have an ANSI label inside each shoe. As described above, additional protection will be provided based on hazard evaluations.

**5.3.4 Hand Protection**

Suitable gloves shall be worn when hazards from chemicals, cuts, lacerations, abrasions, punctures, burns, biological agents, and harmful temperature extremes are present. Glove selection shall be based on performance characteristics of the gloves, conditions, duration of use, and hazards present. One type of glove may not work in all situations.

The first consideration in the selection of gloves for use against chemicals is to determine the nature of the substances to be encountered. Employees will read instructions and warnings on chemical container labels, MSDSs, and HASPs before working with any chemical. Recommended glove types may be listed in the MSDS section for PPE. MSDSs are often not specific on chemical protective glove materials. In the absence of specific information from manufacturers of the materials to be handled or glove manufacturers, WESTON employees seek technical assistance from DEHSMs or CEH&S.

Chemicals may eventually permeate glove materials. Gloves should be replaced periodically, depending on frequency of use, degree of chemical contact, and permeability to the substance(s) handled. However, gloves can be worn safely for limited time periods if specific use (e.g., limited contact with contaminants) and other characteristics (e.g., thickness and permeation rate and time) are known. Safety professionals can assist in determining the specific type of glove material that should be worn for a particular chemical.

Skin contact is a potential source of exposure to toxic materials and for this reason it is important that the proper steps be taken to prevent such contact. Most accidents involving hands and arms can be classified under four main hazard categories: chemicals, abrasions, cutting, and heat. Gloves are available that can protect workers from any of these individual hazards or any combination thereof.

Gloves should also be worn whenever it is necessary to handle rough or sharp-edged objects, and very hot or very cold materials. The type of glove materials to be used in these situations includes leather, welder’s gloves, aluminum-backed gloves, and other types of insulated glove materials.

Careful attention must be given to protecting your hands when working with tools and machinery. Power tools and machinery must have guards installed or incorporated into their design that prevent the hands from contacting the point of operation, power train, or other moving parts. To protect hands from injury due to contact with moving parts, it is important to:
- Ensure that guards are always in place and used.
- Always lockout machines or tools and disconnect the power before making repairs.
- Treat a machine without a guard as inoperative.
- Do not wear gloves around moving machinery, such as drill presses, mills, lathes, and grinders.

The following is a guide to the most common types of protective work gloves and the types of hazards they can guard against:

- Disposable Gloves: usually made of latex or nitrile, can help guard against mild irritants.
- Fabric Gloves: Made of cotton or fabric blends are generally used to improve grip when handling slippery objects. They also help insulate hands from mild heat or cold.
- Leather Gloves: These gloves are used to guard against injuries from sparks or scraping against rough surfaces. They are also used in combination with an insulated liner when working with electricity.
- Metal Mesh Gloves: These gloves are used to protect hands from accidental cuts and scratches. They are used most commonly by persons working with cutting tools or other sharp instruments.
- Cut/Puncture Resistant Gloves: These gloves are made of Kevlar and other materials and are designed to reduce risk of cuts and punctures from sharp objects.
- Aluminized Gloves: Gloves made of aluminized fabric are designed to insulate hands from intense heat. These gloves are most commonly used by persons working with molten materials.
  - Insulated Gloves: Gloves designed for cold weather protection. Also gloves of other materials than aluminum to shield from heat and hot surfaces.
  - Electrical Protective Gloves: Gloves made and tested to insulate from electrical current. Use requires qualified electrician oversight (those who have been trained in use of this PPE).
  - Chemical Resistance Gloves: These gloves may be made of rubber, neoprene, polyvinyl alcohol, or vinyl, etc. These gloves protect hands from corrosives, oils, and solvents. When selecting chemical resistance gloves, be sure to consult the manufacturer’s recommendations and the HASP, especially if the gloved hand will be immersed in the chemical.

Gloves which become contaminated should be carefully removed and disposed after use in accordance with established decontamination procedures and HASP requirements.

### 5.3.5 Other Protection

Employees shall wear clothing suitable for the weather and work conditions encountered. The minimum for fieldwork will be short-sleeved shirts, long pants, and leather or other protective work shoes or boots.

Permission to use PPE other than that identified above (i.e., swim or dive clothing) will be approved through the HASP. Protective clothing will be fire/heat-resistant material as necessary based upon the hazards evaluated.

Persons involved in activities which subject their hands to injury (e.g., cuts, abrasions, punctures, burns, chemical irritants, toxins, vibration, and force which restrict blood flow) will use hand protection appropriate for the hazard.

Persons exposed to vehicular or equipment traffic will wear reflective or high visibility vests or apparel.
**Personal Flotation Devices (PFDs)**
Direction on selection and use of PFDs can be found in FLD 18, “Operation and Use of Boats” and FLD 19, “Working Over or Near Water.”

**Personal Fall Arrest Systems (PFASs)**
Direction on selection and use of PFASs can be found in FLD 25, “Working at Elevation/Fall Protection.”

All other safety equipment required for an assignment (e.g., hard hats, gloves, protective clothing, chemical-resistant overboots, respirators, rain gear) will be provided by WESTON. Use of specialized equipment will be charged to projects or OUs in accordance with established policy and rental/purchase rates.

### 5.4 CLEANING AND MAINTENANCE

All PPE will be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision. PPE will be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection. PPE shall not be shared between employees unless it has been properly cleaned and sanitized between uses. PPE will be distributed for individual use whenever possible.

It is important to ensure that contaminated PPE that cannot be decontaminated is disposed of in a manner that protects employees and the environment from exposure to hazards.

### 5.5 TRAINING

Any worker required to wear PPE shall receive training in the proper use and care of PPE. Periodic retraining shall be offered by CEH&S or designees to both the employees and the supervisors, as needed. The training shall include, but not necessarily be limited to, the following subjects:

- When PPE is necessary to be worn.
- What PPE is necessary.
- How to properly don, doff, adjust, and wear PPE.
- The limitations of the PPE.
- The proper care, maintenance, useful life, and disposal of the PPE.

Typical delivery of training is through formal programs such as, HAZWOPER training, refresher training, or specific hazard training. Additional training is offered through routine site training and site-specific training. After the training, the employees shall demonstrate that they understand the components of the PPE Program and how to use PPE properly, or they shall be retrained.

### 5.6 RECORDKEEPING

Written records shall be kept that identifies the people trained, the type of training provided, and the dates when training occurred. CEH&S and Safety Officers maintain records of employee training. Project files will contain the documented AHAs or HASPs.

### 5.7 REFERENCES


ANSI, American National Standard ANSI Z87.1, Practice for Occupational and Educational Eye and Face Protection.
ANSI, American National Standard ANSI Z89.1, Safety Requirements for Industrial Head Protection.


# APPENDIX 5-1
## HAZARD ASSESSMENT CERTIFICATION FORM

<table>
<thead>
<tr>
<th>Date:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

**Assessment Conducted By:**

**Specific Tasks Performed at this Location:**

### I. Overhead Hazards Identified (Check all that apply):
- [ ] Suspended loads that could fall
- [ ] Overhead beams or loads that could be hit against
- [ ] Energized wires or equipment that could be near enough to arc or hit against
- [ ] Employees work at elevated site who could drop objects on others below
- [ ] Sharp objects or corners at head level
- [ ] Other (Describe/List): __________________________

**Head Protection**
- Hard Hat: [ ] Yes  [ ] No

### II. Eye and Face Hazards Identified (Check all that apply):
- [ ] Chemical splashes
- [ ] Dust
- [ ] Smoke and fumes
- [ ] Welding operations
- [ ] Lasers/optical radiation
- [ ] Projectiles
- [ ] Other (Describe/List): __________________________

**Eye Protection**
- Safety glasses: [ ] Yes  [ ] No
- Goggles: [ ] Yes  [ ] No
- Face Shield: [ ] Yes  [ ] No
- Tinted Lens: [ ] Yes  [ ] No
  (If yes, Degree of Filtering: ______)

### III. Hand Hazards Identified (Check all that apply):
- [ ] Chemicals
- [ ] Sharp edges, splinters, etc.
- [ ] Temperature extremes
- [ ] Biological agents
- [ ] Exposed electrical wires
- [ ] Sharp tools, machine parts, etc.
- [ ] Other (Describe/List): __________________________

**Hand Protection**
- Gloves: [ ] Yes  [ ] No
  - Chemical resistant
  - Temperature resistant
  - Abrasion resistant
  - Electrical protective
  - Other (Describe/List) ________

---

*Fill in the blanks as necessary.*
IV. Foot Hazards Identified (Check all that apply):

- Heavy materials handled by employees
- Sharp edges or points (puncture risk)
- Exposed electrical wires
- Unusually slippery conditions
- Wet conditions
- Construction/demolition
- Other (Describe/List) ____________________________

Foot Protection

Safety Shoes:  □ Yes  □ No
Types:  □ Toe protection
        □ Metatarsal protection
        □ Puncture resistant
        □ Electrical insulation
        □ Non-static
        □ Other (Describe/List) ________

V. Hazards to Body Identified (Check all that apply):

- Chemical contact
- Fire or flash
- Temperature extremes
- UXO
- Radiation (Ionizing)
- Radiation (Non-Ionizing)
- Other (Describe/List) ____________________________

Body Protection

- Chemical-resistant coveralls
- Thermal protection
- Welding “Leathers”
- Ballistic shields for UXO operations
- Flash protection (e.g., Nomex or equivalent)
- Ballistic or cut-resistant chaps

VI. Noise Hazards Identified:

- Noise Source(s): ______________________________

Noise Protection (List): __________________________

VII. Other Identified Safety and/or Health Hazards (list):

- ______________________________

Recommended Protection (List): __________________

I certify that the above inspection was performed to the best of my knowledge and ability, based on the hazards present on (date) _______________________.

__________________
Signature
6.0 RESPIRATORY PROTECTION PROGRAM

Specific types of respirators and appropriate filtering media or air supplies will be assigned to each task within a project or program. Action levels or procedures will be established for each task requiring the use of a respirator. The action level or operating practice will establish when respirators are required and under what circumstances changes in respiratory protection may be made. A qualified person (program administrator) will be assigned to each program, project, or site and will be responsible for implementing the Respiratory Protection Program, including monitoring or sampling, determining when respiratory protection use is appropriate, what type of respirator is required, and when changes are needed.

This Respiratory Protection Program complies with the OSHA standard 29 CFR 1910.134 (Respiratory Protection) and ANSI Standard Z88.2.

6.1 POLICY AND APPLICABILITY

It is WESTON’s policy to provide employees with a safe and healthful working environment. This is accomplished by utilizing facilities and equipment that have all feasible safeguards incorporated into their design. When effective administrative or engineering controls are not feasible, or when they are being initiated, equipment shall be used to ensure personnel protection.

The requirements of this program apply as minimum standards to WESTON employees, contractors, subcontractors, and visitors to WESTON work areas. Non-WESTON personnel who provide their own respiratory protection programs and respiratory protective equipment must ensure that their programs meet or exceed the requirements of this program.

6.2 RESPONSIBILITIES

6.2.1 Corporate Environmental, Health, and Safety Department

The CEH&S is responsible for developing and maintaining a written respiratory protection program to protect WESTON personnel. This Respiratory Protection Program is designed and organized to ensure respirators are properly selected, used, and maintained by WESTON personnel, and to meet federal regulatory standards (29 CFR 1910.134) or industry accepted standards (e.g., ANSI). The CEH&S is responsible for assisting project management in interpreting the requirements of the program. In addition, CEH&S will develop and maintain training courses that meet the program requirements, and maintain records of the participants in WESTON internal training courses.

6.2.2 Occupational Medical Provider

WESTON’s Occupational Medical Provider (OMP) is charged with establishing medical evaluation and surveillance procedures and reviewing the health status of all personnel who may be required to wear respiratory protective equipment in the completion of their assigned tasks as required by OSHA in 29 CFR 1910.134. WESTON’s Occupational Medical Monitoring Program is available on-line on the EHS Portal site. The OMP is also responsible for maintaining records of the medical evaluations conducted for this program.

6.2.3 Division Managers, Project Managers, and Supervisors

DMs are responsible for implementing the respiratory protection programs as described in this document. Project Managers (and Site Managers who are responsible for project activities when the Project Manager is not present) are responsible for the health and safety of the employees under their direction. This responsibility includes designating a respiratory program administrator, ensuring the availability of
appropriate respirators and accessories, providing adequate storage facilities, and requiring that employees on their project sites follow the respiratory protection program procedures. Project Managers must be aware of tasks requiring the use of respiratory protection, and ensure all employees engaged in such work use the appropriate respirators at all times. Project Managers are responsible for maintaining records of the site hazard evaluations and ensuring that a copy of this written program is available at the project site.

Supervisors (Section Managers and Department Managers) will ensure each employee under his or her supervision using a respirator has received appropriate training in its use, a current medical evaluation that certifies the employee to wear a respirator, and a fit-test prior to use.

6.2.4 Safety Staff

Safety staff (e.g., DEHSMs, FSOs) is responsible for providing technical assistance to the managers regarding implementation of this program. They may train program administrators for project sites, evaluate work activities for which respiratory protection is thought to be necessary, specify respiratory protection devices to be used for specific tasks, and evaluate implementation of the program at work sites.

6.2.5 Respirator Wearers

It is the responsibility of each respirator wearer to use his/her respirator when and where required and in the manner in which they were trained. Respirator wearers must retain records of their fit-tests, training attendance, and medical certifications. They must immediately report any personal characteristics or conditions that may impact their ability to effectively use a respirator and any malfunctions of the respirator to their supervisors, Site Managers, or Project Managers. The respirator wearer must also guard against mechanical damage to the respirator, clean the respirator as prescribed in 29 CFR 1910.134, and store the respirator in a clean, sanitary location.

Voluntary use of filtering facepiece respirators (NIOSH-approved dust masks) is allowed at an employee’s request provided such use does not compromise employee safety. Use of such a filtering facepiece is not covered by this program and does not require compliance with these requirements. OSHA 29 CFR 1910.134, provides additional information on voluntary use of respirators.

6.3 MEDICAL EVALUATION

WESTON’s OMP serves as the Occupational Health Physician/Occupational Health Provider for this respiratory protection program. Initially, and periodically thereafter, the OMP evaluates the overall health of the individual and the results of special medical tests (pulmonary function studies, EKG, etc.) to determine whether or not the employee can wear the required respirator without physical or psychological risk. The employee is certified to wear respiratory protective equipment if no medical restriction is applied. The employee, the employee’s supervisor, the Safety Officer and CEH&S are formally notified if certification is not granted.

Specific medical tests and procedures will be determined by the Occupational Health Physician and will be in accordance with OSHA medical surveillance requirements. The medical examination or questionnaire (as required by OSHA 29 CFR 1910.134) must be completed, and medical certification granted, prior to an employee being fit-tested or required to use a respirator in the work place.
6.4 SELECTION AND USE OF RESPIRATORY PROTECTIVE DEVICES

6.4.1 Respirator Authorization and Use

Respiratory protection is authorized and issued for the following personnel:

- Workers in areas known to have contaminant levels requiring the use of respiratory protection or in which contaminant levels requiring the use of respiratory protection may be created without warning (e.g., emergency purposes such as hazardous material spill responses).
- Workers performing operations in atmospheres documented to be hazardous and those unavoidably positioned where elevated levels of contaminants are generated.
- Workers performing operations unavoidably located in atmosphere suspected of being hazardous, but for which adequate sampling data have not been obtained.

The use of respiratory protection is contingent upon the following conditions and criteria being met:

- Medical clearance.
- Proof of training.
- Fit-Testing.
- Respirators must be used in according to the manufacturer’s instructions, regulatory requirements, selection criteria and HASP provisions.
- A respirator may not be used if any item of clothing, other PPE, hair or facial hair may interfere with the function or fit of the respirator.
- A respirator may not be used unless appropriate air sampling, monitoring, or documented basis is performed to ascertain that the respirator is being used within established limits.
- Parts or attachments for one respirator type or brand may not be substituted with another type or brand unless specifically approved by the manufacturers.
- Respirators must be worn at all times in designated areas and may be removed only during prescribed decontamination procedures or in conformance with a predetermined contingency plan.
- Respirator use in designated areas must be defined, ideally by signs, barrier markers, or solid barriers, but at a minimum by clear delineation in the HASP.
- Whenever possible, respirators will be assigned to individuals for their exclusive use.
- The buddy system will be used on all WESTON controlled hazardous materials or waste sites except where workers are in non-hazardous situations and contact is maintained via 2-way radios.
- A safety-watch system will be used on all projects where respiratory protection is required. The safety watch must be able to monitor site activities by line of sight, tie line, or electronic communication from a safe location. Rescue gear must be immediately available, including PPE capabilities equal to that of the entry team. A minimum of one safety watch is required, more may be necessary based upon site conditions and will be specified in the HASP.
- Breathing air cylinders must be properly labeled, stored away from other compressed gasses, and properly secured to prevent falling, and protected from damage by vehicles or other physical conditions.
Air hoses of airline respirators must be monitored by the safety watch or air-line monitor and used in such a manner to protect them from damage. Examples of problematic conditions include snagging on unstable objects, crossing travel ways or work areas where they may be run over, crossing sharp edges, or through doorways where they may be cut by sharp edges or a door closing.

Steps must be taken to minimize contact of respirator parts with contaminants. Where risk of contact is high, additional PPE or procedures such as; face shields aprons, and wrapping of airline hose must be used.

Note that work periods will be established within the HASP and will be based upon criteria such as environmental conditions and respirator effectiveness.

6.4.2 Respirator Selection

Selection of the proper respirator(s) to be used in any work area or operation is made only after a determination as to the real and/or potential exposure of employees to harmful concentrations of contaminants in the workplace atmosphere. This evaluation will be performed prior to the start of any routine or non-routine tasks requiring respirators. The following items will be considered in the selection of respirators and cartridges:

- Effectiveness of the device against the substance of concern.
- Estimated maximum concentration of the substance in the work area.
- General environment (open shop or confined space, etc.).
- Known limitations of the respiratory protective device.
- Comfort, fit, and worker acceptance.
- Other contaminants in the environment or potential for oxygen deficiency.

Respiratory protective devices must be certified by the NIOSH according to 42 CFR Part 84 and will be selected using OSHA 29 CFR 1910.134 and this program.

Project Managers or Supervisors shall contact the appropriate health and safety staff (Safety Officers or their designees) for HASP guidance prior to work that may expose workers to hazardous substances or oxygen deficient atmospheres.

Examples of work which may require the use of respirators include, but are not limited to:

- Hazardous waste site activities.
- Emergency response activities.
- Asbestos sampling, oversight, or abatement activities.
- Abrasive blasting activities.
- Cutting or melting lead or sampling/striping lead-based paints from surfaces.
- Welding or burning.
- Painting, especially with epoxy or organic solvent coatings.
- Using solvents, thinners, or degreasers.
- Any work which generates large amounts of dust.
- Working in a confined space.

A review of the real and/or potential exposures (Hazard Assessment) is made on a program or project basis to determine if respiratory protection is required.
6.4.3 Air-Purifying Respirator

Air-purifying respirators (APRs) remove air contaminants by filtering, absorbing, adsorbing, or chemical reaction with the contaminants as they pass through the respirator canister or cartridge. This respirator is to be used only where adequate oxygen is available.

APRs may not be selected for use in situations where:

- Known or potential oxygen deficiency (less than 19.5%) conditions exist.
- The identity and/or concentration of the contaminant(s) is unknown or cannot be reasonably determined.
- Level of any contaminant exceeds the immediately dangerous to life or health (IDLH) value, the Assigned Protection Factor, or the Maximum Use Concentration.
- A cartridge or canister certified for protection of the contaminant does not exist.
- A filter, cartridge or canister replacement schedule cannot be determined or is prohibitively short.
- The wearer has not been fit-tested or medically qualified.

Air-purifying respirators can be classified as follows:

- Particulate removing respirators, which filter out particulate radionuclides, dusts, fibers, fumes and mists. These respirators may be single-use disposable respirators or respirators with replaceable filters.
  
  NOTE: Surgical masks do not provide protection against air contaminants. They are never to be used in place of an air-purifying respirator. NIOSH-approved disposable dust/mist respirators may be used when approved in the specific HASP.

- Gas- and vapor-removing respirators, which remove specific individual contaminants or a combination of contaminants by absorption, adsorption, or by chemical reaction. Gas masks and chemical-cartridge respirators are examples of gas- and vapor-removing respirators.

- Combination particulate/gas- and vapor-removing respirators, which combine the respirator characteristics of both kinds of APRs.

6.4.3.1 Identification of Respirator Cartridges and Gas Mask Canisters

Respirator cartridges and canisters are designed to protect against individual or a combination of potentially hazardous atmospheric contaminants, and are specifically labeled and color-coded to indicate the type and nature of protection they provide. The NIOSH approval label will also specify the maximum concentration of contaminant(s) for which the cartridge or canister is approved.

6.4.3.2 Warning Signs of Respirator Failure

Particulate Air-Purifying

When breathing difficulty is encountered with a filter respirator (due to partial clogging with increased resistance), the filter(s) must be replaced. Disposable filter respirators must be discarded.

Gas or Vapor Air-Purifying

When air purifying cartridges or canisters are used for protection of gases or vapors and there is no end-of-service-life indicator, a cartridge change calculation must be performed which establishes cartridge
change-out at intervals necessary to preclude break-through. If, when using a gas or vapor respirator (chemical cartridge or canister), any of the warning properties (e.g., odor, taste, eye irritation, or respiratory irritation) occur, the respirator wearer must promptly leave the area and check the following:

- Proper face seal.
- Damaged or missing respirator parts.
- Saturated or inappropriate cartridge or canister.

If no discrepancies are observed, the cartridge or canister must be replaced. A Notice of Incident (NOI) report must be prepared and a qualified person must determine that workers may resume use of the cartridges or canister.

6.4.3.3 Service Life of Air-Purifying Respirator Canisters and Cartridges

The canisters or cartridges of APRs are intended to be used until filter resistance precludes further use, or the chemical sorbent is expended as signified by display of the End of Service Life Indicator (ESLI), or based upon the change-out criteria documented in the HASP. New canisters, cartridges, or filters shall always be provided when a respirator is reissued. Workers must be directed to obtain a replacement canister or cartridge if in doubt about the previous use of the respirator. Workers who may have difficulty determining when the ESLI indicates that a cartridge is expended (e.g., color-blind employees who may be unable to distinguish a color change) will not be permitted to work while wearing a respirator unless an alternate acceptable change-out criterion is established for them.

6.4.4 Supplied-Air Respirators (Air-Line)

These respirators provide breathing air independent of the environment. Such respirators are to be used when the contaminant is of such high concentration or toxicity that an APR is inadequate. Supplied-air respirators, also called air-line respirators, are classified as follows:

- **Demand:** This respirator supplies air to the user on demand (inhalation) which creates a negative pressure within the facepiece. Leakage into the facepiece may occur if there is a poor seal between the respirator and the user's face. Demand-type Supplied Air respirators are not approved for WESTON use.
- **Pressure-Demand:** This respirator maintains a continuous positive pressure within the facepiece, thus preventing leakage into the facepiece.
- **Continuous Flow:** This respirator maintains a continuous flow of air through the facepiece and prevents leakage into the facepiece.

Note: Unless a supplied air respirator has an integral escape self-contained breathing apparatus (SCBA) (combination air-line/SCBA) the air-line has the same restrictions for use as an APR.

6.4.4.1 Self-Contained Breathing Apparatus

This type of respirator allows the user complete independence from a fixed source of air. Training and practice in its use and maintenance are essential.

6.4.4.2 Supplied Air Respirator/SCBA Cautions

Workers must leave the area immediately if, when using an airline respirator, any problem occurs with the respirator, the compressor failure alarm is activated, an air pressure drop is sensed, or the cylinder low air pressure alarm is activated. Airline couplings must be incompatible with other gas systems to prevent
accidental introduction of non-respirable gases. Prior to entry or use, SCBA cylinders must be filled to at least 90% of the manufacturer’s recommended pressure level.

### 6.5 Breathing Air Criteria

Any compressed air for air supplying respirators (this includes SCBA cylinders, cascade cylinders, hip-air bottles, etc.) must be certified to meet at least the requirements for Grade D breathing air as described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1, to include:

- Oxygen content of 19.5 – 23.5 %.
- Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less.
- Carbon monoxide (CO) content of 10 ppm or less.
- Carbon Dioxide content of 1,000 ppm or less.
- Lack of noticeable odor.
- The moisture content in the cylinder does not exceed a dew point of –50 deg. F (–45.6 deg. C) at 1 atmosphere pressure.

Certification must be obtained for all individual cylinders or tubes on air trailers. Acceptable certification for Grade D breathing air will be as follows:

1. Obtain individual cylinder certification from the vendor indicating that each cylinder meets the requirements for Grade D breathing air as indicated above.
2. If only batch cylinder certification can be obtained from the vendor the Site Manager/Supervisor/FSO or designated person will be responsible for verifying the oxygen concentration in each breathing air cylinder and documenting the verification prior to use of the breathing air. Verification will be made by extracting a sample of air and testing with Oxygen Meters or appropriate chemical indicator tubes.
3. To determine the oxygen content in each cylinder the following field sampling procedure must be used:
   a. Prior to sampling refer to FLD 16 "Pressure Systems – Compressed Gas Systems" and follow all procedures and guidance given therein.
   b. Ensure that all cylinders to be sampled are secured. An Oxygen Meter (calibrated) or chemical indicator tubes (e.g., Draeger) may be used to measure the sample from the cylinders.
   c. Since there is a HIGH PRESSURE HAZARD samples should be extracted from the downstream side of a supply pressure regulator or from the downstream side of a throttling valve (such as a SCBA fill valve) into a tedlar or common garbage bag. Samples should not be taken directly from the cylinder valve.
   d. A minimum of 19.5% oxygen must be present in order to be acceptable.
   e. Verification results must be documented.

### 6.6 Respirator Training

Respirator users and supervisors who oversee workers who wear respirators will receive training on the requirements of this Respiratory Protection Program and their responsibilities under it. They will be trained on the proper selection and use, as well as the limitations of the respirator. Training also covers
how to ensure a proper fit before use and how to determine when a respirator is no longer providing the protection intended.

CEH&S or their designees provide training to respirator wearers in the use, maintenance, capabilities, and limitations of respirators prior to assignment of personnel to tasks requiring the use of respirators and annually thereafter. Additional training describing the site-specific procedures and conditions will be arranged by the Site Manager. The training program will include the following topics:

- Nature and degree of respiratory hazard.
- Respirator selection, based on the hazard and respirator capabilities and limitations.
- Donning procedures and fit-tests including hands-on practice.
- Care of the respirator, (e.g., procedures for cleaning, maintenance, storage, and/or replacement).
- Use and limitations of respirator.

6.7 RESPIRATOR FIT-TESTING

A fit-test shall be used to determine the ability of each individual respirator wearer to obtain a satisfactory fit with any respirator (both negative and positive pressure). Medical certification in accordance with Section 6.3 of this Respiratory Protection Program will be acquired for the individual prior to performing a fit-test for them. Either quantitative or qualitative fit-tests may be performed as required to achieve the desired fit factor and assigned protection factor. Personnel must successfully pass the fit-test before being issued a respirator. Assigned protection factors will be taken from best available information, using OSHA documents first, and NIOSH or ANSI recommendations when there is no OSHA guideline.

CEH&S develops and maintains the Respirator Fit-Testing Procedure. Fit-testing will follow one of the protocols listed in the procedure that is available from the CEH&S or accessible on-line at the WESTON EHS Portal site. Professional staff (e.g., Safety Officers, FSOs, Site Managers, and Project Managers) conduct fit-tests in accordance with the WESTON procedure. The program administrator is responsible for ensuring that the fit-test is performed in compliance with the procedure. The test results will be the determining factor in selecting the type, model, and size of negative or positive pressure respirator for use by each individual respirator wearer.

Fit-testing is required prior to the initial use of any negative or positive pressure tight-fitting respirator, whenever a different respirator facepiece (size, style, model or make) is chosen, and at least annually as long as the individual continues to wear a respirator while performing work activities. Additional criteria that would require fit-testing at more frequent intervals include:

- Reports or observance of employee condition which could affect respirator fit (e.g., new dentures, major gain or loss of weight, cosmetic surgery).
- Notification by the employee that the respirator fit is unacceptable.
- Client or specific regulatory criteria.

6.7.1 Fit Checking

Each time a respirator is donned, the user will perform positive and negative pressure fit checks. These checks are not a substitute for fit-testing. Respirator users must be properly trained in the performance of these checks and understand their limitations. The User Seal Check Procedures (Mandatory) are provided as Appendix G.1 to the WESTON Respirator Fit-Testing Procedure that is available from the CEH&S Department or on-line at the WESTON EHS Portal site.
6.7.2 Qualitative Fit-Testing

Federal regulations (29 CFR 1910.134) require qualitative fit-tests (QLFT) of respirators under certain criteria and describe step-by-step procedures. This test checks the subject's response to a chemical introduced outside the respirator facepiece. This response is either voluntary or involuntary depending on the chemical used. Acceptable methods are described in the Respirator Fit-Testing procedure that is available from the CEH&S Department or on-line at the WESTON EHS Portal site.

QLFT protocols may only be used for fit-testing negative pressure air purifying respirators that must achieve a fit factor of 100 or less. A safety factor of 10 is applied, so the maximum protection for a negative pressure respirator that is qualitatively fit-tested is 10 times the permissible exposure limit (PEL) for the contaminant of concern. QLFT protocols may be used for any positive pressure (powered air purifying or atmosphere-supplying) respirators.

6.7.3 Quantitative Fit-Testing

Quantitative fit-testing (QNFT) can be performed on both full-face and half-face negative pressure respirators. Fit factors are determined by comparing the particle concentration outside the respirator with the concentration inside the respirator facepiece. An acceptable fit is achieved when the respirator wearer successfully completes a series of programmed exercises (e.g., normal breathing, deep breathing, moving head up and down, moving head side to side, reading, and normal breathing).

Fit-testing must follow one of the protocols listed in the Respirator Fit-Testing Procedure that is available from the CEH&S Department or on-line at the WESTON EHS Portal site.

6.7.4 Special Problems

Facial Hair

No attempt will be made to fit a respirator on an employee who has facial hair which comes between the sealing surface of the facepiece and the face, or if facial hair interferes with normal functioning of the exhalation valve of the respirator.

Glasses and Eye/Face Protective Devices

Proper fitting of a respiratory protective device facepiece for individuals wearing corrective eyeglasses or goggles, may not be established if temple bars or straps extend through the sealing edge of the facepiece. If eyeglasses, goggles, face shield or welding helmet must be worn with a respirator, they must be worn so as not to adversely affect the seal of the facepiece. If a full-facepiece respirator is used, special prescription glasses inserts are available if needed. Contact lenses may be worn with full-face respirators provided the wearer has successfully demonstrated that contact lenses can be worn without problem in non-exposure situations (i.e., during fit-testing).

6.7.5 Recordkeeping

Respirator fit-testing shall be documented and shall include the type of respirator, brand name and model, method of test and test results, test date and the name of the instructor/tester. A form for documenting fit-tests is provided in the procedure that is available from the CEH&S Department or on-line at WESTON’s EHS Portal site.
6.8 MAINTENANCE AND CLEANING OF RESPIRATORS

6.8.1 Maintenance

The maintenance of respiratory protective devices involves a thorough visual inspection (facepiece, head straps, valves, connecting surfaces/tubes, elastic pieces, and cartridges) for cleanliness and defects (i.e., cracked, broken, deteriorated, or defective parts). Worn-out or deteriorated parts will be replaced prior to use. No respirator with a known defect is to be issued for use. No attempt is to be made to replace components, make adjustments or make repairs on any respirator beyond those recommended by the manufacturer.

Under no circumstances will parts be substituted, as such substitutions will invalidate the approval of the respirator. Either the manufacturer or a qualified trained technician will conduct any repair to reducing or admission valves, regulators, or alarms.

6.8.2 Cleaning of Respirators

All respirators in routine use shall be cleaned and sanitized on a periodic basis. Respirators used non-routinely shall be cleaned and sanitized after each use and filters and cartridges replaced. Routinely used respirators are maintained individually by the respirator wearer or as indicated in the HASP.

Cleaning and disinfecting of respirators must be done frequently to ensure that skin-penetrating and dermatitis-causing contaminants are removed from the respirator surface. Respirators maintained for emergency use or those used by more than one person must be cleaned after each use.

OSHA mandatory procedures must be followed for proper respirator cleaning. These mandatory procedures (Appendix B-2 to 29 CFR 1910.134) are provided in WESTON’s Respirator Fit-Testing Procedure as Appendix G.2 and available on-line at www.osha.gov.

6.8.3 Respirator Storage

After inspection, cleaning, and any necessary minor repairs, respirators must be stored to protect against sunlight, heat, extreme cold, excessive moisture, damaging chemicals or other contaminants. Respirators placed at stations and work areas for emergency use shall be stored in compartments, cases or brackets built for that purpose, shall be quickly accessible at all times, and will be clearly marked. Routinely used respirators, such as half-mask or full-face air-purifying respirators, shall be placed in sealable plastic bags.

Respirators may be stored in such places as lockers or toolboxes only if they are first placed in carrying cases or cartons that are substantial enough to protect the respirator from damage. Respirators shall be packed or stored so that the facepiece and exhalation valves will rest in a normal position and not be crushed. Emergency use respirators shall be stored such that they are quickly accessible and clearly marked. Cartridges or canisters are to be sealed until needed for use.

6.9 ISSUANCE OF RESPIRATORS

Respiratory protective equipment shall not be ordered, purchased, or issued to personnel unless the respirator wearer is medically certified and has received respirator training and a fit-test.

6.10 PROGRAM SURVEILLANCE

An appraisal or evaluation of the effectiveness of this Respiratory Protection Program shall be carried out when required due to changes in regulations, workplace conditions, or recommendations from program
administrators. The CEH&S Department will initiate evaluations when regulations change. Site Managers and program administrators are responsible for initiating and conducting evaluations due to workplace conditions or perceived problems with the implementation of this program. Appropriate actions shall be taken to correct defects found in the program. The evaluation of this Respiratory Protection Program will include determining if proper respirator fit is achieved, appropriate respirators and cartridges are being selected and used, and respirators are being properly used and maintained.

6.11 RECORDKEEPING

The following lists the records generated and maintained, and who is responsible for maintaining them:

- Medical evaluations: WESTON’s Occupational Medical Provider and employee.
- WESTON Training Course attendance lists: CEH&S Department.
- Training certificates: Safety Officer and employee.
- Written Respiratory Protection Program: CEH&S (copies are available on-line and/or kept on project sites by the Site Manager or Project Manager.
- Fit-Test Records: Safety Officer and employee.
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7.0 OCCUPATIONAL NOISE AND HEARING CONSERVATION PROGRAM

Noise can cause sudden traumatic temporary or permanent hearing loss, long-term slowly occurring sensory-neural and irreversible hearing loss, disruption of communication, and masking of warning devices and alarms. Additional concerns include increased stress levels and effects on the cardiovascular and nervous systems. This Program describes the process for controlling, reducing, and minimizing noise exposure.

WESTON’s OMP will assist in compliance with this Program through evaluation of clinics, verification of baseline exams, and employee audiogram evaluation. The OMP will advise the appropriate Safety Officer and, if necessary, the CEH&S Director of any problems associated with medical compliance or occupationally related hearing loss in workers.

The need for noise-monitoring equipment, noise dosimeters or hearing protection devices must be addressed in the planning stages of a project. Some of the sources of noise at hazardous materials sites, demolition operations, construction and industrial sites which can cause hearing damage are: earth moving equipment (front end loader, bull dozer), material handling equipment (cranes, industrial trucks), power units (compressors, generators drill rig engines), impact devices (pile drivers, chipping hammers), and other powered devices (saws, needle guns, drills, vibrating equipment).

7.1 NOISE EVALUATION AND SURVEILLANCE PROCEDURES

OSHA in 29 CFR 1910.95, establishes a PEL, time weighted average (TWA) of 90 dBA for an 8-hour work day and a TWA of 85 dBA as the trigger point (action level or AL) for establishing a Hearing Conservation Program (HCP). The HCP includes baseline and annual hearing tests, and hearing conservation training.

Noise exposure can also be compared to the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV). The TLVs for noise are arranged in a scale in dBs related to time periods. For an 8-hour work period the TWA TLV is 85 dBA, and the AL is 80 dBA. The ACGIH numbers are more conservative and realistically reflect current scientific knowledge on the human effects from noise exposure. Therefore, WESTON will use the ACGIH TLVs and Guidance and the 3 dB exchange rate as the basis for WESTON’s HCP to provide a higher level of protection for our employees than that offered by compliance with the OSHA requirements which are several dB higher.

Noise exposure assessment is performed only by qualified personnel with properly calibrated and functional noise measuring equipment. If the HASP or the FSO indicates that the site, or activity, requires an instrumentation survey then the area will be screened with an A-weighted sound level meter (Area Monitoring). If deemed necessary a more in depth evaluation utilizing a noise dosimeter may be performed (Personnel Monitoring). Both types of monitoring, if needed, will be accomplished in accordance with requirements established in 29 CFR 1910.95(d).

In the absence of sound level measuring instrumentation, any noise preventing normal vocal discussion between two individuals at arms length distance (“arms-length rule”) will dictate the need for hearing protection. WESTON guidelines require the use of hearing protection on an immediate basis under the “arms-length rule”. Exceptions may be granted based upon evaluation of a specific task and duration with consultation with an industrial hygienist.
Long-term work efforts at fixed locations (e.g., water treatment plants, incinerators) require an evaluation of noise levels. Re-monitoring may be necessary when changes in equipment, processes, or activities result in modification of the noise level.

If impact noise is present, the peak noise levels and the frequency of the impacts should be determined. OSHA and ACGIH recommendations and/or qualified personnel should be consulted if questions arise regarding impact or impulse noise.

### 7.2 NOISE CONTROL METHODS

**Engineering Controls**

The primary means of reducing or eliminating personnel exposure to noise is through engineering controls. Engineering controls are defined as any modification or replacement of equipment, or related physical change at the noise source or along the sound transmission path that will reduce the noise level to the employee’s ear. Engineering controls include items such as; mufflers on heavy equipment or motors, sound baffles, and enclosures.

**Administrative Controls**

Administrative controls may include changes in the work schedule or operations to reduce noise exposure, increasing worker distance from the noise source, and rotation of jobs to reduce time limits of exposure. Administrative time control is not a preferable method for preventing noise exposure since extreme noise for a short duration can cause severe, permanent hearing loss. Administrative controls may be utilized in accordance with the TLV Table ACGIH TLVs and Biological Exposure Indices (BEIs), 2007 Edition. Administrative controls may not be utilized for exposures greater than 100 dBA, regardless of the exposure time.

**Hearing Protection**

Hearing protection devices are utilized whenever engineering controls prove to be infeasible or cost prohibitive. Various types of ear muffs and ear plugs are available. Hearing protector attenuation is intended to reduce employee exposures below 80 dBA for employees with standard threshold shifts and below 85 dBA for all other employees.

WESTON personnel and WESTON subcontractors must wear hearing protection devices (HPDs) when required and where signs are posted requiring their use. Hearing protection devices are strongly recommended in any noisy environment, but are mandatory in the following situations:

- The 8-hour average may equal or exceed 85 dBs.
- Any employee exposed to greater than or equal to 85 dBs and who have experienced a standard threshold shift in their hearing.
- Any noise equal to greater than 100 dBs impact, continuous or intermittent.
- Anywhere a “HEARING PROTECTION REQUIRED” sign is posted. These signs are to be posted in all mandatory situations listed above.

In addition when noise levels equal or exceed 80 dBA employees must have:

- Availability of hearing protectors.
- Information and training on effects of noise.
- Availability of audiometric testing where there is a risk to health.
Not all hearing protection devices have the same noise reduction rating (NRR). Verification of all NRR values must be made by referring to the manufacturers’ specifications. The proper hearing protection is selected using results from a properly calibrated sound level meter in accordance with ACGIH TLVs and BEIs, 2007 Edition.

Additional information regarding the selection, use, maintenance, and control of hearing protection devices is provided in the WESTON Personal Protective Equipment Program (Section 5.0).

NRR will be adjusted using the following to estimate the attenuation afforded to a noise-exposed employee in a work environment by mufffs, plugs, or a combination of both:

**Single Protection**

A common formula used to estimate exposure for single protection (either mufffs or plugs) follows:

1. Determine the laboratory-based noise attenuation provided by the HPD. This is referred to as the NRR and is listed on the packaging.
2. Subtract the NRR from the C-weighted TWA workplace noise level, as follows:

   \[
   \text{Estimated Exposure (dBA)} = \text{TWA (dBC)} - \text{NRR}
   \]

   If C-weighted noise level data are not available, A-weighted data can be used by subtracting a 7 dB correction factor from the NRR, as follows:

   \[
   \text{Estimated Exposure (dBA)} = \text{TWA (dBA)} - (\text{NRR} - 7)
   \]

   **Example:**
   - TWA=100 dBA, muff NRR=19 dB
   - Estimated Exposure = 100 - (19-7) = 88 dBA

**Dual Protection**

A common formula used to estimate exposure for dual protection (ear mufffs and plugs are used simultaneously) follows:

1. Determine the laboratory-based NRR for the higher rated protector (NRRh).
2. Subtract 7 dB from NRRh if using A-weighted sound level data.
3. Add 5 dB to the field-adjusted NRR to account for the use of the second hearing protector.
4. Subtract the remainder from the TWA as follows:

   \[
   \text{Estimated Exposure (dBA)} = \text{TWA (dBC)} - (\text{NRR}_h + 5) \quad \text{or} \quad \text{Estimated Exposure (dBA)} = \text{TWA (dBA)} - [(\text{NRR}_h - 7) + 5]
   \]

   **Example:**
   - TWA=110 dBA, plug NRR=29, and muff NRR=25 dB
   - Estimated Exposure = 110 - [(29 - 7) + 5] = 83 dBA
7.3 MEDICAL SURVEILLANCE

Compliance with the HCP is required when an employee’s exposure to noise is in excess of 85 dBA. Employees who work with drill rigs, heavy construction equipment, or noisy client operations are candidates for the HCP and medical surveillance requirements thereof. Supervisors of any employees who do not meet these categories but who work around excessive noise (e.g., treatment plant operations, print shop, maintenance personnel) must perform noise surveys to determine the need for those employees to participate in the HCP, and advise the safety officer who will notify the OMP.

WESTON’s OMP will make the final determination of employee involvement in the medical surveillance component of the HCP. Audiometric testing is performed annually to evaluate the hearing of all individuals who are routinely exposed to 8-hour TWA exposures of 85 dBA or greater (including compliance with the “arms-length rule”). WESTON’s OMP is responsible for assuring local clinic compliance with the audiometric testing component of the standard.

7.4 TRAINING

Training is regularly provided during WESTON’s initial and refresher courses under 29 CFR 1910.120 (HAZWOPER). Alternative training will be given to employees who are included in the HCP but are not required to have HAZWOPER training. Initial and annual training shall be given to each employee included in the HCP and address the following:

- The effects of noise on hearing.
- The purpose of hearing protection, advantages, disadvantages, attenuation of various types, and the selection, fitting, use, and care of protectors.
- The purpose of audiometric tests and explanation of test procedures.
- Recognition of hazardous noise.

7.5 PROGRAM EVALUATION

Periodic program evaluations will be conducted to assess compliance with 29 CFR 1910.95. WESTON’s OMP is responsible for assisting in this evaluation by providing information relative to employee exposure and medical surveillance data.

7.6 RECORDKEEPING

Employee exposure measurements are retained for a minimum of two years and audiometric test records are retained for the duration of the employee’s employment, plus 30 years.

7.7 REFERENCES

29 CFR 1910.95, Occupational Noise Exposure

American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Value (TLV) for Chemical Substances and Physical Agents, 2007
8.0 RADIOLOGICAL ACTIVITIES

For projects involving radiological work, WESTON has established and implements Operating Practice OP-11-01-022, Radiation Safety and WESTON Radiation Operating Procedures (WROPs). These documents are available on-line on the EHS Portal site. WESTON develops any site- or project-specific documentation necessary to supplement these operating procedures and ensure compliance with all applicable laws, standards, regulations, and good practices governing radiological monitoring and radiation safety. WESTON also maintains a radiological services license granted by the New Mexico Environment Department that authorizes remediation, radioactive waste packaging and shipping, and disposal activities. That license provides coverage in all 50 states through reciprocity with the U.S. Nuclear Regulatory Commission and other state agencies.

WESTON’s health physicists provide technical assistance to project managers in the development of work controls to ensure that radiological operations are conducted in a manner that maintains exposures to staff, members of the public, and the environment as low as reasonably achievable (ALARA).
9.0 EMERGENCY RESPONSE PLAN

This Emergency Response Plan provides the plan for preparedness and response on WESTON projects. Specific procedures describe procedures for accident, incident, and emergency situations and for preventing and mitigating associated environmental, health, and safety impacts. Necessary incident reporting chains are clearly delineated in site-specific HASPs with requirements for prompt investigation and the generation of reports to maintain regulatory and internal controls. Section 10 provides the Health and Safety and Emergency Response Plan for Hazardous Waste Site Operations. Section 9.2 provides the Emergency Response Program to Hazardous Substance Releases.

An important element of every WESTON employee’s job is the knowledge of how to respond to emergency situations. Everyone at a job site must be ready to act—and act promptly—and know the site assembly points.

9.1 RESPONDING TO AN EMERGENCY

No matter how carefully work is planned, it is almost inevitable that at some time an emergency situation will arise at a job site. It is vitally important that every member of the site team plans the response to such situations in advance. Preparedness will not only lead to a team that is ready for an unplanned event, but the time taken to plan such activities and actions will often prevent an emergency from happening in the first place.

Good emergency response occurs in several steps:

- Evaluating the risk.
- Developing an emergency plan.
- Implementing the plan (if necessary).
- Controlling the situation until the experts arrive.
- Learning from any accident that does happen.

9.1.1 Evaluating the Risk

Evaluating risk is a function for everyone at a job site. Each person should be looking for possible dangers that could result in a problem that might require immediate response. Evaluation should cover three main areas:

- **Substance** – Each employee must know about the materials that he or she will be working with, whether it’s moving contaminated dirt, using a cleaning solvent, or using a chemical. If the substance is a chemical, the MSDS will tell a lot about the possible risks, e.g., a liquid that can spill, potential to emit a poisonous vapor if the container is opened, flammability or explosivity if it comes in contact with water.

- **Personnel** – Each person should assess the skills and limitations of the people he or she is working with, e.g., whether it is an experienced crew or a team that is new to the site, whether anyone has experience doing this particular job.

- **Facility and Equipment** – Each person should check to make sure that the right tool is being used for the job, that equipment is in good repair, any special conditions around the site that may affect work. For example: if June is tornado season in a particular part of the country, can the job be quickly demobilized and hazardous materials secured, the effect heavy rains or high winds would have upon the work, the proximity of firefighting equipment.
By evaluating risks, each person has the opportunity to look for possible dangers. This will not only help in planning emergency response, but it will often help in identifying and taking actions that could prevent an emergency altogether.

9.1.2 Developing the Response Plan

Once risks are identified, each person and the team must know what to do if an accident occurs. At each site there is a standard emergency plan that outlines the things to do in the event of an emergency and the people or agencies to contact. Every person at the site must be familiar with the requirements of the site plan and always be ready to implement it.

Each job will present unique circumstances that could lead to an accident; therefore, every WESTON employee must be aware of the procedures to follow if an emergency occurs on that job. This job-specific emergency “action” plan should answer the basic questions:

- Who will be in charge and coordinate the response to an accident? What is the chain-of-command?
- When and how would the work area be evacuated?
- What immediate actions would be required to control the situation?
- How are emergency notifications made?
- Where is the closest phone?
- Is there a site alarm system, and where and how is it activated?
- Who should be notified?
  – Which departments or individuals should be called?

Will outside help be needed (fire department, police, etc.)?

Most importantly, it is every WESTON employee’s job to know his or her duty if an emergency occurs. No job should be started until an emergency action plan is in place.

9.1.3 Implementing the Plan/Controlling the Situation

Advance preparation is the most important element in implementing an emergency response plan. The site team must have regular briefings and reviews to make sure that everyone understands the site’s emergency response plan and its required actions. Depending on the complexity of the response actions, practice drills may be held to ensure that everyone understands his role in an emergency.

Any job-specific emergency response action plans must be reviewed for work that will take place. Although there are any numbers of emergency response actions that can be a part of the plan, a few general guidelines are applicable to most situations:

- Make notifications necessary to get help as quickly as possible.
- Avoid taking unnecessary risk. If unsure what to do, wait for instructions.
- Make the best effort (without jeopardizing anyone’s safety) to keep things from getting out of hand—control the situation until experts arrive.
- If it becomes necessary, evacuate the area in an orderly manner. Know how to get out of a dangerous situation and where to assemble after escape.
- Upon reaching safety, be able to account for the people on the team -- know how many people were on the team, as well as where they were working when the emergency started.
- After the emergency is over, take immediate action to replace emergency response supplies and equipment (PPE, spill kits, fire extinguishers, first aid kits, etc.).
9.1.4 Lessons Learned

Once the emergency has passed, the work team should take time to determine what caused the accident, how it might be prevented in the future, and whether the emergency response actions were adequate. It is also important to do the same things after a drill. This information will help prevent the situation from happening again at the job site and sharing it may prevent the same situation at another site.

Lessons learned may be more valuable by:

- Make a record of the actions that were taken as soon after the emergency situation as possible.
- Record quantities of material used (for example, for a spill, how much absorbent was applied?).
- Document those parts of the action plan that worked well and those that did not.

9.1.5 Common Emergency Scenarios

The most common emergency situations that might be encountered on a job site and some general guidelines for response actions to those situations are described below.

9.1.5.1 Spills and Releases

Early detection of a spill or release is critical. While large spills are easy to spot, it is important to be aware of the signs of a small spill:

- Unusual odors
- Wet packages or containers
- Small drips
- Sound of broken glass
- Loose lids or closures on containers
- Blowing materials that look like steam or dust

The general response guidelines for spills include:

- Attempt to identify the nature of the spill or release, and the substance and quantity involved.
- Contact the proper personnel for assistance.
- If the material may be toxic, clear personnel from the area.
- If there is no immediate safety or health hazard, attempt to contain the spill or release using the appropriate technique:
  - Plug the hole in a leaking container.
  - Erect a containment barrier (dike, curb, etc.).
  - Spread an absorbent compound to soak up the spilled material.
  - Do not allow materials to be tracked around the floor.
  - Protect spills of dusts/powders from winds or strong drafts.
- Avoid low areas and stay upwind if a spill is outside.
- When disposing of cleanup materials, treat them with the same care that would be used on the chemical or hazardous substance itself.
9.1.5.2 Fire

Firefighting is a complex job that requires years of training and experience. Anyone who is not trained to fight fires should always call for help; however, there are some things everyone can do without extensive training:

- Always notify others in the area and call for help if there is a fire.
- Know where the firefighting equipment is located and how to use it.
- Check the equipment frequently to check for defects (dents, broken handle, etc.).
- Make sure the cylinder gauge on an extinguisher does not say empty.
- If evacuating a building during a fire, close all doors as exiting.

Preserving human life is the first priority—tools, papers, and other items are not very important when lives are at stake.

9.1.5.3 Medical Emergencies

General requirements for medical emergencies include the following:

- Each person should always protect him or herself first, and then help someone else the best one can.
- Know the location of first aid kits at the site.
- Know who is trained in first aid and CPR.
- When approaching an injured person:
  - Survey the scene and determine if it is safe to approach. If it is unsafe to approach—DON’T!
  - Always call for help and get a person who is trained in first aid/CPR to the scene.
  - Attempt to determine if the injuries require an ambulance. If in doubt, assume an ambulance is needed.
  - Do not move an injured person unless it is necessary to save his life.
  - Report all injuries no matter how minor to the supervisor.

Environmental incident and noncompliance and nonconformance issues will be investigated and managed. Open issues will be tracked with management oversight through corrective action planning and closure.

9.2 HAZARDOUS WASTE SITE OPERATIONS EMERGENCY RESPONSE - PART Q
HEALTH AND SAFETY PROGRAM

9.2.1 Emergency Response Program to Hazardous Substance Releases

This Program covers employees are engaged in emergency response to a hazardous substance release no matter where it occurs except that it does not cover employees engaged in operations specified in 29 CFR 1910.120 (a)(1)(i) through (a)(1)(iv) (see Section 10). Where programs equivalent to this paragraph for handling releases of hazardous substances pursuant to section 303 of the Superfund Amendments and Reauthorization Act (SARA) of 1986 (Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. 11003) exist, they will be deemed to have met the requirements of 29 CFR 1910.120.
9.2.2 Emergency Response Plan

Where WESTON personnel are performing activities subject to 29 CFR 1910.120(q), an emergency response plan will be developed and implemented to handle anticipated emergencies prior to the commencement of emergency response operations. The plan will be in writing and available for inspection and copying by employees, their representatives, and OSHA personnel. In activities where WESTON employees will simply activate the facility or local Emergency Response Plan, then will evacuate from the danger area when an emergency occurs, and are not permitted to assist in handling the emergency (except as provided in 29 CFR 1910.120(q)(4) and (5), WESTON is exempt from the requirements of 29 CFR 1910.120(q) and will provide an emergency action plan in accordance with 29 CFR 1910.38.

9.2.3 Elements of the Emergency Response Plan

WESTON will develop an emergency response plan for emergency response activities which will address, as a minimum, the following areas to the extent that they are not addressed in any specific program required in 29 CFR 1910.120(q):

- Pre-emergency planning and coordination with outside parties.
- Personnel roles, lines of authority, training, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Site security and control.
- Evacuation routes and procedures.
- Decontamination.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- PPE and emergency equipment.

WESTON may use the local emergency response plan or the state emergency response plan or both, as part of their emergency response plan to avoid duplication and may also subcontract Emergency Response Services. Those items of the emergency response plan that are being properly addressed by the SARA Title III plans may be substituted into WESTON's emergency plan or otherwise kept together for WESTON and employee's use.

9.2.4 Procedures for Handling Emergency Response

The senior emergency response official or persons designated in the Emergency Response Plan responding to an emergency will become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders and their communications will be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each contractor on the site.

The "senior official" at an emergency response is the most senior official on the site who has the responsibility for controlling the operations at the site. Initially it is the senior officer on the first-due piece of responding emergency apparatus to arrive on the incident scene. As more senior officers arrive (i.e., battalion chief, fire chief, state law enforcement official, site coordinator, etc.) the position is passed up the line of authority which has been previously established.
The individual in charge of the ICS will identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.

**Personal Protective Equipment**

Based on the hazardous substances and/or conditions present, the individual in charge of the ICS will implement appropriate emergency operations, and assure that the PPE worn is appropriate for the hazards to be encountered. However, PPE must meet, as a minimum, the criteria contained in 29 CFR 1910.156(e) when worn while performing fire fighting operations beyond the incipient stage for any incident.

Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard will wear positive pressure SCBA while engaged in emergency response, until such time that the individual in charge of the ICS determines, through the use of air monitoring, that a decreased level of respiratory protection will not result in hazardous exposures to employees.

**Emergency Response Personnel Responsibilities**

The individual in charge of the ICS will limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing emergency operations. However, operations in hazardous areas will be performed using the buddy system in groups of two or more.

Back-up personnel will be standing by with equipment ready to provide assistance or rescue. Qualified basic life support personnel, as a minimum, will also be standing by with medical equipment and transportation capability.

The Emergency Response Plan individual in charge of the ICS will designate a safety officer, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of operations for the emergency at hand.

When activities are judged by the safety officer to be an IDLH and/or to involve an imminent danger condition, the safety officer will have the authority to alter, suspend, or terminate those activities. The safety official will immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at the emergency scene.

After emergency operations have terminated, the individual in charge of the ICS will implement appropriate decontamination procedures.

When it is necessary to meet the tasks at hand, approved self-contained compressed air breathing apparatus may be used with approved cylinders from other approved self-contained compressed air breathing apparatus provided that such cylinders are of the same capacity and pressure rating. All compressed air cylinders used with SCBA shall meet U.S. DOT and NIOSH criteria.

**Skilled Support Personnel**

Personnel, not necessarily WESTON employees, who are skilled in the operation of certain equipment, such as mechanized earth moving or digging equipment or crane and hoisting equipment, and who are needed temporarily to perform immediate emergency support work that cannot reasonably be performed in a timely fashion by an employer's own employees, and who will be or may be exposed to the hazards at an emergency response scene, are not required to meet the training required in 29 CFR 1910.120(q).
However, these personnel will be given an initial briefing at the site prior to their participation in any emergency response. The initial briefing will include instruction in the wearing of appropriate PPE, what chemical hazards are involved, and what duties are to be performed. All other appropriate safety and health precautions provided to the employer's own employees will be used to assure the safety and health of these personnel.

**Specialist Employees**

Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances, and who will be called upon to provide technical advice or assistance at a hazardous substance release incident to the individual in charge, will receive training or demonstrate competency in the area of their specialization annually.

### 9.2.5 Training

Training will be based on the duties and function to be performed by each responder of an emergency response organization. The skill and knowledge levels required for all new responders, those hired after the effective date of this standard, will be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident. Employees who participate, or are expected to participate, in emergency response, will be provided training according to the following:

**First Responder Awareness Level**

First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. First responders at the awareness level will have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

- An understanding of what hazardous substances are, and the risks associated with them.
- An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
- The ability to recognize the presence of hazardous substances in an emergency.
- The ability to identify the hazardous substances, if possible.
- An understanding of the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the U.S. DOT's Emergency Response Guidebook.
- The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

**First Responder Operations Level**

First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release.

They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operations level will have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and WESTON will so certify:
Know the basic hazard and risk assessment techniques.
Know how to select and use PPE provided to the first responder operations level.
Have an understanding of basic hazardous materials terms.
Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and PPE available with their unit.
Know how to implement basic decontamination procedures.
Have an understanding of the relevant standard operating procedures and termination procedures.

**Hazardous Materials Technician**

Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch, or otherwise stop the release of a hazardous substance. Hazardous materials technicians will have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and WESTON will so certify:

- Know how to implement the applicable emergency response plan.
- Know the classification, identification and verification of known and unknown materials by using field survey instruments and equipment.
- Be able to function within an assigned role in the ICS.
- Know how to select and use proper specialized chemical PPE provided to the hazardous materials technician.
- Understand hazard and risk assessment techniques.
- Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and PPE available with the unit.
- Understand and implement decontamination procedures.
- Understand termination procedures.
- Understand basic chemical and toxicological terminology and behavior.

**Hazardous Materials Specialist**

Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician, however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with Federal, state, local, and other government authorities in regards to site activities. Hazardous materials specialists will have received at least 24 hours of training equal to the technician level and in addition have competency in the following areas and WESTON will so certify:

- Know how to implement the local emergency response plan.
- Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment.
- Know the state emergency response plan.
- Be able to select and use proper specialized chemical PPE provided to the hazardous materials specialist.
- Understand in-depth hazard and risk techniques.
- Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and PPE available.
- Be able to determine and implement decontamination procedures.
- Have the ability to develop a site safety and control plan.
- Understand chemical, radiological and toxicological terminology and behavior.

**On Scene Incident Commander**

Incident commanders, who will assume control of the incident scene beyond the first responder awareness level, will receive at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and WESTON will provide certification:

- Know and be able to implement the employer's incident command system.
- Know how to implement the applicable emergency response plan.
- Know and understand the hazards and risks associated with employees working in chemical protective clothing.
- Know how to implement the local emergency response plan.
- Know of the state emergency response plan and of the Federal Regional Response Team.
- Know and understand the importance of decontamination procedures.

**Trainers**

Trainers who teach any of the above training subjects will have satisfactorily completed a training course for teaching the subjects they are expected to teach, such as the courses offered by the U.S. National Fire Academy, or they will have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a good command of the subject matter of the courses they are to teach.

**9.2.6 Refresher Training**

Those employees who are trained in accordance with the provision above as required by 29 CFR 1910.120(q)(6) will receive annual refresher training of sufficient content and duration to maintain their competencies, or shall demonstrate competency in those areas at least yearly.

A statement will be made of the training or competency, and if a statement of competency is made, WESTON will keep a record of the methodology used to demonstrate competency.

**9.2.7 Medical Surveillance and Consultation**

WESTON personnel who are members of an organized and designated HAZMAT team and/or serve as hazardous materials specialist will receive a baseline physical examination and be provided with medical surveillance as described in Section 10.9.
For any emergency response employees who exhibit signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency incident either immediately or subsequently, WESTON will provide medical consultation as required by 29 CFR 1910.120(f)(3)(ii).

9.2.8 Chemical Protective Clothing

Chemical protective clothing and equipment to be used by employees engaged in activities subject to 29 CFR 1910.120(q) will meet the requirements of Section 10.10 in compliance with 29 CFR 1910.120(g)(3) through (5).

9.2.9 Post-Emergency Response Operations

Upon completion of the emergency response, if it is determined that it is necessary to remove hazardous substances, health hazards and materials contaminated with them (such as contaminated soil or other elements of the natural environment) from the site of the incident, WESTON will implement the provisions of Section 10 in compliance with 29 CFR 1910.120 (b) through (o).

Where the clean-up is done on plant property using plant or workplace employees, such employees will have completed the training requirements of the following: 29 CFR 1910.38, 1910.134, 1910.1200, and other appropriate safety and health training made necessary by the tasks they are expected to perform such as personal protective equipment and decontamination procedures.

9.3 DEFINITIONS

29 CFR 1910.120 also means 29 CFR 1926.65.

EHS or ESH means Environmental, Health, and Safety.

Buddy system means a system of organizing employees into work groups such that each worker of the work group is designated to be observed by at least one other worker in the work group. The purpose is to provide rapid assistance to employees in the event of an emergency.

Clean-up operation means an operation where hazardous substances are removed, contained, incinerated, neutralized, stabilized, cleared-up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment.

Decontamination means the removal of hazardous substances from employees and their equipment as necessary to preclude the occurrence of foreseeable adverse health effects.

Emergency response or responding to emergencies means a response effort by employees from outside the immediate release area or by other designated responders (e.g., mutual aid groups, local fire departments) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance. (See Non-Emergency Response.)

Facility means (A) any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, storage container, motor vehicle, rolling stock, or aircraft; or (B) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any water-borne vessel.

Hazardous materials response (HAZMAT) team means an organized group of employees, designated by the employer, who are expected to perform work to handle and control actual or potential leaks or

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spills of hazardous substances requiring possible close approach to the substance. The team members perform responses to releases or potential releases of hazardous substances for the purpose of control or stabilization of the incident. A HAZMAT team is not a fire brigade nor is a typical fire brigade a HAZMAT team. A HAZMAT team, however, may be a separate component of a fire brigade or fire department.

**Hazardous substance** means any substance defined or listed under (A) through (D) below, exposure to which results or may result in adverse effects on the health or safety of employees:

- Any substance defined under section 101(14) of CERCLA;
- Any biologic agent and other disease causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring.
- Any substance listed by the U.S. DOT as hazardous materials under 49 CFR 172.101 and appendices; and
- Hazardous waste.

**Hazardous waste** means – Those substances as defined in 40 CFR 261.3; or, those substances defined as hazardous wastes in 49 CFR 171.8.

**Hazardous waste operation** means any operation covered by 29 CFR 1910.120.

**Hazardous waste site or Site** means any facility or location within the scope of 29 CFR 1910.120 at which hazardous waste operations take place.

**Health hazard** means a chemical, mixture of chemicals or a pathogen for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes.

**IDLH or Immediately Dangerous to Life or Health** means an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would interfere with an individual's ability to escape from a dangerous atmosphere.

**Non-emergency response** includes responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel and are not considered to be emergency responses within the scope of the standard. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.

**Oxygen deficiency** means that concentration of oxygen by volume below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.

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Permissible exposure limit means the exposure, inhalation, or dermal permissible exposure limit specified in 29 CFR Part 1910, Subparts G and Z.

Published exposure level means the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986, or if none is specified, the exposure limits published in the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1987-88" dated 1987, both of which are incorporated by reference as specified in 29 CFR 1910.6.

Post-emergency response means that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean-up of the site has begun. If post-emergency response is performed by an employer's own employees who were part of the initial emergency response, it is considered to be part of the initial response and not post-emergency response. However, if a group of an employer's own employees, separate from the group providing initial response, performs the clean-up operation, then the separate group of employees would be considered to be performing post-emergency response and subject to 29 CFR 1910.120(q)(11).

Qualified person means a person with specific training, knowledge and experience in the area for which the person has the responsibility and the authority to control.

Site safety and health supervisor (or official) means the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

Small quantity generator means a generator of hazardous wastes who in any calendar month generates no more than 1,000 kilograms (2,205 pounds) of hazardous waste in that month.

Uncontrolled hazardous waste site means an area identified as an uncontrolled hazardous waste site by a governmental body, whether Federal, state, local or other where an accumulation of hazardous substances creates a threat to the health and safety of individuals or the environment or both. Some sites are found on public lands such as those created by former municipal, county or state landfills where illegal or poorly managed waste disposal has taken place. Other sites are found on private property, often belonging to generators or former generators of hazardous substance wastes. Examples of such sites include, but are not limited to, surface impoundments, landfills, dumps, and tank or drum farms. Normal operations at treatment, storage, and disposal (TSD) sites are not covered by this definition.

WESTON means WESTON and WESTON team contractors

9.4 REFERENCES

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard (USCG), and Environmental Protection Agency (EPA); October 1985.
10.0 HAZARDOUS WASTE SITE OPERATIONS HEALTH AND SAFETY PROGRAM – NON-PART Q

This section represents WESTON’s Health and Safety Program as it relates to activities covered under 29 CFR 1910.120, 29 CFR 1926.65, and EM 385-1-1 Section 28. Section 9.2 provides WESTON’s Hazardous Waste Site Operations Emergency Response - Part Q Health and Safety Program.

10.1 SCOPE

This Program covers the following operations, unless it can be demonstrate that the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards:

- Clean-up operations required by a governmental body, whether Federal, state local or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA’s National Priority Site List (NPL), state priority site lists, sites recommended for the EPA NPL, and initial investigations of government identified sites conducted before the presence or absence of hazardous substances has been determined).
- Voluntary clean-up operations at sites recognized by Federal, state, local or other governmental bodies as uncontrolled hazardous waste sites.
- Operations involving hazardous waste that are conducted at treatment, storage, disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or by agencies under agreement with EPA to implement RCRA regulations.
- This program addresses Emergency Response to releases or substantial threats of releases of hazardous substances only as it applies to post emergency response hazardous waste site operations covered in 29 CFR 1910.120 (c)-(p).

This program does not apply to Hazardous Materials Incidents as defined by 29 CFR 1910.120 (q). WESTON activities subject to 29 CFR 1910.120(q) is covered in Section 9.2.

10.2 APPLICATION

In addition to 29 CFR 1910.120, all applicable requirements of 29 CFR Part 1910 and Part 1926 apply to hazardous waste site operations and emergency response operations whether or not covered by 29 CFR 1910.120. If there is a conflict or overlap, the provision more protective of employee safety and health will apply.

Hazardous substance clean-up operations covered by 29 CFR 1910.120(a)(1)(i) through (a)(1)(iii) will comply with all of 29 CFR 1910.120 except paragraphs (p) and (q).

Operations within the scope of 29 CFR 1910.120(a)(1)(iv) will comply with the requirements 29 CFR 1910.120(p).

10.3 HAZARDOUS WASTE SITE HEALTH AND SAFETY PROGRAM

Each work assignment for a client is assigned a Project Manager with appropriate experience who has ultimate responsibility for establishing an effective HASP within each of his or her projects. Project Managers are assisted by DEHSMs, Safety Officers at each of WESTON’s offices, FSOs, and Site 10-1 March 2009
Managers. The FSO is responsible for implementing the HASP and WESTON’s EHS Program. Site Mangers are responsible for establishing the leadership necessary for an effective EHS Program on the site.

This Hazardous Waste Site Health and Safety Program has been developed and is implemented to protect employees involved in hazardous waste operations covered by 29 CFR 1910.120(c) through (p). This program incorporates the WESTON EHS Program and other programs and procedures developed to meet other federal, state, or local regulations. These programs are incorporated by reference in each site HASP developed as required by 29 CFR 1910.120(b)(4).

This program is designed to identify, evaluate, and control safety and health hazards, and provide for emergency response for hazardous waste operations. This health and safety program is part of the WESTON comprehensive EHS Program which includes the following:

- Section 2.0 describes the WESTON overall organizational structure which establishes EHS responsibilities at the corporate level and for project management and site personnel. Section 10.3.5 describes organizational structure specific to hazardous waste operations.
- A comprehensive work plan is developed for each project as described in Section 10.4.
- A site-specific HASP (based on the work plan) is prepared for each project as described in Section 10.5 and required by 29 CFR 1910.120(b)(4).
- A comprehensive EHS Training Program, as described in Section 10.8, using internal and carefully selected external sources that is compliant with 29 CFR 1910.120(e). During the course of hazard evaluation for each project, training requirements necessary to comply with 29 CFR 1910.120(e) as well as other training requirements are determined and defined in the HASP.
- A medical surveillance program as described in Section 10.9.
- Standard procedures (e.g., FLDs, OPs) required by 29 CFR 1910.120(b)(1)(ii)(F) are incorporated by reference into the HASP. These procedures must be present on site as part of the HASP.
- Any necessary interface between general program and site-specific activities is described in the HASP.

10.3.1 Site Excavation

FLD 28, “Excavation/Trenching” is applicable to site excavations that are performed during initial site preparation or during hazardous waste operations. FLD 28 complies with 29 CFR Part 1926, Subpart P. A competent person is assigned to oversee excavations and implement FLD 28.

10.3.2 Contractors and Team Contractors

WESTON ensures that contractors or team contractors hired for work in hazardous waste operations are informed of hazards known to exist on site including any potential fire, explosion, health, safety or other hazards of the hazardous waste operation that have been identified. Additionally, WESTON informs contractors of the site emergency response procedures.

10.3.3 Program Availability

WESTON’s written EHS Program is made available to any contractor or subcontractor, or their representative, who will be involved with the hazardous waste operation; to employees; to employee designated representatives; to OSHA personnel, and to personnel of other Federal, state, or local agencies with regulatory authority over the site.
10.3.4 Organizational Structure

The organizational structure part of the program is described in the HASP and establishes the site-specific chain of command and specifies the overall responsibilities of supervisors and employees. It includes, at a minimum, the following elements:

- A general supervisor (e.g., site manager) who has the responsibility and authority to direct all hazardous waste operations.
- A site safety and health supervisor (e.g., FSO) who has the responsibility and authority to develop and implement the site HASP and verify compliance.
- All other personnel needed for hazardous waste site operations and emergency response and their general functions and responsibilities.
- The lines of authority, responsibility, and communication.
- The organizational structure shall be reviewed and updated as necessary to reflect the current status of waste site operations.

10.4 COMPREHENSIVE WORKPLAN

A comprehensive workplan is developed for each hazardous waste operations project to address the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives. The comprehensive workplan includes the following:

- Anticipated activities as well as normal operating procedures and relies, where possible, on established WESTON procedures. Otherwise, the workplan describes the activities and methods.
- Defined work tasks and objectives and the methods for accomplishing those tasks and objectives.
- Personnel requirements for implementing the plan.
- Description of the training required in 29 CFR 1910.120(e). This may also be described in the HASP.
- Provisions for the implementation of the required informational programs required in 29 CFR 1910.120(i). This may also be provided in the HASP.
- Provisions for the implementation of the medical surveillance program required by 29 CFR 1910.120(f). This may also be provided in the HASP.

10.5 SITE-SPECIFIC HEALTH AND SAFETY PLAN

It is WESTON Policy that every field activity must have a site-specific HASP or APP. The site HASP, Safety Manual (Section 11), and FLDs must be kept on site. These implementing documents address the safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection.

The site-specific HASP, as a minimum, shall address the following:

- A safety and health risk or hazard analysis for each site task and operation that is specified in the workplan.
- Employee training requirements to ensure compliance with 29 CFR 1910.120(e) and other applicable training requirements.
- PPE to be used by employees for each site task and operation being conducted as required by the PPE requirements in 29 CFR 1910.120(g)(5) and WESTON’s PPE program (Section 5.0).
- Medical surveillance requirements in accordance with 29 CFR 1910.120(f) and WESTON’s Occupational Medical Monitoring Program.
- An air monitoring program which establishes the following:
  - frequency and types of air monitoring and personnel monitoring
  - environmental sampling techniques and instrumentation to be used
  - methods of maintenance and calibration of monitoring and sampling equipment
  - action levels for changing levels of protection or area or site evacuation.
- Site control measures as required in 29 CFR 1910.120(d).
- Decontamination procedures in accordance with 29 CFR 1910.120(k).
- An emergency response plan meeting the requirements of 29 CFR 1910.120(l) for safe and effective responses to emergencies, including the necessary PPE and other equipment. The HASP provides site-specific details and requirements, including but not limited to:
  - emergency response procedures to control spills, releases, fires or explosions and chemical reactions
  - emergency alarm procedures
  - evacuation distances and routes
  - rally points
  - phone numbers for emergency agencies
  - directions to pre-designated local emergency medical facilities.
- Confined space entry procedures meeting the requirements of 29 CFR 1910.146 and WESTON’s “Confined Space Entry Procedure,” FLD 08. As a minimum, even if entry is not anticipated, confined spaces will be identified and the HASP will stipulate no entry to confined spaces.
- A spill containment program meeting the requirements of 29 CFR 1910.120(j).

10.5.1 Pre-entry Briefing

The site-specific HASP will provide for pre-entry briefings to be held prior to initiating any site activity, and at other times as necessary to ensure that employees are apprised of and implement the site-specific HASP. The information and data obtained from site characterization and analysis work required in 29 CFR 1910.120(c) is used to prepare and update the site-specific HASP.

10.5.2 Effectiveness of Site–Specific HASP

Inspections to determine the effectiveness of the site-specific HASP are conducted by the FSO or, in the absence of the FSO, another individual who is knowledgeable in occupational safety and health, acting on behalf of WESTON. Any deficiencies in the effectiveness of the site-specific HASP are corrected by WESTON.
10.6 SITE CHARACTERIZATION AND ANALYSIS

General
Hazardous waste sites are evaluated in accordance with 29 CFR 1910.120 and WESTON procedures to identify specific site hazards and to determine the appropriate safety and health controls needed to protect employees from the identified hazards.

Preliminary Evaluation
A preliminary evaluation of a site's characteristics is performed by a qualified person prior to site entry in order to aid in the selection of appropriate employee protection methods prior to site entry. Immediately after initial site entry, a more detailed evaluation of the site's specific characteristics is performed by a qualified person in order to further identify existing site hazards and to further aid in the selection of the appropriate engineering controls and PPE for the tasks to be performed.

Hazard Identification
All suspected conditions that may pose inhalation or skin absorption hazards that are IDLH or other conditions that may cause death or serious harm are identified during the preliminary survey and evaluated during the detailed survey. Examples of such hazards include, but are not limited to, confined space entry, potentially explosive or flammable situations, visible vapor clouds, or areas where biological indicators such as dead animals or vegetation are located.

Required Information
WESTON will obtain the following information to the extent available prior to allowing employees to enter a site:

- Location and approximate size of the site.
- Description of the response activity and/or the job task to be performed.
- Duration of the planned employee activity.
- Site topography and accessibility by air and roads.
- Safety and health hazards expected at the site.
- Pathways for hazardous substance dispersion.
- Present status and capabilities of emergency response teams that would provide assistance to on-site employees at the time of an emergency.
- Hazardous substances and health hazards involved or expected at the site and their chemical and physical properties.

Personal Protective Equipment
PPE will be provided and used during initial site entry in accordance with the following requirements:

- Based upon the results of the preliminary site evaluation, WESTON selects and uses a PPE ensemble during initial site entry. This PPE will provide protection to a level of exposure below permissible exposure limits and published exposure levels for known or suspected hazardous substances and health hazards and will provide protection against other known and suspected hazards identified during the preliminary site evaluation. If there is no permissible exposure limit or published exposure level, WESTON will use other published studies and information as a guide to appropriate PPE.
If respiratory protection is warranted by the potential hazards identified during the preliminary site evaluation, and positive-pressure SCBA is not used as part of the entry ensemble, an escape SCBA of at least five minute's duration will be carried by employees during initial site entry.

If the preliminary site evaluation does not produce sufficient information to identify the hazards or suspected hazards of the site, an ensemble equivalent to Level B PPE will be provided as minimum protection, and direct reading instruments will be used as appropriate for identifying IDLH conditions. WESTON’s Personal Protective Equipment and Respiratory Protection Programs (Sections 5.0 and 6.0) define the levels of protections and criteria for use or change of levels. The HASP defines the specific requirements for each site and task.

**Monitoring**

The HASP establishes air and other physical hazard monitoring to be conducted during initial site entry when the site evaluation produces information that is insufficient to eliminate the need for a specific monitoring. The HASP specifies conditions to be monitored and instruments to be used. The monitoring is designed to rule out hazardous conditions or sufficiently quantify hazards to more objectively determine continued protective measures. Monitoring information to be specified in the HASP includes:

- Monitoring with direct reading instruments for hazardous levels of ionizing radiation.
- Monitoring the air with appropriate direct reading test equipment (i.e., combustible gas meters, detector tubes) for IDLH and other conditions that may cause death or serious harm (e.g., combustible or explosive atmospheres, oxygen deficiency, toxic substances.)
- Visually observing for signs of actual or potential IDLH or other dangerous conditions.
- Ongoing air monitoring program compliant with 29 CFR 1910.120(h) to be implemented after site characterization has determined the site is safe for the start-up of operations.

**Risk Identification**

Once the presence and concentrations of specific hazardous substances and health hazards have been established, WESTON will identify and document the risks associated with these substances. Employees who will be working on the site will be informed of any risks that have been identified. Risks to consider include, but are not limited to:

- Exposures which exceed the permissible exposure limits and published exposure levels.
- IDLH Concentrations.
- Potential skin absorption and irritation sources.
- Potential eye irritation sources.
- Explosion sensitivity and flammability ranges.
- Oxygen deficiency.

**Employee Notification**

WESTON will maintain any information concerning the chemical, physical, and toxicological properties of each substance known or expected to be present on site. The information that is relevant to the duties an employee is expected to perform will be made available to the affected employee prior to the commencement of their work activities. WESTON may use information developed for the Hazard Communication Program (Section 4.0) for this purpose.
10.7 SITE CONTROL

Appropriate site control procedures will be implemented to control employee exposure to hazardous substances before clean-up work begins. A site control program for protecting employees will be developed during the planning stages of a hazardous waste clean-up operation and modified as necessary as new information becomes available.

The site control program will, as a minimum, include: A site map; site work zones; the use of a "buddy system"; site communications including alerting means for emergencies; the standard operating procedures or safe work practices; and, identification of the nearest medical assistance. Site control requirements are specified in the HASP.

10.8 TRAINING

All employees working on site (such as but not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site will have training meeting the requirements of 29 CFR 1910.120(e). Employees will receive training before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards. Employees will also receive review training compliant with 29 CFR 1910.120(e). Employees will not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility.

The training elements will thoroughly cover the following:

- Names of personnel and alternates responsible for site safety and health;
- Safety, health and other hazards present on the site;
- Use of PPE;
- Work practices by which the employee can minimize risks from hazards;
- Safe use of engineering controls and equipment on the site;
- Medical surveillance requirements including recognition of symptoms and signs which might indicate overexposure to hazards; and
- The contents of the safety and health elements specified in Sections 10.5.

Initial Training

- General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards will receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor.
- Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits will receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.
- Workers regularly on site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits
where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, will receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

- Workers with 24 hours of training covered by 29 CFR 1910.120(e)(3)(ii) and (iii), who become general site workers or who are required to wear respirators, will have an added 16 hours and two days of training necessary to total the training specified in 29 CFR 1910.120(e)(3)(i).

**Management and Supervisor Training**

On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations will receive 40 hours initial training, and three days of supervised field experience (the training may be reduced to 24 hours and one day if their only area responsibility is employees covered by 29 CFR 1910.120(e)(3)(ii) and (iii)) and at least eight additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.

**Qualifications for Trainers**

Trainers will be qualified to instruct employees about the subject matter that is being presented in training. Such trainers will have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they will have the academic credentials and instructional experience necessary for teaching the subjects. Instructors will demonstrate competent instructional skills and knowledge of the applicable subject matter.

**Training Certification**

Employees and supervisors that have received and successfully completed the training and field experience specified in 29 CFR 1910.120(e)(1) through (e)(4) will be certified by their instructor or the head instructor and trained supervisor as having completed the necessary training. A written certificate will be given to each person so certified. Any person who has not been so certified or who does not meet the requirements of 29 CFR 1910.120(e)(9) will be prohibited from engaging in hazardous waste operations.

**Emergency Response**

Employees who are engaged in responding to hazardous emergency situations at hazardous waste clean-up sites that may expose them to hazardous substances will be trained in how to respond to such expected emergencies.

**Refresher Training**

Employees specified in 29 CFR 1910.120(e)(1), and managers and supervisors specified in 29 CFR 1910.120(e)(4), will receive eight hours of refresher training annually on the items specified in 29 CFR 1910.120(e)(2) and/or (e)(4), any critique of incidents that have occurred in the past year that can serve as training examples of related work, and other relevant topics.

**Equivalent Training**

If WESTON can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training required in 29 CFR 1910.120(e)(1) through (e)(4), WESTON will not be required to provide the initial training requirements of those paragraphs to such employees and will provide a copy of the certification or documentation to the employee upon
request. However, certified employees or employees with equivalent training new to a site will receive appropriate, site-specific training before site entry and have appropriate supervised field experience at the new site. Equivalent training includes any academic training or the training that existing employees might have already received from actual hazardous waste site experience.

10.9 MEDICAL SURVEILLANCE

WESTON’s Medical Surveillance Program was instituted in the late 1970’s and has continuously been under the management of a qualified occupational physician. The Medical Surveillance Program is in full compliance with the provisions of 29 CFR 1910.120(f) as well as other OSHA and regulatory agency requirements. The medical surveillance program has been instituted by WESTON for the following employees:

a. All employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;

b. All employees who wear a respirator for 30 days or more a year or as required by 29 CFR 1910.134;

c. All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and

d. Members of HAZMAT teams.

Frequency of Medical Examinations and Consultations

WESTON makes available medical examinations and consultations to each employee covered under 29 CFR 1910.120 (f)(2) on the following schedules:

- For employees covered under 10.9.a, b, and d above;
  - Prior to assignment;
  - At least once every twelve months for each employee covered unless the attending physician believes a longer interval (not greater than biennially) is appropriate;
  - At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last six months.
  - As soon as possible upon notification by an employee that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the permissible exposure limits or published exposure levels in an emergency situation;
  - At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary.

- For employees covered under 10.9.c. above and for all employees covered by 29 CFR 1910.120(a)(1)(iv) who may have been injured, received a health impairment, developed signs or symptoms which may have resulted from exposure to hazardous substances resulting from an emergency incident, or exposed during an emergency incident to hazardous substances at concentrations above the permissible exposure limits or the published exposure levels without the necessary PPE being used:

As soon as possible following the emergency incident or development of signs or symptoms;
At additional times, if the examining physician determines that follow-up examinations or consultations are medically necessary.

**Content of Medical Examinations and Consultations**

WESTON’s medical surveillance program examinations include a medical and work history (or updated history if one is in the employee's file) with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the work site. WESTON’s OMP establishes medical evaluation procedures.

The content of medical examinations or consultations made available to employees according to 29 CFR 1910.120(f) is determined by the attending physician. The guidelines in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* have been consulted.

All medical examinations and procedures are performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine, and are provided without cost to the employee, without loss of pay, and at a reasonable time and place.

WESTON has provided one copy of 29 CFR 1910.120 and its appendices to the attending physician. WESTON also provides the following for each employee:

- A description of the employee's duties as they relate to the employee's exposures.
- The employee's exposure levels or anticipated exposure levels.
- A description of any PPE used or to be used.
- Information from previous medical examinations of the employee which is not readily available to the examining physician.

**Physician's Written Opinion**

WESTON obtains and furnishes each employee in the medical surveillance program with a copy of a written opinion from the examining physician containing the following:

- The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or emergency response, or from respirator use.
- The physician's recommended limitations upon the employee’s assigned work.
- The results of the medical examination and tests if requested by the employee.
- A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

The written opinion obtained by WESTON does not reveal specific findings or diagnoses unrelated to occupational exposure.

**Recordkeeping**

An accurate record of the medical surveillance required by 29 CFR 1910.120(f) is retained by WESTON’s Medical Surveillance Program Manager. This record will be retained for the period specified in and meet the criteria of 29 CFR 1910.1020. This record includes at least the following information:
- The name and social security number of the employee;
- Physicians' written opinions, recommended limitations and results of examinations and tests;
- Any employee medical complaints related to exposure to hazardous substances;
- A copy of the information provided by WESTON to the examining physician, with the exception of the OSHA standard and its appendices.

10.10 ENGINEERING CONTROLS, WORK PRACTICES, AND PERSONAL PROTECTIVE EQUIPMENT (PPE) – GENERAL REQUIREMENTS

Substances Regulated in Subparts G and Z

It is WESTON policy to use engineering controls and work practices whenever possible to control employee’s exposure to hazards. As hazardous work site operations are primarily outdoors in an unfixed location, employee protection frequently is provided by PPE. As applicable to hazardous substances, WESTON will use engineering controls, work practices, and PPE to maintain employees’ exposures below applicable permissible or published exposure limits. It is also WESTON policy to control exposures to below the most stringent of either the OSHA PEL (29 CFR Part 1910 Subpart Z, “Toxic and Hazardous Substances”) or current ACGIH TLVs. If no PEL or TLV is available, the NIOSH recommended exposure limits (RELs) or other consensus standard exposure limits will be used.

WESTON will not use a schedule of employee rotation as a means of compliance with permissible exposure limits or dose limits except when there is no other feasible way of complying with the airborne or dermal dose limits for ionizing radiation.


Substances Not Regulated in Subparts G and Z

WESTON uses an appropriate combination of engineering controls, work practices, and PPE to reduce and maintain employee exposure to or below published exposure levels for hazardous substances and health hazards not regulated by 29 CFR Part 1910, Subparts G and Z. WESTON may use the published literature and MSDS as a guide in determining the level of protection appropriate for hazardous substances and health hazards for which there is no permissible exposure limit or published exposure limit.

10.10.1 PPE Selection

PPE is selected and used to protect employees from the hazards and potential hazards they are likely to encounter as identified during the site characterization and analysis. WESTON’s Personal Protective Equipment and Respiratory Protection Programs (Sections 5.0 and 6.0) establish the basic criteria for selection and use of PPE. The HASP prescribes the level of PPE required for each task as well as the activities and action levels triggering the various levels of protection.

PPE selection is based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.

Positive pressure SCBA, or positive pressure air-line respirators equipped with an escape air supply will be used when chemical exposure levels present will create a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape, or are unknown.
**Totally-encapsulating Chemical Protective Suits**

Totally-encapsulating suits must protect employees from the particular hazards which are identified during site characterization and analysis. Totally-encapsulating suits will be capable of maintaining positive air pressure. Appendix A of 29 CFR 1910.120 or the manufacturer’s written procedures are used to establish a test method to evaluate this requirement.

Totally-encapsulating suits will be capable of preventing inward test gas leakage of more than 0.5 percent. Appendix A of 29 CFR 1910.120 or the manufacturer’s written procedures are used to establish a test method to evaluate this requirement.

Totally-encapsulating chemical protective suits (protection equivalent to Level A protection as recommended in Section 5.0) will be used in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

The level of protection provided by PPE selection will be increased when additional information or site conditions show that increased protection is necessary to reduce employee exposures below permissible exposure limits and published exposure levels for hazardous substances and health hazards. WESTON’s Personal Protective Equipment and Respiratory Protection Programs (Sections 5.0 and 6.0) provide guidance for selecting PPE ensembles. HASPs will clearly specify the conditions that will require increasing (upgrading) a level of protection.

The level of employee protection provided may be decreased when additional information or site conditions show that decreased protection will not result in hazardous exposures to employees. HASPs will clearly specify the conditions that will permit decreasing (downgrading) a level of protection.

Personal protective equipment will be selected and used to meet the requirements of 29 CFR Part 1910, Subpart I, “Personal Protective Equipment” and additional requirements specified in 29 CFR 1910.120.

**10.10.2 PPE Program**

WESTON maintains and implements Personal Protective Equipment and Respiratory Protection Programs (Sections 5.0 and 6.0), as required in 29 CFR 1910.120(b) or (p)(1). Site-specific PPE Programs are also established in each HASP.

The PPE program addresses the elements listed below. When elements, such as donning and doffing procedures, are provided by the manufacturer of a piece of equipment and are attached to the plan, they need not be rewritten into the plan as long as they adequately address the procedure or element.

- PPE selection based upon site hazards,
- PPE use and limitations of the equipment,
- Work mission duration,
- PPE maintenance and storage,
- PPE decontamination and disposal,
- PPE training and proper fitting,
- PPE donning and doffing procedures,
- PPE inspection procedures prior to, during, and after use,
Evaluation of the effectiveness of the PPE program, and
- Limitations during temperature extremes, heat stress, and other appropriate medical considerations.

10.10.3 Monitoring

General
Each HASP establishes and specifies the instruments and methods to be used to comply with 29 CFR 1910.120(h) where there may be a question of employee exposure to hazardous concentrations of hazardous substances. Monitoring ensures the proper selection of engineering controls, work practices, and PPE so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

Air Monitoring
WESTON conducts air monitoring to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of employee protection needed on site.

During initial entry, WESTON conducts representative air monitoring to identify any IDLH condition, exposure over permissible exposure limits or published exposure levels, exposure over a radioactive material's dose limits, or other dangerous condition such as the presence of flammable atmospheres or oxygen-deficient environments.

Periodic Monitoring
WESTON conducts periodic monitoring when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:

- When work begins on a different portion of the site.
- When contaminants other than those previously identified are being handled.
- When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling).
- When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon).

Monitoring of High-Risk Employees
After the actual clean-up phase of any hazardous waste operation commences (for example, when soil, surface water or containers are moved or disturbed), WESTON will monitor those employees likely to have the highest exposures to those hazardous substances and health hazards likely to be present above permissible exposure limits or published exposure levels. Monitoring of high-risk employees will be through personal sampling or equivalent methods and conducted frequently enough to characterize employee exposures.

WESTON may use a representative sampling approach by documenting that the employees and chemicals chosen for monitoring are based on those employees likely to have the highest exposures to those hazardous substances and health hazards likely to be present above permissible exposure limits or published exposure levels. If the employees likely to have the highest exposure are over permissible
exposure limits or published exposure limits, monitoring will continue to determine all employees likely
to be above those limits. WESTON may use a representative sampling approach by documenting that the
employees and chemicals chosen for monitoring are based on the criteria stated above.

WESTON is not required to provide personal sample monitoring of employees engaged in site
characterization operations covered by 29 CFR 1910.120(c), “Site Characterization and Analysis.”

10.11 INFORMATIONAL PROGRAMS

WESTON has developed and implements a program which is part of WESTON's comprehensive EHS
Program required in 29 CFR 1910.120(b) to inform employees, contractors, and subcontractors (or their
representative) actually engaged in hazardous waste operations of the nature, level and degree of exposure
likely as a result of participation in such hazardous waste operations. The site-specific aspects of the
program are established in each HASP and include documented initial site indoctrination and daily
tailgate safety meetings.

10.12 HANDLING DRUMS AND CONTAINERS

WESTON personnel handle drums in accordance with FLD 58 “Drum Handling Operations.”

10.13 DECONTAMINATION

Decontamination procedures for personnel and equipment are specified in each HASP and are
communicated to site workers during site safety and health orientation. WESTON personnel implement
FLD 59, “Decontamination” to minimize employee contact with hazardous substances or with equipment
that has contacted hazardous substances. FLD 59 is based on Occupational Safety and Health Guidance
Manual for Hazardous Waste Site Activities, prepared by OSHA, NIOSH, the U.S. Coast Guard, and
EPA.

All employees leaving a contaminated area will be appropriately decontaminated; all contaminated
clothing and equipment leaving a contaminated area will be appropriately disposed of or decontaminated.

Decontamination procedures will be monitored by the FSO to determine their effectiveness. When such
procedures are found to be ineffective, WESTON will take appropriate steps to correct any deficiencies.

WESTON will perform decontamination in geographical areas that will minimize the exposure of
uncontaminated employees or equipment to contaminated employees or equipment. All equipment and
solvents used for decontamination will be decontaminated or disposed of properly.

PPE and Equipment

WESTON decontaminates, cleans, launders, maintains, or replaces PPE and equipment as needed to
maintain their effectiveness.

Employees whose permeable clothing becomes wetted with hazardous substances will immediately
remove that clothing and proceed to shower. WESTON will ensure that the clothing is disposed of or
decontaminated before it is removed from the work zone.

Unauthorized employees will not remove PPE or equipment from change rooms.

WESTON will inform commercial laundries or cleaning establishments that decontaminate PPE or
equipment of the potentially harmful effects of exposures to hazardous substances.
Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, WESTON will provide them and ensure they meet the requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then WESTON will provide other effective means for cleansing.

10.14 EMERGENCY RESPONSE BY EMPLOYEES AT UNCONTROLLED HAZARDOUS WASTE SITES

WESTON has developed a standard Emergency Response Plan for use in hazardous waste site operations activities that is included in each HASP. The HASP also establishes site-specific and unique emergency response procedures. These plans conform to 29 CFR 1910.120(l).

In other than hazardous waste site operations as defined by this program, WESTON will normally activate the Facilities Emergency Response Plan and evacuate our employees from the danger area when an emergency occurs. WESTON will not permit any of our employees to assist in handling the emergency, except as provided for in 29 CFR 1910.120(q)(4) and (5). If WESTON employees or subcontractors respond to the emergency phase of a hazardous materials incident defined by 29 CFR 1910.120(q) WESTON Procedure for Emergency Response to Hazardous Material Incidents Part Q will be used.

For the purposes of hazardous waste site activities, WESTON’s HASP will provide an emergency response plan for emergencies which will address, as a minimum, the following:

- Pre-emergency planning.
- Personnel roles, lines of authority, training, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Site security and control.
- Evacuation routes and procedures.
- Decontamination procedures which are not covered by the HASP.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- PPE and emergency equipment.

Procedures for Handling Emergency Incidents

In addition to the emergency response plan elements, WESTON will ensure that the following requirements are addressed or met in emergency response plans:

- Site topography, layout, and prevailing weather conditions.
- Procedures for reporting incidents to local, state, and federal governmental agencies.
- The emergency response plan will be a separate section of the HASP.
- The emergency response plan will be compatible and integrated with the disaster, fire, and/or emergency response plans of local, state, and federal agencies.
- The emergency response plan will be rehearsed regularly as part of the overall training program for site operations.
- The site emergency response plan will be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.
An employee alarm system will be installed in accordance with 29 CFR 1910.165 to notify employees of an emergency situation, to stop work activities if necessary, to lower background noise in order to speed communication, and to begin emergency procedures.

Based upon the information available at time of the emergency, WESTON will evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

**10.15 CERTAIN OPERATIONS CONDUCTED UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 (RCRA)**

When WESTON conducts operations involving hazardous waste at TSD facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or by agencies under agreement with the EPA to implement RCRA regulations [29 CFR 1910.120(a)(1)(iv)], the following programs will be implemented:

**Safety and Health Program**

WESTON will develop a site-specific HASP for employees involved in hazardous waste operations that will be available for inspection by employees, their representatives and OSHA personnel. The program will be designed to identify, evaluate and control safety and health hazards in their facilities for the purpose of employee protection, to provide for emergency response meeting the requirements of 29 CFR 1910.120 (p)(8) and to address as appropriate site analysis, engineering controls, maximum exposure limits, hazardous waste handling procedures and uses of new technologies.

**Hazard Communication Program**

WESTON’s Hazard Communication Program is provided in Section 4.0 of this EHS Program.

**Medical Surveillance Program**

WESTON’s medical surveillance program is summarized in Section 10.9. WESTON’s Occupational Medical Monitoring Program is available on the EHS Portal site.

**Decontamination Program**

WESTON’s decontamination program is described in Section 10.13.

**New Technologies Program**

WESTON will develop and implement procedures for the introduction of effective new technologies and equipment developed for the improved protection of employees working with hazardous waste clean-up operations. As appropriate, WESTON will evaluate new technologies, equipment or control measures available to the industry, such as the use of foams, absorbents, neutralizers, or other means to suppress the level of air contaminants while excavating the site or for spill control. Such an evaluation will be done to determine the effectiveness of the new methods, materials, or equipment before implementing their use on a large scale for enhancing employee protection. Information and data from manufacturers or suppliers may be used as part of the WESTON’s evaluation effort. These evaluations will be made available to OSHA upon request.

**Material Handling Program**

Where employees will be handling drums or containers, they will implement FLD 58, “Drum Handling Operations,” meeting the requirements of paragraphs 29 CFR 1910.120(j)(1)(ii) through (viii) and (xi), as well as 1910.120(j)(3) and (j)(8) prior to starting such work.
Emergency Response Plan

The site-specific HASP will include an emergency response plan as described and defined above. Such plans need not duplicate any of the subjects fully addressed in the WESTON’s contingency planning required by permits, such as those issued by the EPA, provided that the contingency plan is made part of the emergency response plan. If the Emergency Response Plan is to simply evacuate employees from the worksite location when an emergency occurs and employees are not permitted to assist in handling the emergency (except as provided for in 29 CFR 1910.120(q)(4) and (5)), the requirements of 29 CFR 1910.120(p)(8) do not apply.

If WESTON employees or subcontractors respond to the emergency phase of a hazardous materials incident defined by 29 CFR 1910.120(q), the requirements of Section 9.2 will be implemented.
Part 2
Safety Manual
11.0 SAFETY MANUAL

During project execution, a necessary approach to minimize, control or eliminate the potential for adverse impact to human health and the environment is the use of administrative controls. The primary administrative control is the development and implementation of a site-specific HASP or APP that addresses all recognized and anticipated hazards associated with every work assignment. The HASP or APP must be read, understood and implemented by all project personnel. FLDs are field operation procedures followed by WESTON personnel and available on the WESTON EHS Portal. The FSO will ensure that a tailgate health and safety briefing covers all work activities scheduled for a particular day. An important administrative control is the Field Environmental Compliance (EC) Plan or EHS Analysis Checklist.

11.1 EHS DOCUMENTS AND RECORDS

WESTON has established and maintains procedures for controlling records and documents. Documents and records will be appropriately maintained (i.e., accessible, periodically reviewed, updated as necessary, approved for adequacy, current versions of documents available at all locations, obsolete documents are removed from use or marked for unintended use and outdated documents retained for legal and/or other purposes will be appropriately marked).

WESTON EHS documents are developed and reviewed to ensure document quality and compliance with regulations and client requirements. Project managers ensure version and access control of project documents. As needed, client- or project-specific procedures and responsibilities are established and maintained regarding development and revision of documents. Examples of EHS documents developed by WESTON include, but are not limited to, HASPs; regulatory plans; monitoring, status, and summary reports; and documentation of programmatic data.

Regulatory plans such as RCRA Contingency Plan, the Storm Water Runoff Plan, the Spill Prevention Control and Countermeasures Plan are maintained and updated on the required regulatory reporting cycle. Compliance reporting may include Toxic Substances Control Act (TSCA) Reporting, RCRA Annual Hazardous Waste Generation Reporting, SARA 312 Inventory Quantities, SARA 313 Toxic Release Inventory (TRI) Reporting, National Pollutant Discharge Elimination System (NPDES) monitoring and stormwater runoff reporting, ground water monitoring reports, permit renewal.

11.1.1 Health and Safety Plan (HASP)/Accident Prevention Plan (APP)

The HASP or APP is required for all field projects and includes project-specific task-by-task hazard risk analysis, emergency contingencies, field operating procedures, and background information. The HASP or APP must be submitted to the Project Manager for approval and to the appropriate DEHSM, OSO, or designee, for review. For F&I and fuels projects, a copy of the completed HASP/APP will be sent to the respective Service Line EHS Manager.

11.1.2 Field Environmental Compliance Plan

Environmental compliance issues should be identified and addressed through proper planning at the proposal stage of a project using available checklists and templates. The EHS Analysis Checklist is to be completed for each project. If the evaluation made using the EHS Analysis Checklist determines an EC Plan is not needed for a project, the EHS Analysis Checklist is to be retained in the project files to document that finding. All EC documentation (including designation of the Site EC Officer) should be included in a separate EC Plan or in the HASP/APP as an attachment.
11.1.3 Field EHS Reviews

To ensure that appropriate WESTON, OSHA, EPA and other applicable policies, procedures and practices are implemented, an EHS review must be completed and documented. The EHS review is to be completed by an appropriate professional as determined by the Project Manager. The EHS review process is mandatory for all projects with a duration greater than 90 days and at least 10% of field projects with a duration less than 90 days. All corrective actions are to be completed as soon as possible, but not later than 30 days after the review. A copy of the EHS review should be forwarded to the respective EHS Manager, DEHSM, Project Manager, Client Services Manager, FSO, and the project file.

When developing project budgets, Project Managers are encouraged to consider the time required to complete EHS activities, including the site EHS reviews.

11.1.4 Field Procedures

WESTON’s EHS Program is standard work practice for every job, with workers operating in a manner compliant with requirements, standards, and established procedures. As applicable to the work scope, line managers are supported by WESTON EHS staff including corporate and field safety professionals, industrial hygienists, health physicists, and site safety officers.

The field procedures available on-line on the WESTON EHS Portal site and other programs in this EHS Program were developed to meet or exceed federal safety regulations. Additional state-specific regulations often exist and may differ from the federal requirements. It is the responsibility of the project or site manager(s) to ensure that their operations comply with local or state safety requirements.

The project manager must establish clear lines of communication with the client and ensure that project- or site-specific requirements, QA plans, and other required documentation are approved before work begins.

11.1.5 EHS Records

WESTON has established and maintains procedures for the identification, maintenance and disposition of records. EHS records shall include training records, inspection results, monitoring data, and the results of audits and reviews. WESTON EHS records shall be legible, dated, identifiable and traceable to the activity, product, or service involved. EHS records shall be appropriately stored and maintained, retained for a specified period, and updated on a scheduled basis.

Records authenticate the activities that have taken place or the conditions that exist at the site at any given time. Records can reduce the potential for miscommunication or misunderstandings in a conversation, and can be a protection from claims that might otherwise be defended based only on memory. Typical site record requirements include:

- Training logs.
- Site walk inspection reports.
- Environmental sampling and monitoring logs.
- Chemical and/or material inventories.
- Hazardous substance shipping manifests.
- Equipment calibration logs.
- Hazardous work permits and environmental permits.
- Listing of all hazardous chemicals and wastes at the site (and the MSDSs).
- Environmental data (rainfall, weather conditions, etc.).
- Environmental permits.
The thoroughness and accuracy of the records is critical. Incomplete records may result in a job having to be redone to ensure that there is proper documentation of all the requirements. This is especially true for activities such as those involving environmental sampling data or instrument calibration. Accuracy is important. Intentionally falsifying information can result in fines or imprisonment.

11.2 HEALTH AND SAFETY PLAN

A segment of WESTON’s safety programs address field activities in general. Prior to beginning work on any field project, a site-specific HASP is developed to address the recognized hazards that may be present during the work activities. The site-specific HASP is developed to implement general requirements of 29 CFR Part 1910 and/or 1926, and may implement specific requirements of 29 CFR 1910.120/1926.65 for hazardous waste operations and emergency response. The completed and approved HASP must be accessible on site to all personnel working on the project. It is the responsibility of the site workers to ensure that they understand and comply with the requirements in the site health and safety plan. WESTON project HASPs may follow a client-preferred format (e.g., DoD, DOE, USACE). Some of these formats or templates and the WESTON form HASP are available on-line on the EHS Portal.

11.2.1 Amending Health and Safety Plans

In the event on-site conditions change, new tasks are added to a project, HASP end dates need to be extended, or new personnel or subcontractors are assigned to the project, the HASP will need to be amended.

The following procedure provides a formal guide for accomplishing this so the effort is efficient, and review and approval are provided in a consistent format:

- Provide the following information in writing:
  - Project name.
  - Project Work Order Number.
  - Amendment number: Check the page 1 cover sheet of the original HASP and use the next available HASP amendment number (lower right-hand side of the page 1 cover sheet).
  - Indicate the reason(s) for the HASP amendment (e.g., extension of end date, add new tasks, additional personnel).
  - Include any additional information required by the amendment (e.g., chemical data sheets, MSDS sheets, Field Operating Procedures, changes in action levels or levels of protection, new subcontractor information).
- Ensure review by Safety Office, DEHSM, CEH&S, as necessary.
- Submit the above information, along with a copy of the original signed HASP page 1 cover sheet, to the Project Manager for approval.

11.3 ASSESSMENTS AND AUDITS

WESTON’s top management will, on a scheduled basis, review the EHS management system to ensure continuing suitability, adequacy and effectiveness. EHS management system reviews will be documented. The EHS Director will communicate status of EHS performance to management in regularly scheduled meetings.
WESTON will maintain program and procedures for periodic environmental management system audits to provide information on the results of audits to management and learn if the EHS management system is being implemented.

WESTON EHS inspections and audits are conducted to evaluate the effectiveness of the EHS Program. Weston’s President’s Safety Award criteria requires EHS Review of 100% of all high risk projects, as well as projects 90 days or longer in the field – at least once per quarter by the responsible Division EHS Manager or delegated representative. Formal EHS Review is also required on at least 20% of all other field projects. Additional reviews are conducted on an “as-needed” basis which may be triggered by feedback from the Project Life Cycle (PLC) review process.

Continuous improvement in performance is developed on the ‘Plan-Do-Check-Act’ quality model. Audit data are tracked as nonconformance data until formal closure is accomplished with verification.

EHS inspections and audits listed above do not limit or eliminate the requirement for Project Management and Site Management-level compliance audits, surveillance, and inspections that are to be conducted on an established schedule.

WESTON will establish and maintain appropriate EHS compliance programs with regularly scheduled audits, assessments and surveillances planned to monitor EHS performance and assure continuous compliance programs.

11.4 EHS GUIDANCE AND FORMS

WESTON reviews and improves documents and other tools that are used to ensure the health and safety of workers and the public and protection of the environment. Some of these tools are described below. These and other forms are available on the WESTON EHS Portal.

Field Operation Procedures (FLDs)—These FLDs are a compilation of field safety procedures that are implemented by WESTON personnel. FLDs are listed in Appendix 10-1. These procedures may be found under “Guidance Documents and Policies”, OPs and FLDs.

Radiation Safety Operating Procedures—This is a compilation of a wide variety of Radiation Safety Operating Practices, Procedures, and Protocols that can be adapted to field operations with radiological concerns. These procedures may be found under “Guidance Documents and Policies”, OPs and FLDs.

EHS Compliance Checklist—This important planning tool/template has multiple uses to ensure environmental compliance.

- First, it should be used at the pre-proposal stage for a specific contract or statement of work to highlight environmental issues that need to be addressed during project execution. This will enable a Project Manager or CSM to identify personnel and other necessary resources, and to plan appropriate budgets. The template requires issues surrounding potential environmental impacts to be fully explored and resolved before the proposal is submitted to a client.

- Second, the completed Checklist provides the basis for developing a Site-Specific Environmental Compliance Plan that will be implemented during Project execution.

- Third, the completed Checklist serves as the initial step in an environmental compliance review process: The Checklist is used to ensure the Site-Specific Environmental Compliance Plan addresses all relevant elements and all “unknown” answers have been resolved; then site operations are reviewed to assess if the EC Compliance Plan is properly implemented.
- Environmental Health and Safety Inspection Checklist – This document is comprehensive EHS Review document based on OSHA, EM 385-1-1, and select environmental regulations. It is primarily targeted at health and safety elements and a number of routine environmental concerns. The Environmental Compliance Checklist referenced above provides for a more rigorous environmental compliance assessment. This Checklist can be found under “Forms” on the CEHS Portal Site.

- EHS Analysis Checklist—This form is to be used during field operations to highlight chemical, biological, radiological, and physical hazards that employees may be exposed to during their work shift, and the required protective equipment and measures. The second page contains a checklist of environmental compliance considerations. It can also be used as an audit/review form to create a “snap shot” of daily site operations. This Checklist can be found under “Forms” on the CEHS Portal Site.

- Hazardous Waste Inspection Checklist—This form is a single-page checklist that targets critical on-site hazardous waste storage issues with questions on containers, storage areas, satellite accumulation areas, and emergency response equipment. This Checklist can be found under “Forms” on the CEHS Portal Site.

- RCRA Hotline Training Modules—These modules are in “PDF” format and contain EPA’s written training program for 34 major elements under the RCRA regulations. It is used for training contractors who staff EPA’s RCRA Hotline and field questions from the regulated community. These can be found under “Environmental Topics”.


- Construction Safety Guide Attachments to CRRG—Includes Site Safety Files System, OSHA Written Program Requirements, OSHA Training Requirements, New Employee/Visitor Indoctrination, Competent Person Requirement List, Qualified Persons Requirement List, Housekeeping Checklist, Site-Specific Hazard Communication Program, Hazard Assessment and PPE Selection, Site-Specific Confined Space Entry Programs, Site-Specific Lockout/Tag-out Program, and Logging Operations Inspection Requirements. This document may be found under “Guidance Documents and Policies”- CRR/TS Project Guidance Documents.
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### APPENDIX 11-1
WESTON FIELD OPERATION PROCEDURES (FLDs)

<table>
<thead>
<tr>
<th>FLD No.</th>
<th>FLD Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLD 01</td>
<td>Conservation Revised as a Program. (Section 7.0)</td>
</tr>
<tr>
<td>FLD 02</td>
<td>Inclement Weather</td>
</tr>
<tr>
<td>FLD 03</td>
<td>Hot Processes – Steam, Low Temperature Thermal Treatment Unit and Transportable Incinerator</td>
</tr>
<tr>
<td>FLD 04</td>
<td>Incinerator Combined with FLD 03.</td>
</tr>
<tr>
<td>FLD 05</td>
<td>Heat Stress Prevention and Monitoring</td>
</tr>
<tr>
<td>FLD 06</td>
<td>Cold Stress</td>
</tr>
<tr>
<td>FLD 07</td>
<td>Feet Combined with FLD 02.</td>
</tr>
<tr>
<td>FLD 08</td>
<td>Confined Space Entry Program</td>
</tr>
<tr>
<td>FLD 09</td>
<td>Powered Industrial Trucks</td>
</tr>
<tr>
<td>FLD 10</td>
<td>Manual Lifting and Handling of Heavy Objects</td>
</tr>
<tr>
<td>FLD 11</td>
<td>Rough Terrain</td>
</tr>
<tr>
<td>FLD 12</td>
<td>Housekeeping</td>
</tr>
<tr>
<td>FLD 13</td>
<td>Structural Integrity</td>
</tr>
<tr>
<td>FLD 14</td>
<td>Site Security</td>
</tr>
<tr>
<td>FLD 15</td>
<td>Areas All information covered in other FLDs.</td>
</tr>
<tr>
<td>FLD 16</td>
<td>Pressure Systems: Compressed Gas Systems</td>
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<tr>
<td>FLD 17</td>
<td>Diving</td>
</tr>
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<td>FLD 18</td>
<td>Operation and Use of Boats</td>
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<td>FLD 19</td>
<td>Working Over or Near Water</td>
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<td>FLD 20</td>
<td>Traffic</td>
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<td>FLD 21</td>
<td>Explosives</td>
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<tr>
<td>FLD 22</td>
<td>Heavy Equipment Operation</td>
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<tr>
<td>FLD 23</td>
<td>Cranes, Rigging, and Slings</td>
</tr>
<tr>
<td>FLD 24</td>
<td>Aerial Lifts/Manlifts</td>
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<td>FLD 25</td>
<td>Working at Elevation/Fall Protection</td>
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<td>FLD 26</td>
<td>Ladders</td>
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<td>FLD 27</td>
<td>Scaffolding</td>
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<td>FLD 28</td>
<td>Excavating/Trenching</td>
</tr>
<tr>
<td>FLD 29</td>
<td>Handling Moved information to FLD 12, FLD 30, and new FLD 57, “Motor Vehicle Safety &amp; Maintenance”</td>
</tr>
<tr>
<td>FLD 30</td>
<td>Hazardous Materials Use and Storage</td>
</tr>
<tr>
<td>FLD 31</td>
<td>Fire Prevention and Protection Planning</td>
</tr>
<tr>
<td>FLD 32</td>
<td>Fire Extinguishers Required and Requirements</td>
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<td>FLD 33</td>
<td>Demolition</td>
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<td>FLD 34</td>
<td>Utilities</td>
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<td>FLD 35</td>
<td>Electrical Safety</td>
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<td>FLD 36</td>
<td>Welding/Cutting/Burning</td>
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<td>FLD 37</td>
<td>Pressure Washers/Sandblasting</td>
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<tr>
<td>FLD 38</td>
<td>Hand and Power Hand Tools</td>
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<td>FLD 39</td>
<td>Illumination</td>
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<td>FLD No.</td>
<td>FLD Title</td>
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<tr>
<td>FLD 40</td>
<td>Storage Tank Removal and Decommissioning</td>
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<td>FLD 41</td>
<td>Hand and Emergency Signals/Radio Communication</td>
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<tr>
<td>FLD 42</td>
<td>Lockout/Tagout</td>
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<tr>
<td>FLD 43</td>
<td>Biological Hazards</td>
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<tr>
<td>FLD 44</td>
<td>Biological Hazards – Bloodborne Pathogens Exposure Control Plan – First Aid Providers</td>
</tr>
<tr>
<td>FLD 45</td>
<td>Biological Hazards – Bloodborne Pathogens Exposure Control Plan – Work With Infectious Waste</td>
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<td>FLD 46</td>
<td>Control of Exposure to Lead</td>
</tr>
<tr>
<td>FLD 47</td>
<td>Clearing, Grubbing and Logging Operations</td>
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<td>FLD 48</td>
<td>Federal, State, Local Regulatory Agency Inspections</td>
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<tr>
<td>FLD 49</td>
<td>Safe Storage of Samples</td>
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<td>FLD 50</td>
<td>Cadmium Exposure Control Plan</td>
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<td>FLD 51</td>
<td>Process Safety Procedure</td>
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<td>FLD 52</td>
<td>Asbestos Exposure Control Plan</td>
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<td>FLD 53</td>
<td>Hexavalent Chromium Exposure Control Plan</td>
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<tr>
<td>FLD 54</td>
<td>Benzene Exposure Control Plan</td>
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<td>FLD 55</td>
<td>Working with Hydrofluoric Acid</td>
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<tr>
<td>FLD 56</td>
<td>Drilling Safety</td>
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<tr>
<td>FLD 57</td>
<td>Motor Vehicle Safety and Maintenance</td>
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<tr>
<td>FLD 58</td>
<td>Drum Handling Operations</td>
</tr>
<tr>
<td>FLD 59</td>
<td>Decontamination</td>
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<tr>
<td>FLD 60</td>
<td>Employee Duty Schedule/Basic Fatigue Management Plan</td>
</tr>
<tr>
<td>FLD 61</td>
<td>Gasoline Contaminant Exposure</td>
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</tbody>
</table>
Part 3
Environmental Protection and Sustainability Program
12.0 ENVIRONMENTAL PROTECTION AND SUSTAINABILITY PROGRAM

As part of Weston Solutions, Inc.’s (WESTON®) comprehensive, integrated Environmental, Health, and Safety (EHS) Program, this Environmental Protection and Sustainability Program (EPSP) establishes the approach to executing all operations in a manner that protects the environment, complies with all environmental laws and regulations, and encourages environmental sustainability while ensuring the safety of employees and the public. This EPSP provides a simplified framework and process for accomplishing WESTON’s Policy for environmental protection and compliance.

12.1 ENVIRONMENTAL COMPLIANCE – FUNDAMENTAL ELEMENTS

Environmental compliance at WESTON is anchored by four (4) fundamental elements that firmly establish our Environmental Protection Program as part of WESTON’s culture: 1) The EPSP Impact Checklist, 2) The Environmental Compliance Plan, 3) internal WESTON Environmental Advisors, and 4) Environmental Compliance Site Reviews and Audits with corrective actions as-needed.

(1) Project Managers (PM) (and Client Services Managers [CSM] at the proposal phase of our Project Life Cycle process [PLC] if there is not a designated PM) are accountable and responsible for environmental compliance planning. The PM or CSM or their designee will complete the EPSP Impact Checklist found under “Forms” and under the Environmental Protection Tab on Corporate Environmental Health and Safety (CEHS) Portal. This checklist will be completed during the pre-proposal stage so that all relevant environmental compliance issues can be identified before WESTON submits a proposal. The checklist will be approved by the PM or CSM and will be maintained in the project file.

(2) The PM will ensure that items which have been checked as “Yes” or “Unknown” in the EPSP Impact Checklist will be addressed in an Environmental Compliance Plan that is usually developed upon contract award. There may be circumstances in which the process may begin before contract award under the direction of the PM. The Environmental Compliance Plan describes how the project team, office, or activity will comply with national, state, and local environmental regulations. This will include direction on how to obtain required permits; report as required; and design, construct, and institute the necessary controls required to protect the environment and the public. Depending on the nature of the project, the Environmental Compliance Plan may require the use of other forms that are available on the CEHS Portal, such as the “Hazardous Waste Storage Area Inspection Plan” or the “Treatment Storage & Disposal Facility (TSDF) Audit Questionnaire.”

The Plan will be written by appropriately qualified and experienced individuals and reviewed, as appropriate, by subject matter experts. The Plan will be approved and maintained by the Project Manager who will be responsible for environmental compliance and sustainability issues throughout project execution. The Environmental Compliance Plan may be a stand-alone document or may be incorporated into the site-specific Health and Safety Plan as an attachment which is readily identifiable as the Environmental Compliance Plan Appendix.

(3) The CEHS Department will maintain a list of WESTON Environmental Advisors (subject matter experts) on the CEHS Portal site that will be updated once a quarter by the Division EHS Managers. An Environmental Advisor will be consulted, when local subject matter expertise is not available. Environmental Advisors will provide assistance in the development of the EPSP Impact Checklist, the Environmental Compliance Plan and for project-specific needs. (Division EHS Managers will provide assistance on an as-needed/requested basis.)
Environmental Compliance Site Reviews will be performed by Division EHS Managers and/or their designees to assure that any environmental issues identified in the EPSP Impact Checklist and the Environmental Compliance Plan are being properly addressed. Division EHS Managers are responsible for conducting Environmental Compliance Site reviews on the following project sites at least once per quarter:

- 100% of all High-Risk Projects
- Projects 90 days or longer in the field
- 20% of all other field Projects

An Environmental Compliance Site Review may be performed in conjunction with a General Health & Safety Site Review or may be conducted as a separate review. Profit Center Managers or their delegates (other than Site Managers or Division EHS Managers) should participate in at least one EHS Site Review per quarter – providing leadership by example. This Review is intended to be a dialogue, not a formalized check-list type of audit, to ensure all parties understand the challenges and successes and to enable the manager to allocate additional resources if needed. It should be conducted in the spirit of Behavior-Based Safety, an active caring process to ensure the well-being of our employees and the environment.

The Corporate EHS Director will assist with Environmental Compliance Site Reviews on an as-needed/as-requested basis.

The EPSP Impact Checklist and the Environmental Compliance Plan are the core documents against which the Environmental Compliance Site Review should be conducted. The initial Environmental Compliance Site Review of a project site should address whether the Environmental Compliance Plan adequately addresses the issues identified in the EPSP Impact Checklist. The initial and subsequent Environmental Compliance Site Reviews of a project site should address whether the project is following each element of the Environmental Compliance Plan.

All Environmental Compliance Site Reviews should be documented using the EPSP Impact Checklist as a starting point, or using other documentation that clearly shows what items were reviewed, the review findings and any plans/suggestions for improvement. At the end of each calendar quarter Division EHS Managers must provide the Corporate EHS Director with a copy of the documentation for all Environmental Compliance Site Reviews that have been conducted during the quarter. This documentation will be posted on the Corporate EHS Portal Site.

Note: This EPSP references specific United States laws and regulations. WESTON conducts many operations globally in which host country regulations take precedence. Host country regulations must be evaluated for each opportunity, and while most regulations encountered have been aligned with those of the United States, a thorough check must be performed to ensure understanding of local requirements. A Best Practice is to seek local in-country support for an EHS Briefing as there is no substitute for in-country expertise. For example, in 2008 we were informed that driving certain types of trucks on the road on Sundays is forbidden in France. Additional resources can also be found using the list of WESTON Environmental Advisors under Global Regulations.

A global EHS newsletter is produced by ENHESA which provides a starting point for researching host country regulations. ENHESA is a global environmental, health and safety consultancy, providing EHS regulatory compliance assurance support to industry worldwide. Their web site is found at: http://www.enhesa.com/ . Having to identify, understand and assure compliance with a multitude of legal requirements is a necessity in doing business in today's global marketplace.
12.2 UNDERSTANDING ENVIRONMENTAL RESPONSIBILITIES

Protection of the environment is critical to our future as a nation, as a business, and as individuals. Compliance with laws and regulations affect the manner in which we perform work and our personal safety. Although the legal and regulatory framework is complex, all WESTON employees must comply with these requirements. Each employee must be aware of the EHS responsibilities and how we are expected to meet them. This EPSP does not replace project procedures, but is intended to provide the detail necessary to implement the Corporate environmental policy. This Program has been designed as a roadmap to identify some of the key regulations and responsibilities, and how to ensure that our operations and actions meet these requirements.

WESTON employees are expected to carry out WESTON’s EPSP by:

- Conducting all activities (office or field) in a manner that protects the environment.
- Complying with all environmental laws and regulations.
- Understanding and complying with this EPSP.
- Following the most current version of applicable environmental compliance procedures.
- Following client-specific and/or other nation guidance where and as applicable (e.g., overseas operations).

12.3 SUSTAINABILITY WITHIN WESTON

Weston is committed to minimizing impacts on the environment and society by promoting sustainability through its business practices. Hence, Weston is integrating environmental performance considerations into its evaluation criteria for project practices and for selecting suppliers, service providers and contractors to furnish materials, supplies, equipment and services, whether for internal use or for project execution on behalf of its Clients. These sustainability performance considerations include resource efficiency, use of renewable resources, life-cycle assessment, waste reduction, pollution prevention, fair labor practices, positive relationship with the local community.

The resources in the Sustainability Portal can be used to help address those sustainability issues or opportunities identified through the use of the Checklist. WESTON’s Sustainability Portal can be found at: [http://westonportal/sites/sustainability/default.aspx](http://westonportal/sites/sustainability/default.aspx) and can be used to access Sustainability Practices, background information, project summaries, training resources and personnel contacts. In addition, several key questions related to sustainability have been incorporated into the Environmental Health and Safety Impact Checklist to ensure that all projects go through at least a basic analysis of the potential for integration of sustainable approaches to project execution.

12.4 ENVIRONMENTAL POLICY STATEMENT

Environmental management systems and processes are an integral and essential part of the WESTON EHS Program. WESTON is committed to operating and performing work in accordance with sound environmental and sustainability practices. To ensure fulfillment of that commitment, WESTON’s management and employees will be guided by the following principles:

- WESTON personnel will be responsible stewards of the environment.
WESTON activities will be conducted in compliance with WESTON procedures and applicable national, state, and local environmental regulations.

WESTON personnel will identify environmental issues during work planning and execution and will implement appropriate control of those issues during operations.

WESTON personnel will promote greater operational efficiencies, by applying the principle of reduce, reuse and recycle to improve our performance and decrease or eliminate negative impacts to the environment.

WESTON Senior Management will monitor the effectiveness of WESTON’s environmental and sustainability performance and provide focus and leadership through Corp Track and PLC reviews, as well as maintain Environmental Compliance and Sustainability as a standing agenda item for the Corporate EHS Committee meeting.

WESTON will promote these principles among its contractors and will require that its contractors follow all applicable environmental laws and regulations.

WESTON personnel are prepared to serve as mentors for area business, municipal, and educational organizations in sustainability and environmental practices.

Through the integration of environmental management throughout all operations, WESTON intends to achieve and maintain full environmental compliance (e.g., no unpermitted discharges or releases to the environment) and resource efficiency. This EPSP will be augmented by project-specific Environmental Compliance Plans and sustainability check lists at individual work sites and for WESTON clients. Much like a classic Environmental Management System (EMS), WESTON's EPSP is designed to incorporate a process of systematic thinking, provide a framework to identify and assure compliance with regulatory requirements and at the same time provide opportunities for continuous improvement and sustainability. Weston's commitment to excellence and sustainability drives our efforts beyond compliance, providing our clients and ourselves maximum value and quality.

12.5 BACKGROUND FOR WESTON'S ENVIRONMENTAL PROTECTION AND SUSTAINABILITY PROGRAM

“WESTON” as an entity is the sum of our employees’ efforts on behalf of our clients. We are responsible to our clients for conducting operations safely, in compliance with applicable regulations and with resource efficiency. This EPSP is designed to provide employees with an understanding of WESTON’s commitment to sustainability and environmental responsibility.

12.6 HISTORICAL PERSPECTIVE OF UNITED STATES ENVIRONMENTAL REGULATIONS

A brief description of the major Federal environmental laws and regulations is provided in Table I below.

12.7 ENVIRONMENTAL AGENCIES AND REGULATIONS/REQUIREMENTS

As the primary U.S. environmental regulatory agency, the Environmental Protection Agency (EPA) works closely with other Federal agencies, State agencies, industry, and the public to ensure that our work is performed in an environmentally responsible and safe manner. Other Federal agencies that directly affect WESTON work are Occupational Safety and Health
Administration (OSHA), Department of Energy (DOE), Department of Defense (DOD), and Department of Transportation (DOT).

U.S. laws provide state and local governments with powers to enact and enforce various parts of environmental regulations. In addition to complying with U.S. Federal government requirements, many activity sites and projects are also bound by state and local regulations. It is not uncommon for a WESTON office to prepare proposals for work in states outside of that office’s geographic area. It is highly recommended that regional WESTON expertise with state and local government be engaged during the proposal stage to ensure that appropriate environmental compliance requirements are part of project planning.

In addition to environmental laws and regulations enacted at various levels of government, individual governmental departments and agencies can issue orders, (e.g., DOE orders) that provide specific guidance on how work is to be performed under their contracts and at sites they control or participate in operating. These orders are designed to ensure that work is performed in a consistent manner in accordance with applicable laws, safety requirements, and good work practices.
### Table 12-1
U.S. Government Environmental Laws Summary

<table>
<thead>
<tr>
<th>Federal Environmental Laws</th>
<th>Summary Description</th>
<th>Major Provisions</th>
<th>Applicability/Types of activities or Projects</th>
</tr>
</thead>
</table>
| Clean Air Act (CAA)        | The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. | NAAQS for six common air pollutants. (Title I, all sections but Section 112)  
- carbon monoxide,  
- lead,  
- nitrogen dioxide,  
- ozone,  
- particulate matter (also known as particle pollution), and  
- sulfur dioxide.  
National Emission Standards for Hazardous Air Pollutants (NESHAPs) (Title I, Section 112); provide air emission limits for specific pollutants that are hazardous to human health. Air pollutants from stacks and vents are regulated, as well as some emissions or leaks from pumps, pipes, and equipment.  
Mobile Sources (Title II)  
Acid Deposition (Title IV)  
Operating Permits (Title V)  
Stratospheric Ozone (Title VI) | Creating dust;  
Running a diesel generator;  
Decommission refrigeration and air conditioning equipment;  
Operating a fuel tank farm;  
Painting  
Asbestos Removal  
Putting in new equipment that discharges or vents into the air  
Storage and/or use of chemicals at or above TPQ levels under 40 CFR Part 68. |
<table>
<thead>
<tr>
<th>Federal Environmental Laws</th>
<th>Summary Description</th>
<th>Major Provisions</th>
<th>Applicability/Types of activities or Projects</th>
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</thead>
<tbody>
<tr>
<td>Comprehensive, Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)</td>
<td>CERCLA (also known as “Superfund”) provides a Federal &quot;Superfund&quot; to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.</td>
<td>Through CERCLA, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.</td>
<td>Brownfield Redevelopment Projects</td>
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<td>Certain remediation projects. Sites with the potential for hazardous substance releases greater than RQ.</td>
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<tr>
<td>Clean Water Act (CWA)</td>
<td>The Clean Water Act (CWA) is the cornerstone of surface water quality protection in the United States. (The Act does not deal directly with ground water or with water quantity issues.) The statute employs a variety of regulatory and nonregulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.</td>
<td>Water Quality Standards</td>
<td>Any operation that may impact surface water (lake, stream, river, ocean, etc)</td>
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<td>National Pollutant Discharge Elimination System (NPDES) which regulates the discharge of pollutants into U.S. waters (Section 402).</td>
<td>Construction activities that disturb land. Real estate projects.</td>
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<td>• Waste Water and</td>
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<td>• Storm Water.</td>
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<td>Wetlands protection permitting program (Section 404).</td>
<td>Dredging Operations, work around wetlands</td>
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<td></td>
<td>Oil and Hazardous Substance Releases and spill response requirements (Section 311 Oil Pollution Prevention Regulation amended by the Oil Pollution Act of 1990 “SPCC Rule” and “FRP Rule” and the NCP</td>
<td>Spills or potential for release of oil (petroleum, animal or vegetable based).</td>
</tr>
<tr>
<td>National Environmental Policy Act (NEPA)</td>
<td>Our basic national policy for protection of the environment; regulated by the Council on Environmental Quality. The regulations require Federal agencies to consider the environmental impacts of their proposed actions and any reasonable alternatives in order to make well-informed decisions.</td>
<td>Any work on a Federal Facility or federally funded requires NEPA analysis.</td>
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</tr>
<tr>
<td>Federal Environmental Laws</td>
<td>Summary Description</td>
<td>Major Provisions</td>
<td>Applicability/Types of activities or Projects</td>
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<td>National Historic Preservation Act (NHPA)</td>
<td>Requires that the impact on historic and cultural resources be considered during planning and execution of work.</td>
<td></td>
<td>Structure is 50 years old or older or has significant historical value.</td>
</tr>
<tr>
<td>Endangered Species Act (ESA)</td>
<td>A program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The Fish and Wildlife Service of the US Department of Interior maintains the list of threatened and endangered species. The law prohibits any action, administrative or real, that results in a “taking” of a listed species or adversely affects habitat.</td>
<td>The law requires federal agencies, in consultation with the U.S. Fish and Wildlife Service and/or the U.S. National Oceanic and Atmospheric Administration Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.</td>
<td>Any work on a federal facility Must be evaluated as part of stormwater discharge permit under the NPDES.</td>
</tr>
<tr>
<td>Resource Conservation and Recovery Act of 1976 (RCRA)</td>
<td>RCRA's primary goals are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. To achieve these goals, RCRA established three (3) distinct, yet inter-related programs</td>
<td>RCRA Subtitle C, Hazardous Waste; establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal — in effect, from cradle to grave.</td>
<td>Hazardous waste can be the commercial product that you use (including such materials as cleaning fluid or battery acid) or a waste stream that you generate as part of your project and that is being disposed of.</td>
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<td>RCRA Subtitle D, also known as the Solid Waste Disposal Act, regulates nonhazardous waste.</td>
<td>Construction and Demolition Debris Trash</td>
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<td></td>
<td>RCRA Subtitle I: Underground Storage Tanks</td>
<td>Installation, repair, operation, removal, testing of underground storage tanks.</td>
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<tr>
<td>Emergency Planning and Community Right-to-Know Act ((EPCRA) also known as SARA Title III))</td>
<td>The national legislation on community safety. This law is designed to help local communities protect public health, safety, and the environment from chemical hazards. Requires reporting to state and local agencies when certain quantities of hazardous substances are stored or used,</td>
<td>Emergency planning (Section 301-303), Emergency release notification (Section 304) Hazardous chemical storage reporting requirements (Sections 311-312),</td>
<td>If you are storing or using products that have a material safety data sheet (MSDS) you may be subject to EPCRA requirements.</td>
</tr>
<tr>
<td>Federal Environmental Laws</td>
<td>Summary Description</td>
<td>Major Provisions</td>
<td>Applicability/Types of activities or Projects</td>
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<td>and that these agencies make this information available to the public.</td>
<td>Toxic chemical release inventory (Section 313)</td>
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</table>
| Safe Drinking Water Act (SDWA)             | The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources.                                                                                                                                         |                                                                                  | Is project around a public drinking water supply?  
Well head protection programs?                                                          |
| Toxic Substances Control Act (TSCA)        | TSCA allows EPA to regulate the manufacture, processing, distribution, and disposal of chemicals that may pose an unreasonable risk to health or the environment. PCBs, CFCs, and asbestos are the most notable items regulated under TSCA.                                                                                | TSCA addresses the production, importation, use, and disposal of specific chemicals including polychlorinated biphenyls (PCBs), asbestos, radon and lead-based paint.                                      | Radon abatement Projects  
Transformers  
Demolition and renovation of buildings                                                      |
12.8 LIABILITY

Failure to comply with applicable environmental laws and regulations may result in very serious consequences for WESTON and our employees, including potential contract termination and being barred from future work opportunities. WESTON and its client(s) may be liable for violations at a site; the employee may also have personal liability. Certain violations may result in criminal prosecution. For example, criminal liability applies to any person who:

- Treats, stores, or disposes of hazardous waste without a permit.
- Makes a false statement in any documentation.
- When in the performance of duty, does not report hazards germane to his area of expertise.
- Does not report releases of hazardous substances.
- Knowingly destroys, alters, or conceals documentation.
- Ships hazardous waste over public roadways without a manifest.

Types of criminal penalties that may result include:

- Fines up to $50,000 per day of violation.
- Imprisonment up to five (5) years.
- Subsequent convictions, up to $100,000 per day.
- 10 years of imprisonment.
- For placing another person in imminent danger of death or serious bodily injury, up to $250,000 and 15 years of imprisonment.

Civil penalties are also assessed for non-compliance. These penalties can include fines of up to $37,500 per violation per day, and corrective action requirements.

Ignorance of the law is not considered an acceptable excuse in the government’s eyes.

12.9 ADDITIONAL RESOURCES FOR CONSTRUCTION ACTIVITIES UNDER U.S. REGULATIONS

The Construction Industry Compliance Assistance Center (CICA) is a reference source for plain language explanations of environmental rules for the construction industry. This information is provided free of charge and was funded by the U.S. EPA. This organization provides an on-line compliance summary tool at: [http://www.cicacenter.org/cs.cfm](http://www.cicacenter.org/cs.cfm).

The information you get from this tool is specific to your project and your location. Here is how it works:

- First you make a few selections from the choices below to specify the characteristics of your project. (CICA does not keep any record of your choices.)
- Then you will receive a summary report, including an overview of environmental responsibilities that are particularly important for your project, plus links to more detailed information such as state regulations and the names of people to contact for further assistance.
ATTACHMENT A

WESTON SOLUTIONS, INC., CORPORATE ENVIRONMENTAL COMPLIANCE, HEALTH, AND SAFETY PROGRAM
## 1. ACCIDENT CLASSIFICATION

<table>
<thead>
<tr>
<th>Personnel Classification</th>
<th>Injury/Illness/Fatal</th>
<th>Property Damage</th>
<th>Motor Vehicle Involved</th>
<th>Diving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civilian</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Military</td>
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</tr>
<tr>
<td>Contractor</td>
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</tr>
<tr>
<td>Public</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

## 2. PERSONAL DATA

<table>
<thead>
<tr>
<th>a. Name (Last, First, MI)</th>
<th>b. Age</th>
<th>c. Sex</th>
<th>d. Social Security Number</th>
<th>e. Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>f. Job Series/Title</th>
<th>g. Duty Status</th>
<th>h. Employment Status at Time of Accident</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 3. GENERAL INFORMATION

<table>
<thead>
<tr>
<th>a. Date of Accident (month/day/year)</th>
<th>b. Time of Accident (military time)</th>
<th>c. Exact Location of Accident</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d. Contractor's Name</th>
<th>e. Contractor's Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOEL Services</td>
<td>1 PRIME:</td>
</tr>
</tbody>
</table>

## 4. CONSTRUCTION ACTIVITIES

<table>
<thead>
<tr>
<th>a. Construction Activity (Code)</th>
<th>b. Type of Construction Equipment (Code)</th>
</tr>
</thead>
</table>

## 5. INJURY/ILLNESS INFORMATION

<table>
<thead>
<tr>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>e. Body Part Affected</th>
<th>f. Type and Source of Injury/Infection (Code)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>g. Nature of Illness/Injury (Code)</th>
<th>h. Source (Code)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

## 6. PUBLIC FATALITY

<table>
<thead>
<tr>
<th>a. Activity at Time of Accident (Code)</th>
<th>b. Personal Floatation Device Used? (Yes/No/N/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 7. MOTOR VEHICLE ACCIDENT

<table>
<thead>
<tr>
<th>a. Type of Vehicle</th>
<th>b. Type of Collision</th>
<th>c. Seat Belts Used</th>
<th>d. Front Seat</th>
<th>e. Back Seat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

## 8. PROPERTY/MATERIAL INVOLVED

<table>
<thead>
<tr>
<th>a. Name of Item</th>
<th>b. Ownership</th>
<th>c. Amount of Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 9. VESSEL/FLOATING PLANT ACCIDENT

<table>
<thead>
<tr>
<th>a. Type of Vessel/Floating Plant (Code)</th>
<th>b. Type of Collision/Mishap (Code)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 10. ACCIDENT DESCRIPTION (Use Additional Paper, if Necessary)

See attached page.
### 11. CASUAL FACTORS (Read Instructions Before Completing)

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

### 12. TRAINING

<table>
<thead>
<tr>
<th>a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?</th>
<th>YES</th>
<th>NO</th>
<th>CLASSROOM</th>
<th>ON JOB</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. TYPE OF TRAINING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. DATE OF MOST RECENT FORMAL TRAINING</td>
<td>Month/Day/Year</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

a. DIRECT CAUSE

b. INDIRECT CAUSE(S)

### 14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S)

DESCRIBE FULLY:

### 15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14

<table>
<thead>
<tr>
<th>a. BEGINNING (Month/Day/Year)</th>
<th>b. ANTICIPATED COMPLETION (Month/Day/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>c. SIGNATURE AND TITLE OF SUPERVISOR</td>
<td>d. DATE (Month/Day/Year)</td>
</tr>
<tr>
<td>CORPS CONTRACTOR</td>
<td>e. ORGANIZATION IDENTIFIER (Div, Br, Sect)</td>
</tr>
<tr>
<td>f. OFFICE SYMBOL</td>
<td>Weston Solutions, Inc</td>
</tr>
</tbody>
</table>

### 16. MANAGEMENT REVIEW (1st)

| a. CONCUR | b. NON CONCUR | c. COMMENTS |
| SIGNATURE | TITLE | DATE |

### 17. MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)

| a. CONCUR | b. NON CONCUR | c. COMMENTS |
| SIGNATURE | TITLE | DATE |

### 18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW

| a. CONCUR | b. NON CONCUR | c. ADDITIONAL ACTIONS/COMMENTS |
| SIGNATURE | TITLE | DATE |

### 19. COMMAND APPROVAL

| COMMANDER SIGNATURE | DATE |
FLD 02 INCLEMENT WEATHER

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

RELATED FLDs AND OP

FLD 05 – Heat Stress Prevention and Monitoring
FLD 06 – Cold Stress
OP 05-03-008 – Inclement Weather & Business Disruption Policy

PROCEDURE

The potential for exacerbating the impact of physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment and hazards analysis should be accomplished during the planning stages of a project for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The Field Safety Officer (FSO) must determine the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his/her work and be actively alert to these hazards. Managers and workers must be familiar with the requirements of FLD 05 and FLD 06.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and personal protective equipment (PPE) function must be conveyed to site workers who should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The appropriate Safety Professional must be notified of all instances of the need to stop work for safety reasons, including inclement weather.

Heat

Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

Prevention and Protective Measures

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed PPE. Wind shifts and velocity should be measured where change may result in dispersion of airborne contaminants into the work area.

Rain, Wet Weather, and High Humidity

Wet conditions resulting from rain and wet weather increase slipping and tripping hazards, braking distances of vehicles, the potential for vehicle skidding, or difficulties in handling powered devices such as augers and drills. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock
when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces. Rain and wet conditions may decrease visibility (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

Feet that become wet and are allowed to remain wet can lead to serious problems under both heat and cold conditions. Activities that may result in wet feet include extended work in chemical protective clothing and wading in water/liquid during biological assessments. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration. (NOTE: The following Preventive and Protective Measures also apply to Cold, Snow, and Ice.)

Preventive and Protective Measures

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow. Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.

Vehicles used in rain or cold weather must have working windshield wipers and defrosters, and windows must be kept clear of obstruction.

Drivers must observe traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times. Note that this may mean operating below the posted speed limit.

When walking, workers should use a walking stick or probe to test footing ahead where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

Prior to using vehicles or equipment in off-road work, workers should walk the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Project managers should arrange to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided.**

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

**Cold, Snow, and Ice**

Cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision. Cold, wet weather can cause icing of roadways,
driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

Preventive and Protective Measures

WESTON personnel are cautioned against operating motor vehicles such as cars or trucks on ice under any circumstances. If traveling in icy conditions, WESTON personnel should follow all public service advisories that curtail driving activities.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurement guidelines are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factors impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed (contains entrained air) is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

Lightning

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

Lightning is the most dangerous and frequently encountered weather hazard people experience each year. Lightning affects all regions. Florida, Michigan, Pennsylvania, North Carolina, New York, Ohio, Texas, Tennessee, Georgia, and Colorado have the most lightning deaths and injuries.

Preventive and Protective Measures

Prior to working in areas or beginning projects when or where there is an increased potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes. Recommendations include:

- Check with client management to determine if there are any patterns or noted conditions that can help predict lightning or if there are structures that are prone to lightning strikes. Arrange for
client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.

- Monitor weather reports.
- Note weather changes and conditions that produce lightning.
- Stop work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- Ensure all personnel are provided with safe areas of refuge. Prevent personnel from standing in open areas, under lone trees, or under drill rigs.
- Observe the “30-30” Rule. If you see lightning and thunder is heard within 30 seconds (approximately 6 miles), seek shelter. If you hear thunder, but did not see the lightning, you can assume that lightning is within 6 miles and you should seek shelter. Remain in the sheltered location for 30 minutes following the last lightning strike.
- Use a hand held static potential meter (lightning detection device) to monitor the potential difference between a cloud and the ground. When the measured potential is greater than 2 kV/m, there is a potential for a lightning strike – seek shelter.

**High Wind and Tornado Safety**

**High Winds**

Many construction workers have died due to wind-related accidents and injuries. A ladder that seems secure under normal circumstances can become unstable during windy conditions and cause you to fall. Scaffolding that is improperly secured can rip free during strong winds and kill bystanders. The risk of injury for construction workers increases during strong winds. Keep in mind that changing weather conditions can affect your daily work tasks, and make sure you have a game plan to prevent proper damage and personal injury.

**Stay Informed:** With today’s modern technology available at the touch of a button, you should keep up to date with the latest local weather reports. Visit weatherbug.com or weather.gov to stay informed in case of wind warnings, watches, and advisories. Larger projects may have their own weather station on site to provide instant weather data. Use daily hazard assessments to determine if working conditions have changed or will change throughout the day.

**Be Prepared:** When you know the weather will be windy, secure loose building materials, scaffolding and fencing that could be picked up or torn loose by strong winds and thrown onto surrounding streets, structures, vehicles, or bystanders.

**Know the Limits of Your Equipment:** When operating any equipment, take time to read the operator’s manual and become familiar with the wind specifications. Many crane manufacturers have high-wind guidelines to prevent you from operating a crane in unsafe weather. You should also check safety equipment such as fall protection to determine if it is adequate for windy conditions.
Know the Terminology

**Severe Thunderstorm Watch**

A Severe Thunderstorm Watch means that strong thunderstorms capable of producing winds of 58 mph or higher and/or hail 3/4 inches in diameter or larger are possible. If you are in the area of a Severe Thunderstorm Watch, you should be prepared to take shelter from thunderstorms. Severe Thunderstorm Watches are generally issued for 6-hour periods.

**Severe Thunderstorm Warning**

A Severe Thunderstorm Warning means that thunderstorms capable of strong winds and/or large hail are occurring or could form at any time. If you are in the area of a severe thunderstorm, you should take shelter indoors immediately, avoid windows, and be prepared for high winds and hail. Severe Thunderstorm Warnings are generally in effect for an hour or less.

**High Wind Watch**

A High Wind Watch is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are likely to develop in the next 24 to 48 hours. For summit areas, high wind watches are issued when sustained winds are expected to exceed 45 mph and/or frequently gust over 60 mph. If you are in an area for which a High Wind Watch has been issued you should secure loose objects outdoors that may blow about and avoid outdoor activity that exposes you to high winds.

**High Wind Warning**

A High Wind Warning is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are occurring or imminent. For summit areas, wind warnings are issued for winds exceeding 45 mph and/or frequently gusting over 60 mph. Wind warnings may be issued up to 24 hours ahead of the onset of high winds and remain in effect for 6 to 12 hours. If you are in an area where a high wind warning is in effect you should avoid activities that expose you to high winds. Loose objects may be blown around. Tree limbs may break and fall. Power lines may be blown down.

**Wind Advisory**

A Wind Advisory is issued when sustained winds of 30 to 39 mph and/or frequent gusts to 50 mph or greater are occurring or imminent. Wind advisories may be in effect for 6 to 12 hours. If you are in an area where a wind advisory is in effect you should secure loose objects that may be blown about outdoors and limit activity that may expose you to high winds.

Work Safely: If you will be working on a windy day, you should be alert and protected. Wear eye protection to prevent dust and other particles from entering or striking your eyes. Keep your hard hat on at all times to prevent injuries from falling or flying objects. The likelihood of falls from heights is greatly increased by strong winds. Wear the necessary PPE to ensure your safety.

To avoid flying debris and to minimize damage during high winds:

- Shut down outdoor activities involving work at elevation on ladders, scaffolding, aerial lifts, etc.; handling large tarps and plastic sheeting when wind speeds exceed 25 mph; including work with radioactive materials and highly toxic materials that could be dispersed by the winds.
- At 13 - 18 mph wind will raise dust. Follow the dust action level.
• Move mobile items stored outside to indoor storage.
• Secure any items that cannot be moved inside.
• Be careful opening exterior doors.
• Be cautious about downed power lines, tree limbs, and debris on roads.
• Be alert for animals who have escaped from farms and zoos.

Stay Away from Power Lines: High winds can cause tree limbs to fall on power lines resulting in electrocution hazards or loss of power. Your best bet is to keep your distance.

Tornados

What is a TORNADO?

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm or as a result of severe weather associated with hurricanes. A funnel cloud is formed as cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado results from high wind velocity and wind blown debris.

Tornado Safety

When a tornado approaches, you have only a brief amount of time to make life-or-death decisions. Advance planning and quick response are the keys to surviving a tornado.

Purchase a NOAA Weather Alert radio with an alert feature. When tuned to the proper frequency, these weather radios remain silent until a weather emergency occurs. Once they pick up the alarm tone, they will begin broadcasting emergency weather information so that citizens can protect themselves and their property. Some models of the NOAA weather radio incorporate the Specific Area Message Encoder technology, allowing users to target only those warnings that affect their immediate geographic area.

Conduct tornado drills. Designate an area to serve as your safe area, and practice having team members assemble there in response to a mock tornado warning.

Emergency Communications Plan. Develop an emergency communications plan in case team members are separated from one another when a tornado warning goes into effect. Designate an emergency coordinator. Instruct everyone to contact this coordinator in a weather emergency for instructions on what to do during the storm and where to reassemble after the emergency has passed. Design contingency plans to be consistent with client contingency plans. When possible use client warning and alerting systems and confirm that team members have access to shelters and know how to get to them.

Know the Difference between a Tornado Watch and a Tornado Warning

Tornado Watch: Issued by the National Weather Service when tornadoes are possible in your area. You should remain alert for approaching storms. Remind family members of where the safe areas are within your home, and carefully monitor radio or television reports for further developments.

Tornado Warning: Indicates that a tornado has been sighted in your area, or is indicated on weather radar. You should proceed to safe shelter immediately.
When A Tornado Warning Goes In Effect, Put Your Safety Plans In Action.

In Your Automobile: Motor vehicles are easily overturned by tornado winds. Leave your vehicle and seek shelter in a sturdy building. As a last resort, seek shelter in a ditch or culvert. Do not try to outrun or outmaneuver a tornado! Use the time to seek appropriate shelter outside your vehicle.

Office Buildings, Hotels, and Shopping Centers: Take shelter in an interior hallway on a lower floor. A closet, bathroom or other small room with short, stout walls will give some protection from collapse and flying debris. Otherwise, get under heavy furniture and stay away from windows. Many tornado deaths have occurred in large buildings due to the collapse of a roof or wide span wall. A corner area, away from a window, is safer than the middle of a wide span wall.

Out In Open Country: When severe weather approaches, seek inside shelter immediately. The chances of encountering falling trees, downed power lines and lightning are far greater than encountering a tornado itself. If a tornado approaches, lie flat in the nearest depression, such as a culvert or ditch, and cover your head with your arms.

BE ALERT TO CHANGING WEATHER CONDITIONS
HAVE AN EMERGENCY WEATHER PLAN IN PLACE
REHEARSE YOUR CONTINGENCY PLANS PERIODICALLY
KNOW WHERE TO GO WHEN A TORNADO THREATENS.
Heat stress may occur at any time work is performed at elevated temperatures. If the body’s physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur such as fatigue, irritability, anxiety, and decreased concentration or dexterity, and possibly death. Because heat stress is one of the most common and potentially serious illnesses at field sites, regular monitoring and other preventive measures are vital to ensure worker safety. Wearing chemical protective clothing often decreases natural body heat loss (cooling) and increases the risk of heat stress.

Employees who are taking prescription or over-the-counter medications should consult with their personal physician prior to working in high-temperature environments to see if their medication would impair their ability to handle heat stress.

REFERENCES

OSHA 29 CFR 1910 and 1926

RELATED FLDs

FLD 02 – Inclement Weather
FLD 03 – Hot Processes – Steam, Low Temperature Thermal Treatment Unit, and Transportable Incinerator
FLD 08 – Confined Space Entry Program
FLD 36 – Welding/Cutting/Brazing/Radiography
FLD 37 – Pressure Washers/Sandblasting

PROCEDURE

Heat Stress Symptoms and Treatment

Heat Rash

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation and is aggravated by chafing clothes. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impairs a worker’s performance.

Symptoms – Mild red rash, especially in areas of the body that come into contact with protective gear.

Treatment – Decrease amount of time spent working in protective gear and provide body powder to help absorb moisture and decrease chafing. Heat rash can be prevented by showering, resting in a cool place, and allowing the skin to dry.

Heat Cramps

Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water; however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue, causing cramping.

Symptoms – Acute painful spasms of voluntary muscles, most notably the abdomen and extremities.
**Treatment** – Move the victim to a cool area and loosen clothing. Have the victim drink 1 to 2 cups of cool potable water or diluted commercial electrolyte solution (e.g., Gatorade, Quench) immediately, and then every 20 minutes thereafter until symptoms subside. Electrolyte supplements can enhance recovery; however, it is best to double the amount of water required by the dry mix package directions or add water to the liquid form.

**Heat Exhaustion**

Heat exhaustion is a state of weakness or exhaustion caused by the loss of fluids from the body. Heat exhaustion is not as dangerous as heat stroke, but if not properly managed in the field it may lead to heat stroke.

**Symptoms** – Pale, clammy, and moist skin, profuse perspiring, and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, may feel dizzy, and may be irritable or confused.

**Treatment** – Move the victim to a cool, air-conditioned or temperature-controlled area, loosen clothing, place in a position with the head lower than the feet (shock prevention), and allow the victim to rest. Consult a physician. Ensure that the victim is not nauseated or vomiting. If not nauseated or vomiting, give the victim small sips of cool water or diluted electrolyte replenishment solution (one to one dilution with water, or if mixing from powder, double the water added). If this is tolerated, have the victim drink 1 to 2 cups of fluid immediately, and every 20 minutes thereafter until symptoms subside. Seek medical attention at the advice of the consulting physician.

**Heat Stroke**

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body’s heat regulating mechanisms, i.e., the individual’s temperature control system (sweating) stops working correctly. Body temperature rises so high that brain damage and death may result if the person is not cooled quickly.

**Symptoms** – Red, hot, dry skin (although the person may have been sweating earlier); nausea, dizziness, confusion, extremely high body temperature (i.e., 104°F or greater as measured with an oral thermometer), rapid respiratory and pulse rate, seizures or convulsions, unconsciousness or coma.

**Treatment** – Immediately call for emergency medical assistance. Remove the victim from the source of heat and cool the victim quickly. If the body temperature is not brought down quickly, permanent brain damage or death may result. Remove all PPE and as much personal clothing as decency permits. Fan the person while sponging or spraying with cool or tepid water. Apply ice packs (if available) to the back of the neck, armpits, groin area, or behind the knees. Place the victim flat on their back or with head and shoulders slightly elevated. If conscious, and not nauseated or vomiting, the victim may be provided sips of cool water. Do not give the victim coffee, tea, or alcoholic beverages. Emergency medical personnel will take over treatment when they arrive.

**Recognition and Risk Assessment**

In the planning stages of a project, the potential for heat stress disorders must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely heat stress disorders that may occur. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not
followed or the risk is too great. In addition, all site personnel must be aware of these symptoms in both themselves and their co-workers.

Prevention and Protection Programs

Heat stress is affected by several interacting factors including, but not limited to, age, obesity, physical condition, substance abuse, level of personal protective equipment (PPE) worn, and environmental conditions (temperature, shade, and humidity). Site workers must learn to recognize and treat the various forms of heat stress. The following recommendations should be followed to prevent heat stress:

- The most important measure to prevent heat-related illness is adequate fluid intake. Workers should drink 1/2 to 1 quarts of liquids per hour in high heat conditions. Most of this liquid should be water. Under heavy work and heat conditions, the body may lose up to 2 gallons of fluids per day. To prevent heat stress symptoms, the individual must ensure replacement of this fluid.

- Provide disposable cups that hold about 4 ounces, and water that is maintained at 50 to 60°F. Workers should drink 16 ounces of water before beginning work, and a cup or two at each break period.

- Provide a shaded area for rest breaks. Ensure that adequate shelter is available to protect personnel against heat and direct sunlight. When possible, shade the work area.

- Discourage the intake of caffeinated drinks during working hours.

- Monitor for signs of heat stress.

- Encourage workers to maintain a good diet during these periods. In most cases, a balanced diet and lightly salted foods should help maintain the body’s electrolyte balance. Bananas are especially good for maintaining the body’s potassium level.

- If utilizing commercial electrolyte mixes, double the amount of water called for in the package directions. Indications are that “full-strength” preparations taken under high heat stress conditions may actually decrease the body’s electrolytes.

- Acclimate workers to site work conditions by slowly increasing workloads (i.e., do not begin work activities with extremely demanding tasks).

- Rotate shifts of workers who are required to wear impervious clothing in hot weather.

- Encourage workers to wear lightweight, light-colored, loose-fitting clothing.

- In extremely hot weather, conduct field activities in the early morning and evening.

- Provide cooling devices to aid natural body heat regulation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.

- Good hygienic standards must be maintained by frequent showering and changes of clothing.

- Clothing should be permitted to dry during rest periods.

- Whenever working in the sun, provide employees with sunscreen with both UVA and UVB protection.

- Persons who notice skin problems should immediately consult medical personnel.
Heat Stress Monitoring and Work Cycle Management

When strenuous field activities are part of on-going site work conducted in hot weather, the following guidelines should be used to monitor the body’s physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the temperature exceeds 70°F and the tasks/risk analysis indicates an increased risk of heat stress problems. Consult the HASP and a safety professional (e.g., Division EHS Manager, FSO) if questions arise as to the need for specific heat stress monitoring. In all cases, the site personnel must be aware of the signs and symptoms of heat stress and provide adequate rest breaks and proper aid as necessary.

Measure Heart Rate – Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the rest period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.

Measure Body Temperature – When ambient temperatures are over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the rest period. If the oral temperature exceeds 99.6°F (or 1 degree change from baseline) at the beginning of the rest period, the following work cycle should be shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F (or 1 degree change from baseline). Under no circumstances should a worker be allowed to work if their oral temperature exceeds 100.6°F.

Measure Body Water Loss – Body water loss greater than 1.5% of total body weight is indicative of a heat stress condition. Body weight is measured before PPE is donned and after the PPE is removed following a work cycle. Body water loss can be measured with an ordinary bathroom scale; however, the scale must be sensitive to one-half pounds increments. A worker is required to drink additional fluids and rest if their body water loss is greater than 1.5%.

NOTE: For purposes of this operating practice, a break is defined as a 15-minute period and/or until an individual’s vital signs are within prescribed guidelines.

A physiological monitoring schedule is determined by following the steps below:

- Measure the air temperature with a standard thermometer.
- Estimate the fraction of sunshine by judging what percent the sun is out (refer to Table 1).
- Calculate the adjusted temperature based on the following formula:
  \[ \text{Adjusted Temperature} = \text{Actual Temperature} + 13 \times \text{X} \]  
  (where X = sunshine fraction from Table 1)
- Using Table 2, determine the physiological monitoring schedule for fit and acclimated workers for the calculated adjusted temperature.

The length of work period is governed by frequency of physiological monitoring (Table 2). The length of the rest period is governed by physiological parameters (heart rate and oral temperature).
Table 1. Percent Sunshine Factors
Heat Stress Prevention and Monitoring

<table>
<thead>
<tr>
<th>Percent Sunshine (%)</th>
<th>Cloud Cover</th>
<th>Sunshine fraction</th>
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</thead>
<tbody>
<tr>
<td>100</td>
<td>No cloud cover</td>
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</tr>
<tr>
<td>50</td>
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<tr>
<td>0</td>
<td>Full cloud cover</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 2. Physiological Monitoring Schedule
Heat Stress Prevention and Monitoring

<table>
<thead>
<tr>
<th>Adjusted Temperature</th>
<th>Level D (Permeable clothing)</th>
<th>Level C, B, or A (Nonpermeable clothing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90°F (32.2°C) or above</td>
<td>After each 45 minutes of work</td>
<td>After each 15 minutes of work</td>
</tr>
<tr>
<td>87.5°F (30.8° - 32.2°C)</td>
<td>After each 60 minutes of work</td>
<td>After each 30 minutes of work</td>
</tr>
<tr>
<td>82.5° - 87.5°F (28.1° - 32.2°C)</td>
<td>After each 90 minutes of work</td>
<td>After each 60 minutes of work</td>
</tr>
<tr>
<td>77.5° - 82.5°F (25.3° - 28.1°C)</td>
<td>After each 120 minutes of work</td>
<td>After each 90 minutes of work</td>
</tr>
<tr>
<td>72.5° - 77.5°F (22.5° - 25.3°C)</td>
<td>After each 150 minutes of work</td>
<td>After each 120 minutes of work</td>
</tr>
</tbody>
</table>

Example: Site personnel anticipate wearing level C (imperm eable clothing) during site activities. The air temperature is 80°F and there are no clouds in the sky (100% sunshine). The adjusted temperature is calculated in the following manner:

\[
\text{Adjusted Temperature (Adj T °F) = Actual Temperature (Amb T °F) + (13 x sunshine fraction)}
\]

\[
\text{Adj T °F} = 80°F + (13 \times 1.0)
\]

\[
\text{Adj T °F} = 93°F
\]

Using Table 2, the pulse rate, oral temperature and body water loss monitoring would be conducted after each 15 minutes of work. The adjusted temperature may need to be redetermined if the percent sunshine and ambient temperature changes drastically during site work.

If an individual’s heart rate exceeds 110 beats per minute at the beginning of the rest period, that individual will continue to rest until his or her heart rate drops to baseline; the next work period is then decreased by 33%.
FLD 06  COLD STRESS

Three major factors that contribute to cold stress are cold temperatures, dampness, and wind velocity. Persons working outdoors in low temperatures, especially in wet or windy conditions, are subject to cold stress. Exposure to extreme cold for even a short time can cause severe injury to the surface of the body, or result in cooling of the body core temperature which, if unchecked, can be fatal. Site workers must learn to recognize and treat the various forms of cold stress.

RELATED FLDs

FLD 02 – Inclement Weather
FLD 17 – Diving
FLD 19 – Working Over or Near Water
FLD 25 – Working at Elevation/Fall Protection

GENERAL INFORMATION

Body heat is conserved through the constriction of surface blood vessels. This constriction reduces circulation at the skin layers and keeps blood nearer the body core. Loss of body heat can occur through:

1. **Respiration** – The process of breathing; inhaling and exhaling air. Heat is lost when breathing cold air into the lungs.
2. **Evaporation** – Heat loss from the body by vaporization of water from the skin surface.
3. **Conduction** – Direct transfer of body heat by contact with a cooler object. Conduction may occur when sitting on snow, touching cold equipment, and working in the rain. Body heat is lost rapidly when a person becomes wet. Most clothing loses approximately 90 percent of its insulating properties when wet. Additionally, water conducts heat 240 times faster than air; thus, the body cools suddenly when the layer of clothing that contacts the skin becomes wet.
4. **Radiation** – Heat radiated outward from the body to a cooler environment. The greatest amount of body heat is lost from uncovered surfaces of the body, especially the head, neck, and hands.
5. **Convection** – Heat transferred to cool air moving across the surface of the body. The body continually heats a thin layer of air next to the skin. Clothing retains this warm surface layer of air. If this warm air is removed by air currents (wind), the body will be cooled while attempting to rewarm the surface air. Wind chill is the chilling effect of moving air in combination with low temperature.

Other factors may contribute to cold stress, such as:

1. Medications, including antidepressants, sedatives, tranquilizers and some heart medications may affect the body’s ability to thermo-regulate.
2. Dehydration, or the loss of body fluids, occurs in a cold environment and may increase the susceptibility of workers to cold injury due to a significant change in blood flow to the extremities.
3. Heavy work typically causes sweating that will result in wet clothing.
4. A worker’s predisposing health condition such as cardiovascular disease, diabetes, and hypertension.

5. Older people are not able to generate heat as quickly, thus may be at more risk than younger adults.

When the body is unable to warm itself, serious cold-related illness and injuries may occur, including permanent tissue damage and possible death.

RECOGNITION AND RISK ASSESSMENT

In the planning stages of a project, the potential for cold-related hazards must be considered in the site-specific Health and Safety Plan (HASP) and during risk assessment. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

Low Temperature + Wind Speed + Wetness = Injuries and Illness

The Cold Stress Equation (OSHA Card-3156) is a quick-reference tool provided on the Weston Portal.

Frostbite

Frostbite is the freezing of tissue and most commonly affects the toes, ears, fingers, and face. Frostbite occurs when an extremity loses heat faster than it can be replaced by the circulating blood. Frostbite may result from direct exposure to extreme cold or cool, high wind. Damp socks and shoes may contribute to frostbite of the toes.

Signs and symptoms of frostbite include:

- Cold, tingling, aching, or stinging feeling followed by numbness
- Skin color is red, purple, white, or very pale and is cold to the touch
- Blisters may be present (in severe cases)

Treatment for frostbite:

- Call for emergency medical assistance.
- Move the victim indoors and/or away from additional exposure to cold, wet, and wind.
- Wrap the affected area in a soft, clean cloth (sterile, if available).
- Give a warm drink (water or juices, not coffee, tea or alcohol). Do not allow the victim to smoke.
- Do not rub the frostbitten part (this may cause gangrene).
- Do not use ice, snow, gasoline or anything cold on the frostbitten area.
- Do not use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do not place the frostbitten area near a hot stove.
- Do not break blisters.
- After rewarming, elevate the area and protect it from further injury.

Hypothermia

Hypothermia means “low heat” and is a potentially serious condition. Systemic hypothermia occurs when body heat loss exceeds body heat gain and the body core temperature falls below the normal 98.6°F. While some hypothermia cases are caused by extremely cold temperatures, most cases develop in air
temperatures between 30° and 50°F, especially when compounded with water immersion and/or windy conditions.

The victim of hypothermia may not know, or refuse to admit, that he or she is experiencing hypothermia. All personnel must be observant for these signs for themselves and for other team members. Hypothermia can include one or more of the following symptoms.

- Cool bluish skin
- Uncontrollable shivering
- Vague, slow, slurred speech
- Irritable, irrational, or confused behavior
- Memory lapses
- Clumsy movements, fumbling hands
- Fatigue or drowsiness

Below the critical body core temperature of 95°F, the body cannot produce enough heat by itself to recover. At this point, emergency measures must be taken to reverse the drop in core temperature. The victim may slip into unconsciousness and can die in less than 2 hours after the first signs of hypothermia are detected. Treatment and medical assistance are critical.

Treatment for hypothermia:

- Call for emergency medical assistance.
- Do not leave the victim alone.
- Prevent further heat loss by moving the person to a warmer location out of the wind, wet, and cold.
- Remove cold, wet clothing and replace with warm dry clothing or wrap the victim in blankets.
- If the victim is conscious, provide warm liquids, candy, or sweetened foods. Carbohydrates are the food most quickly transformed into heat and energy. Do not give the victim alcohol or caffeine.
- Have the person move their arms and legs to create muscle heat. If they are unable to move, place warm bottles or hot packs in the arm pits, groin, neck, and head. Do not rub the arms and legs or place the person in warm water.

**Prevention and Protection**

The following general guidelines are recommended for preventing or minimizing cold stress:

- Wear loose, layered clothing, masks, woolen scarves, and hats. Wear liners under hard hats
- Protect hands with gloves or mittens.
- Never touch cold metal with bare hands.
- Wear waterproof, slip-resistant, insulated boots
- Use chemical foot and hand warmers (commercially available) inside boots and gloves.
- In extreme cold, cover the mouth and nose with wool or fur to “pre-warm” the air you breathe.
- If wearing a face protector, remove it periodically to check for frostbite.
• Ensure that clothing remains secure around the body, especially at the neck and waist.
• If required to wear chemical protective clothing, remember that it generally does not afford protection against cold stress. In many instances, chemical protective clothing increases susceptibility. Dress carefully if both chemical protection and thermal insulation are required.
• Remove outer layers to avoid overheating and soaking clothing with perspiration; replace layers to avoid becoming chilled.
• Keep clothes dry by wearing water-resistant and wind-resistant clothing and outerwear.
• Wear clothing that will “breathe” or allow water vapor to escape.
• Eat well-balanced meals, ensure adequate intake of liquids and avoid alcoholic beverages. Drink warm sweet beverages and soups. Limit the intake of caffeinated drinks due to the diuretic and circulatory effects.
• Utilize available warm shelters and implement work-rest schedules.
• If warm shelters are not available, use cars/vehicles as shelter from the cold. (Ensure that tailpipes are not covered by heavy snowfall).
• Use radiant heaters to provide warmth (if using propane heaters ensure adequate ventilation to avoid carbon monoxide poisoning).
• Monitor yourself and others for changes in physical and mental condition.
• Use the buddy system or supervision to ensure constant protective observation.
• If heavy work must be done, resulting in sweating/wet clothing, take rest periods in heated shelters and change into dry clothing as necessary.
• New employees should not work full-time in the cold during the first days of employment until they become accustomed to the working conditions and the use of required protective clothing.
• Include the weight and bulkiness of clothing in estimating the required work performance and weights to be lifted by the worker.
• Arrange the work in such a way that sitting or standing still for long periods is minimized.
• Perform work protected from drafts to the greatest extent possible. If possible, shield the work area from wind.
• Instruct workers in safety and health procedures. The training program should include, as a minimum, instruction in:
  – Signs and symptoms of frostbite, impending hypothermia, or excessive cooling of the body
  – Proper use of clothing
  – Proper eating and drinking habits
  – Safe work practices
  – Proper rewarming procedures and appropriate first aid treatment
• Tables 1 and 2 should be consulted to adjust working schedules for wind chill conditions based on equivalent chill temperature (ECT). These tables are guidelines only; ambient temperatures and wind conditions should be monitored frequently and work schedules adjusted as required. If workers show signs or symptoms of cold stress, the work schedule must be adjusted, as required.
Work/Warming Regimen

Work should be performed in the warmest part of the day. If work is performed continuously in the cold or winter conditions or where rain or cool winds are expected, provide heated warming shelters, tents, cabins, or break rooms nearby. Encourage workers to use the shelter at regular intervals depending on the severity of the cold exposure. Table 2, Cold Work/Warmup Schedule for 4-Hour Shifts, provides guidance for working in severe cold weather. The onset of heavy shivering, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. Pain, numbness, or tingling in the extremities are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation, or the worker should change into dry clothing. Never return to work in wet clothing.

Table 1. Wind Chill Chart

<table>
<thead>
<tr>
<th>Temperature (°F)</th>
<th>Calm</th>
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</tr>
</tbody>
</table>

Frostbite Times

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})

Where, T= Air Temperature (°F) \ V= Wind Speed (mph)

Effective 11/01/01

Table 2. Cold Work/Warmup Schedule for 4-Hour Shifts

<table>
<thead>
<tr>
<th>EQUIVALENT CHILL TEMPERATURE</th>
<th>MAXIMUM WORK PERIOD</th>
<th>NO. OF BREAKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥-24°F</td>
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<td>1</td>
</tr>
<tr>
<td>-25°F to −30°F</td>
<td>75 minutes</td>
<td>2</td>
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<td>55 minutes</td>
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</tr>
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</table>
FLD 10  MANUAL LIFTING AND HANDLING OF HEAVY OBJECTS

Improper lifting can result in cuts, pinches, crushing, and serious injury to back, abdomen, arm and leg muscles, and joints. Even relatively light objects, lifted improperly, can contribute to injury. Muscle and joint injuries occur when objects to be lifted are too heavy or awkward, are lifted improperly, or in areas where access is restricted. Lifting tasks which are awkward and repetitive, even if involving only light objects, can lead to nerve and joint damage.

At the project level, the need for manual lifting or handling of heavy objects must be identified as a physical hazard in the planning stages of a project Health and Safety Plan (HASP).

MANUAL LIFTING

Plan any manual lifting task noting the following:

Contact hazards. Check each object before lifting for presence of splinters, slivers, sharp edges or parts, cracks and loose joints, which can result in cuts. Signs of biological hazards, and chemical or radioactive material contamination.

- **Weight of object.** Unless involved in weight training, recommended safe lifting weights for an average man or woman are 50 and 35 pounds, respectively.
- **Size and shape of object.** Large and oddly shaped objects are more difficult to lift, even within safe weight limits, due to imbalanced center of gravity.
- **Area in which lifting is to be done.** Heavy objects can pinch or crush fingers, toes, arms, and legs between the object and nearby objects (e.g., walls, tables, counters, or railings). Check for pinch points such as other objects close by and ensure there is room for safe lifting.
- **Conditions under which lifting is to be accomplished.** Check for wet or slippery surfaces. Consider level of protection to be used. Level B or A protection may add up to 40 lbs. To be lifted, as well as restricting range of motion and adding to area restriction by increasing bulk.

Route to be traveled, if lifting includes carrying. Check walking and working surfaces for slip and trip hazards, note ramps, changes in level of elevation, and ladders or stairways that need to be negotiated.

Manual Lifting - Prevention and Protection

- Before lifting, identify the potential for contact hazards on objects to be lifted. Check each object before lifting, remove any noted hazards as feasible, and wear gloves (cotton, at a minimum, or leather, kevlar, or chemical resistant material, depending on the nature of the hazard).
- Avoid contact with, or cover cracks or loose joints to reduce hazards of pinching.
- Workers must know their lifting limitations, plan before lifting, keep themselves in good physical condition, and get help if uncertain that they can lift safely. Managers must plan and allow for safe lifting.
- When lifting an object from the floor:
  - Determine that the object is within the safe weight limit.
  - Check for contact hazards.
  - Walk the intended route of travel to identify and remove slip and fall hazards.
  - Identify changes in elevation, steps, ramps, stairs and ladders that must be negotiated.
• To lift square or rectangular objects:
  – Avoid reaching as you lift.
  – Set feet firmly, placing one foot alongside the load and the other slightly behind the load.
  – Keep objects close to the body.
  – Squat in front of the load.
  – Grasp one of the top corners away from the body and the opposite bottom corner closest to the body.
  – Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight and tuck in the chin.
  – Straighten the legs, keeping the spine straight, pull the object into the body and stand up slowly and evenly without jerking or twisting.

If turning or change of direction is required, turn with feet without twisting the torso and step in the direction of travel.

To set an object down, reverse the sequence, being sure not to trap the bottom hand between the object and the surface on which the object is set.

Workers must be trained and have the opportunity to use the above steps with lighter objects before performing heavy lifting. For odd-shaped objects, the only modification needed should be hand-hold position. When two or more persons are lifting, have a plan and a set of signals so lifting occurs simultaneously.

Do not carry objects in a manner which obstructs vision in the line of travel.

Carry objects so one hand is free to hold the handrail on stairs and that there is an unobstructed view of footing. Carry objects in a manner to permit use of both hands while climbing a ladder.

**MANUAL HANDLING OF HEAVY OBJECTS**

Manual handling of heavy objects, even when not lifting, can pose the same hazards as lifting including cuts, pinches, bruises, crushing, muscle and joint strain, and contact with hazardous materials and biological hazards.

Drums and other containers which must be maneuvered for access to information or sampling locations, that are inaccessible to mechanical handling equipment, require manual handling and special precautions. When handling of heavy objects does not involve lifting, workers can handle heavier objects safely, even those weighing several hundred pounds, if proper techniques are used. In many instances, the procedures involve balancing and taking advantage of the shape of the object.

**Manual Handling - Prevention and Protection**

Prior to performing manual handling, it must be determined that it can be done safely and that mechanical assistance is infeasible. Mechanical equipment or assistance such as dollies, carts, come-alongs or rollers are to be used whenever possible. Mechanical assistance must be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists. Objects to be moved must be secured to prevent falling and properly balanced to prevent tipping.
The minimum protection for manual handling is heavy cotton or leather gloves, safety boots, and coveralls. Metatarsal guards, chemical protective clothing, and metal mesh or kevlar gloves must be used as risk increases of heavy items falling, hazardous materials contact and sharp edges, splinters or slivers.

Workers must be aware of and work within their weight-handling capabilities.

Objects to be manually handled must be checked for contact hazards before handling, and to ensure handling will not trap hands, arms, legs, or feet between the object and other objects, walls, or railings.

Properly trained personnel may roll heavy objects with a round base such as 55-gallon drums or compressed gas cylinders, if rolling will not damage the structural integrity. Rolling must be controlled by chutes, tag-lines, or other means of limiting acceleration. Use of the legs for pushing and tag-line control of rolled objects must be stressed.

Only properly trained personnel may move cylindrical objects which must remain upright by hand. Cylindrical objects, such as drums that must remain upright, are handled manually by slightly tilting the object, using the legs for control, and balancing the object on the bottom edge. The handler then walks beside the object, with the object tilted toward the body, positioning the hands on the top edge away from the body and moving so they do not cross, thus maintaining balance and a steady controlled forward motion.

Prior to moving cylindrical objects in this way, the route of travel must be walked to identify any changes of elevation, pot holes, or other obstructions that could cause the object to snag, tip, or get out of control.

Flat, square, or rectangular objects are most easily handled using make-shift rollers or skids to break the friction with the resting surface and pushing, using the legs.
FLD 11  ROUGH TERRAIN/ATV USE

RELATED FLDs

FLD 02 – Inclement Weather
FLD 05 – Heat Stress Prevention and Monitoring
FLD 06 – Cold Stress
FLD 22 – Heavy Equipment Operation
FLD 47 – Clearing, Grubbing, and Logging Operations
FLD 57 – Motor Vehicle Safety

HAZARD

Physical hazards associated with rough terrain include vehicle accidents, heavy equipment incidents, falling, slipping, and tripping.

Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles.

When working on foot, step inclines and heavy or downed vegetation can hide holes or breaks in the terrain, increasing the risk of slips, trips, and falls.

RECOGNITION AND RISK ASSESSMENT

Rough terrain complicates work activities and adds to or increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard and identified in the site-specific health and safety plan (HASP). Risk assessment is usually accomplished from site history information (i.e., site topography) and on site by the Field Safety Officer (FSO).

HAZARD PREVENTION AND PROTECTION PROGRAMS

Safety on Foot

Personnel working on rough terrain should maintain a high level of physical conditioning due to increased body stress and exertion.

The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls.

Boots should be ankle high or higher to provide additional support and stability.

Work will be completed in adequate natural light or sufficient illumination will be maintained.

Site personnel will conduct an initial walkover and the “buddy system” will be implemented.

Emergency communications such as a cell phone or two-way radio should be carried at all times.

Personnel should be aware of potential hazards and ensure the availability of first-aid supplies and knowledge of the location of the nearest medical assistance.

VEHICLE SAFETY

Vehicle drivers and passengers will wear seatbelts at all times.
Hazards can be prevented by ensuring regular maintenance is performed on vehicles and all safety features are working. Have brakes and wheel bearings of vehicles used off road or in four wheel drive inspected at increased frequency (suggest inspections at twice the manufacturer’s recommended frequency).

In order to minimize accidents, site surveillance on foot may be required to ensure clear driving paths.

Minimize side hill travel. Travel straight up and down hills whenever possible. Passengers will not be allowed when side hill travel is required.

Take into account loads or superstructure of vehicles which raise the center of gravity and increase risk of tipping.

Cross streams, small logs or other passable (there is adequate clearance of the undercarriage) obstructions at right angles.

Four wheel drive vehicles should be used if terrain conditions are wet, frozen, broken, or otherwise deemed unsafe for two wheel drive vehicles by the FSO. Use of vehicles off-road will be specifically addressed in the HASP and personnel operating vehicles will be checked for proficiency.

- Before moving a vehicle in the field, first walk the route of travel, inspecting for depressions, stumps, gullies, ruts, and similar obstacles.
- Always check the brakes of a vehicle before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Engage the all wheel drive when traveling off highway on hilly terrain.
- Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- After the vehicle/equipment has been moved to a new site, set all brakes and/or locks. When grades are steep, block the wheels.

**Definitions**

**Class I**, All-terrain vehicle (ATV): A motorized off-highway vehicle, 50 in. (127 cm) or less in width, having dry weight of 800 lbs (362.9 kg) or less, and traveling on three or more low pressure tires (10 lbs [4.5 kg] psi or less), with a seat designed to be straddled by the operator.

**Class I, Category G**, ATV: An ATV intended for general recreational and utility use.

**Class I, Category U**, ATV: An ATV intended primarily for utility use.

**Class II**, ATV: A motorized off-highway vehicle with a width which exceeds 50 in. (127 cm) or having a dry weight that exceeds 800 lbs (362.9 kg), traveling on four or more low-profile, low-pressure tires (10 lbs [4.5 kg] psi or less) and having a bench seat.
**NOTE:** Utility Vehicles are designed to perform off-road utility tasks such as passenger and cargo transportation and are addressed separately below. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Rollover Protective Structure (ROPS). A cab or frame that provides a safe environment for the tractor operator in the event of a rollover.

**ALL TERRAIN VEHICLES (ATVS)**

**Qualifications**

ATV operators will have completed a nationally recognized accredited ATV training course (such as provided by the Specialty Vehicles Institute of America or in-house resources that have been certified as trainers by an accredited organization) prior to operation of the vehicle.

The operator must pass an operating skills test prior to being allowed to operate an ATV. Proof of completion of this training will be maintained.

**Equipment**

All ATVs shall be equipped with:

- An operable audible warning device (horn);
- Headlights (if it will be used during hours of darkness);
- Taillights; and
- Brake lights.
- Mufflers and spark arresters.

All Class II ATVs will be equipped with ROPS and seatbelts

**Operation**

Only Class I and Class II ATVs with four or more wheels may be used. Class III ATV’s may not be used.

The manufacturer's recommended payload will not be exceeded at any time.

Gloves and an approved motorcycle helmet with full-face shield or goggles will be worn at all times while operating a Class I ATV.

An ATV will not be driven on public roadways except to cross the roadway, and it will only be driven on a public roadway at designated crossing points or with a road guard (no paved road use unless allowed by the manufacturer).

A copy of the operator’s manual will be kept on the vehicle and protected from the elements (if practicable).

Tires shall be inflated to the pressures recommended by the manufacturer.

Passengers are prohibited on Class I ATVs.
UTILITY VEHICLES

Utility vehicles are defined as specialty Class II ATVs designed to perform off-road utility tasks such as passenger and cargo transportation. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Utility vehicle operators shall be trained and familiar with the use of all controls; understand proper moving, stopping, turning and other operating characteristics of the vehicle. Operators must review all training materials provided by the manufacturer for the specific vehicles, and training should be in accordance with appropriate manufacturer recommendations. A copy of the operator’s manual shall be kept on the vehicle at all times and protected from the elements. At a minimum, training should address:

- Basic riding tips from the manufacturer’s published literature for each vehicle.
- Reading terrain.
- Climbing hilly terrain.
- Descending a hill.
- Traversing a slope.
- Riding through water.
- Cargo carriers and accessories.
- Loading and unloading.
- Troubleshooting.
- Proper preventative maintenance, (i.e., oil levels, tire pressure requirements and scheduled maintenance requirements according to the manufacturer’s guidelines).

Utility vehicles shall be equipped with:

- Operable audible warning device (horn).
- Headlights.
- Taillights.
- Brake lights.
- Seatbelts.
- ROPS.

Occupancy in utility vehicles is limited to manufacturer designated seating that has built-in seatbelts. Passengers may not ride in the vehicle’s back cargo area unless the vehicle is otherwise equipped. Note: When used for emergency response, medical litters may be placed in the back cargo area but must be secured as described below.

The manufacturer’s recommended load carrying capacity, personnel capacity, or maximum safe vehicle speed shall not be exceeded at any time.

Cargo items will be secured as necessary to prevent movement/tipping. All loads over fifty pounds (to include medical litters) must be securely strapped to cargo tie-downs in the rear and to the cargo shelf in the front.

Seatbelts will be worn by operators and passengers of specialty vehicles where installed by the manufacturer. Operators and passengers shall wear goggles at all times when a utility vehicle, not equipped with a windshield, is in motion.
Utility vehicles will not normally be driven on public roadways except to cross the roadway, and will only be driven on a public roadway at designated crossing points or with a road guard. Utility vehicles that are allowed to operate outside a controlled work area and/or on public roads will meet the minimum vehicle safety standards in accordance with 49 CFR 571.5, to include ROPs, seatbelts and placement of “Slow Moving Vehicle” emblems where required.

Manufacturer-installed safety equipment will be maintained in working order and used in compliance with the requirement of this regulation and in accordance with manufacturer’s recommendations.

RULES

Observe the following practices to help prevent accidents:

- Do not misuse utility vehicles.
- Reduce speed and exercise extreme caution on slopes or on rough ground.
- Do not overload vehicle and avoid shifting loads. Reduce load when operating over rough or hilly terrain.
- Do not stop or start suddenly when going uphill or downhill. Be especially cautious when changing direction on slopes.
- Stay alert for holes, rocks, and other hidden hazards in the terrain.
- Keep away from drop-offs, ditches, embankments, as well as ponds and other bodies of water.
  The machine could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
- Keep front wheels straight at crest of hill or going over bumps.
- When descending a hill, remove foot from accelerator and apply brakes to reduce speed and maintain control.

Transport Loads Safely

- Be sure load is evenly distributed.
- Do not load above the load guard.
- Securely anchor all loads in cargo box.
- Reduce cargo box capacity when operating on rough or hilly terrain.
- Use existing trails. Avoid terrain such as dangerous slopes and impassable swamps. Watch carefully for sharp bumps, holes, ruts, or obstacles.
- Look ahead at terrain. Know what is coming and be prepared to react. Be alert for hazards.
- Keep front wheels straight at the crest of a hill or going over bumps.
- Reduce speed according to trail, terrain, and visibility conditions.
- The passenger should always use the hand holds.
Climbing or Descending a Hill

- Always use the brakes when going down slopes, the utility vehicle can speed up (freewheel) going down a slope. Engine or clutch braking effect is minimal.
- Balance loads evenly and secure them. Braking could shift the load and affect vehicle stability.
- Sit on the center of the seat and keep both feet within the foot platform.
- Never drive past the limit of visibility. Slow down near the crest of a hill until getting a clear view of the other side.
- If the vehicle stops or loses power going up a hill, lock the park brake to hold the vehicle on slope. Maintain direction of travel and release the brake slowly. Back straight down hill slowly while maintaining control. Do not turn the vehicle sideways. The vehicle is more stable in a straight forward or rearward position.
- If the utility vehicle begins to tip, turn the front wheel downhill to gain control before proceeding.

Riding Through Water

- Avoid water whenever possible. If the drive belt becomes wet, slippage will occur and the vehicle will lose power.
- Never cross any body of water where the depth may be unknown to the operator. As an operational guideline, deep water is considered anything in excess of 152 mm (6 in.) in depth. Tires may float, making it difficult to maintain control.
- Choose a course within the waterway where both banks have a gradual incline. Cross at a point known to be safe.
- Proceed at a slow steady speed to avoid submerged obstacles and slippery rocks.
- Avoid water crossings where the operation of a utility vehicle may cause damage to waterway beds or erode waterway shoreline.
FLD 12 HOUSEKEEPING

Hazards associated with poor housekeeping include but are not limited to slips, trips, falls, punctures, cuts, and fires. Good housekeeping is a critical element when working under all FLDs. Housekeeping inspection checklists are available on-line on the Weston Environmental, Health, and Safety (EHS) Portal site.

RECOGNITION AND RISK ASSESSMENT

Good housekeeping is an important element of incident prevention. Good housekeeping should be planned at the beginning of the job and carefully supervised and monitored through project completion.

Housekeeping requirements must be addressed in the planning stages of a project Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the site-specific HASP, good housekeeping requirements and the hazards associated with poor housekeeping (e.g., slips, trips and falls). The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

PREVENTION AND PROTECTION

Incidents can be prevented or minimized by following the general guidelines described below:

1. **Plan ahead.** A materials storage area which has been planned is more orderly than one which has developed haphazardly.

2. **Assign responsibilities.** If the size of the job and work force merit, a person should be assigned specific responsibility for clean up. Ideally, each individual should pick up his or her work area and help keep the site neat.

3. **Implement the program.** Housekeeping must be part of the daily routine, with clean-up being a continuous procedure.

Incidents caused by poor housekeeping can also be prevented by adherence to the following rules.

Lunch areas should be kept clear of empty bottles, containers, and papers. Trash disposal cans should be provided. An effective means of preventing litter is the provision of suitable receptacles for hazardous waste as well as no hazardous waste.

Accumulation of flammable and combustible liquids on floors, walls, and other areas is prohibited. All spills of flammable and combustible liquids must be cleaned up immediately.

Combustible waste such as soiled rags and paper is to be stored in a safe place (e.g., covered metal container) and disposed of regularly.

Materials must be stacked and stored to prevent sliding or collapsing.

WESTON project managers and WESTON subcontractors should provide sufficient personnel and equipment to ensure compliance with all housekeeping requirements.

Work will not be allowed in areas that do not comply with the requirements of this FLD.
The FSO and WESTON subcontractors will inspect the work area daily for adequate housekeeping and record findings on the daily inspection report.

Adequate lighting should be provided in or around all work areas, passageways, stairs, ladders, and other areas used by personnel.

All stairways, passageways, gangways, decontamination lines, and accessways shall be kept free of materials, supplies, and obstructions at all times.

Loose or light material should not be stored or left on roofs or floors that are not enclosed, unless it is safely secured.

Tools, materials, extension cords, hoses, or debris are to be used, disposed of, and stored so as not to cause a tripping or other hazard.

Tools, materials, and equipment subject to displacement or falling should be adequately secured.

Empty bags that contained lime, cement, and other dust-producing materials should be removed periodically, as specified by the designated authority.

Protruding nails in scrap boards, planks, and timbers should be removed, hammered in, or bent over flush with the wood, unless placed in containers or trucks for removal.

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

Containers should be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.

When rivet heads are knocked off or backed out, they should be prevented from falling.

Form and scrap lumber and debris should be cleared from work areas, passageways, and stairs in and around building storage yards and other structures.

All storage and construction sites should be kept free of the accumulation of combustible materials.

All materials should be maintained in neat stockpiles for ease of access. Aisles and walkways should be kept clear of loose materials and tools.

Areas prone to weeds and grass should be kept mowed. A standard procedure should be established for cleanup of such areas, as specified by the FSO.

Rubbish, brush, long grass, or other combustible material must be kept from areas where flammable and combustible liquids are stored, handled, or processed.
FLD 21  EXPLOSIVES

GENERAL

Explosives are a special category of hazardous materials. If improperly handled, processed, or stored, explosives can cause substantial property damage, injuries, or death. Thus, the safety of explosives operations must be a primary concern at WESTON.

Explosions fall generally into two major categories: detonations and deflagrations. Detonations are chemical reactions containing large amounts of energy per unit mass. A detonation produces a shock wave that travels faster than the speed of sound in air. Explosive hazards include potential exposure to energetic materials or to the use of metastable or exothermic materials that, although not intended for use as explosives, could react explosively. Another type of explosion is referred to as a deflagration. Deflagrations occur when the pressure of vapors trapped within a space or container exceed the ability of the container to retain the pressure. If the failure produces enough energy, the escaping vapors can be ignited resulting in a fireball sometimes referred to as a BLEVE (Boiling Liquid Expanding Vapor Explosion) that can be deadly and cause severe extensive damage from the fire, shockwave and flying debris. It is different than a detonation because the shock wave associated with a deflagration travels slower than the speed of sound in air.

Recognition and Risk Assessment

WESTON activities involve potential exposure to explosives or use of explosives in a number of ways. Explosives may be used for seismic investigations to improve production of wells, and may also be used in construction. Explosives in the form of containers potentially under pressure due to mismanagement or abandonment, containers that have been impacted by a fire or other catastrophe may be encountered in hazardous materials response or remediation. Explosions may also be associated with process equipment and repair or replacement of fuel systems. WESTON activities involving exposure to explosives also include investigation and remediation of (1) soils presenting explosive hazards, (2) buildings with explosives residues that represent explosion hazards, (3) unexploded Ordnance (UXO), and (4) military munitions that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, or buried. These are the four categories of explosives referred to as ordnance and explosive (OE). Explosives are also used to dispose of OE categories 3 and 4.

Handling of containers that may present explosion hazards and OE investigation and disposal or any investigation and remediation work where OE may be present are topics addressed in other procedures. This FLD addresses use of explosives for well development, construction and seismic investigations.

REFERENCES

Related FLD OPS:

FLD01 – Noise Protection
FLD30 – Hazardous Materials Use and Storage

29 CFR 1926 sub Part U
USACE EM 385-1-1 Section 29
RESPONSIBILITIES

The project manager, person(s) preparing site specific safety plans and persons providing technical review of site specific safety plans are responsible for determining the hazards associated with explosive materials and a particular explosives operation, specifying the appropriate control measures needed to mitigate those hazards including assignment of qualified persons to perform work with explosives or blasting and establishing controls for explosives used for blasting, seismic investigations, developing wells, etc., and participating in periodic inspections to ensure that appropriate control measures are in effect. It is also the responsibility of the project manager and site manager and Site Safety Officer to ensure explosive handlers and blasters are properly qualified, that blasters licenses are in place and only persons with Commercial Drivers Licenses with explosive endorsements or authorized military personnel operate vehicles transporting explosives.

Prevention and Protection Programs

Only personnel who are approved by the site manager and the Site Health and Safety Coordinator (SHSC) shall be allowed access to an area where there is a recognized potential for explosives or where explosives are being used. Only properly certified persons will perform explosives handling or blasting work.

Explosives are considered a hazardous material and once used, must be handled and disposed of in accordance with Resource Conservation Recovery Act (RCRA) guidance.

PROCEDURE

Potentially Explosive Containers

Working near explosive or potentially explosive containers requires extreme caution. Containers that are over-pressurized to the extent that the container head (opening/bung) is swollen several inches above the level of the chime should not be moved. The practice of tapping containers to determine their contents is neither safe nor effective. A laser thermometer can be used at a distance to determine the level of substance in a container and whether the contents are liquid or non-liquid.

When sampling or venting is required, remotely operated tools are the safest available means of opening containers. Sampling or venting is performed using a backhoe spike, hydraulic drum opener, or pneumatic device. Critically swollen drums should be vented or opened in-place. Drums that can be moved should be staged in an open area. Drums should be placed in rows with adequate aisle space to allow ease in backhoe maneuvering. Once staged, the drums are quickly opened by remotely punching a hole in the drum head or lid with the spike or pneumatic drill, which removes the bung.

Heavy equipment shall be equipped with blast shields to protect against flying debris. Blast shield shelters will be provided for personnel who must remain with in the exclusion distance of potential explosions and fragmentation hazards. Site personnel not protected by blast shields should be far enough away from the potentially explosive containers to avoid being hit by debris if an explosion occurs.
Explosives as Monitoring Devices for Construction and Well Development

Explosives as identified in Table 1 are occasionally used for project work. For example, electronically detonated black powder shells (Betsy Seismic shells) are used as a seismic source for underground surveys. Explosives, blasting caps, detonation cord, etc may be used for construction and well development. Material safety data sheets shall be obtained for explosive products intended for use at a site.

Handling of explosives and performance of blasting will comply with 29 CFR 1926 Subpart U and EM 385-1-1 Section 29.

When using explosives for project work, the following precautions shall be observed:

- Only trained and qualified personnel are authorized to perform explosives work.
- Un-used explosives must be promptly returned to the manufacturer or approved on-site storage.
- Adequate security measures should be taken when storing explosives onsite. DOD and/or U.S. Bureau of Alcohol, Tobacco and Fire Arms regulations must be followed.
- The explosives should not be stored behind doors that can be removed. Hinges may or may not be welded and could be removed by unauthorized personnel.
- Signs indicating explosive hazards must be prominent.
- Detonators should be stored away from explosives.
- Gasoline other that in vehicle fuel tanks must not be carried in a vehicle containing explosives.
- An approved Explosives Management Plan must be in place prior to handling of explosives or blasting.

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<th>HAZARD</th>
<th>EXAMPLE</th>
<th>DOT CLASSIFICATION</th>
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<td>Blast and fragment</td>
<td>Bulk explosive or artillery shell</td>
<td>Class A</td>
</tr>
<tr>
<td>Intense heat/fire</td>
<td>Rocket motor</td>
<td>Class B</td>
</tr>
<tr>
<td>Minimal hazard</td>
<td>Squibs, small-arms ammunition detonators</td>
<td>Class C</td>
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<tr>
<td>Insensitive high explosives substance</td>
<td></td>
<td>Blasting agent</td>
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</table>
EXPLOSIVES MANAGEMENT PLAN

The following represents minimal requirements for an Explosives Management Plan:

GENERAL

This Explosives Management Plan outlines the procedures to be used by WESTON personnel to acquire, receipt, store, transport, issue, and report the loss of explosives utilized during this project. All personnel involved with explosives will comply with all federal, state, and local laws as required.

LICENSES / PERMITS

ACQUISITION

The types and estimated quantities of explosives that are anticipated are listed in Table -1:

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</tbody>
</table>

Explosives will be purchased from a commercial vendor. Vendor information will be provided as required.

INITIAL RECEIPT

The following procedures will be adhered to upon receipt of explosive materials.

a. Explosives on site will be limited to what will be used in one day with the provision that unused explosives will be returned to the vendor or supplier, or they will be stored in accord with 27 CFR 55.

b. Upon arrival at the site the blaster will escort the vendor to the explosives storage magazine.
c. The vehicle transporting the explosives will be escorted to the explosives bunker prior to unloading.

d. All unauthorized personnel will remain at a minimum of 900 ft from explosive vehicle while it is loading/unloading.

e. An individual authorized to receive the explosives will compare the explosives delivery record to the actual quantity delivered prior to accepting custody for the explosives.

f. Once the quantity has been confirmed, the explosive delivery record will be signed and the explosives transferred to and stored in the approved bunker.

g. All material introduced or removed from the magazine will be entered on stack cards and explosive records updated.

h. If it is determined that there is a discrepancy between the quantity delivered and quantity shipped, the following will occur:

- Notify the Site Safety Officer.
- Do not accept shipment.
- Contact the Shipper to resolve the discrepancy.

*Note:* If discrepancy cannot be resolved, notify the Local Law Enforcement Agency, Bureau of Alcohol, Tobacco, and Firearms, WESTON Regional Safety Manager, PM, and the client COR.

**Figure 1**

**Procedures for Receipt of Explosives**

- Receive Explosive
- Inventory
- Sign Receipt Documentation
- Generate Magazine Data Cards
- Secure Explosives in Magazine

**STORAGE**

Explosive materials will be stored as follows:

a. Explosives will be stored in an explosive storage facility (magazine) provided by the client or that WESTON will construct for an explosives facility for the project. These explosive magazines will comply with OSHA, USACE EM 385-1-1, Department of the Army, Bureau of Alcohol, Tobacco, and Firearms, and any appropriate State regulations pertaining to explosive magazines.
b. The explosive magazine will be secured with a padlock having a case hardened shackle and at least five (5) tumblers and shall be protected with a cap constructed of at least No. 14 gage steel so as to prevent sawing or levering action on the lock or hasp.

c. In the event that the lock or facility shows signs or tampering or break-in, do not enter the magazine or touch the broken lock/door. Refer to Subsection on Loss, Theft, and Unauthorized Use of Explosives.

TRANSPORTATION

The transportation of explosives from the magazine to locations requiring demolition operations will be conducted in the following manner:

a. Vehicles transporting explosives from the magazine to locations requiring demolition operations will stay on all roads either improved or unimproved.

b. Speeds will be kept to 20 miles per hour or less depending on road conditions.

c. Radio communications will be maintained with the UXO Safety Officer.

d. Vehicles will have a safety inspection performed prior to loading explosives.

e. Vehicle will be equipped with a first aid kit and a minimum of two (2) each 2A10BC fire extinguishers.

f. Vehicle will be placarded during transport of explosives.

RECEIPT PROCEDURES

Prior to accepting any explosives, the procedures outlined above in the initial receipt procedures will be accomplished.

Only licensed and authorized blasters will be authorized to purchase, receive, access, issue, transport, and use explosives for this project.

Upon completion of each demolition operation, an ammunition consumption report will be completed. Upon expenditure of all explosives, the authorized person will certify in writing that the explosives were used for their intended purpose.

INVENTORY REQUIREMENTS

A physical inventory of all explosives will be accomplished in accordance with the following schedule:

- Whenever explosives are removed from the magazine.
- On a minimum weekly basis, when the magazine is not unlocked and opened.
- Whenever the door to the magazine is unlocked.

**Exception:** When opened for inspection by State or Federal Inspectors, an inventory need not be completed.

A running inventory will be completed using the Department of Army Form 3020-R Magazine Data Card or equivalent. If a discrepancy exists between the physical inventory and inventory records, the following steps will be taken:

- Notify the Safety/QC Officer
- Re-inventory explosives
- Inspect data cards for errors
- Reconcile data cards, physical inventory, and ammunition consumption reports

**Note:** If discrepancies continue to exist, see Subsection Loss, Theft, and Unauthorized Use of Explosives.

### RETURN OF UNUSED EXPLOSIVES

All explosives not used for demolitions operations will be returned to the magazine at the end of the day. Magazine data cards will be annotated and an inventory completed in accordance with inventory requirements above.

### DISPOSAL OF REMAINING EXPLOSIVES

Upon completion of all site activities, the client will be contacted with a request to dispose of all excess explosives. Upon approval from USACE, all explosives will be disposed of in accordance with appropriate demolition procedures.

### LOSS, THEFT, AND UNAUTHORIZED USE OF EXPLOSIVES

These procedures apply if either of the following occurs:

- If during an inspection of the explosive magazine, it is determined that forced-entry has occurred:
  
  a. Do not enter the magazine.
  b. Do not handle or disturb items within the immediate vicinity.
  c. Secure the magazine by posting a guard to prevent further access.
  d. Notify the following individuals:

    i. WESTON Safety Officer
    ii. WESTON Project Manager
    iii. WESTON Division Safety Manager
    iv. WESTON Corporate EHS Director
    v. Client designated contacts
vi.  Appropriate local law enforcement agency(s)

vii. Bureau of Alcohol, Tobacco, and Firearms

viii. State agencies as appropriate

e. Do not allow entry into the magazine by others until Law Enforcement Personnel arrive.

f. Immediately upon request of Law Enforcement Personnel perform physical inventory and reconcile on-hand explosives with magazine data cards.

g. Assist above individuals and agencies as needed.

- If during routine inventories discrepancies are discovered and cannot be reconciled, notify the personnel listed above.

**EXPLOSIVES SITING PLAN**

**EXPLOSIVE STORAGE MAGAZINES**

The explosive storage magazines to be used on this project are an ABC ATF Type 2 specification magazine with an attached Type 4 class BC cap box attached. Additionally, a IME/DOT truck box will be utilized for transport of the explosives and as a day box. The location of the magazine is depicted in figure 1.
Figure 2: Magazine Siting

PLANNED OR ESTABLISHED DEMOLITION AREAS

EXPLOSIVE REQUIREMENTS

Table 3 Explosive Quantities

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boosters, Cast</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Shaped Charges</td>
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<td>TBD</td>
</tr>
<tr>
<td>Time Fuse</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Non-electric Detonators</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Detonating Cord</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Fuse Igniters</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>NONEL</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>
BLASTING PLAN

A blasting plan using the following Blasting Questionnaire/Plan or an equivalent Plan providing the information identified below must be developed, written reviewed and approved prior to any blasting:

BLAST QUESTIONNAIRE/PLAN

A. Preparation and Personnel

1. Is Blast Permit Required? (Y/N) __. Who is responsible for obtaining? __________. Has it been obtained? (Y/N) __.

2. Blaster in Charge:
   - Co-Supervisor:
   - Shot Logger:
   - Plan/information provided by:

   Identified personnel are qualified according to client, blasting contractor, state and Federal standards? (Y/N)

   Name: _______________ Signature:

B. Information to be provided/completed by Blaster before beginning.

1. Explosive
   a. Name/Type of Explosive:
   b. Size of charges:
   c. Configuration of charges:
   d. Initiation system to be employed: Electrical Sequential Timer
   e. Number of shots:
   f. Time between shots:
   e. Initiation system acceptable for explosive, size and configuration of charges? (Y/N)

2. Procedures to control flyrock:

3. Vibration control procedures:

<table>
<thead>
<tr>
<th>Structures of concern:</th>
<th>No.</th>
<th>Distance to closest</th>
<th>Control procedures</th>
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</thead>
<tbody>
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<td></td>
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</tbody>
</table>
   a. Wait 60 minutes
   b. Blaster-in-Charge's plan for correction:
   c. Does the situation require contact with manufacturer? __. If so, was contact made? __ With whom?

What was direction given if any?

Blast Questionnaire/Plan

B. Shot completion documentation

1. Number of Charges Set:
2. Number of Shots Fired:
3. Number of Misfires:
4. All misfires corrected:
5. Seismograph documents vibration control effective on each shot?
6. Visual inspection of structures completed?
   a. Damage to Sewer?
   b. Damage to Building? __ If yes, describe.

Documentation Completed by:

Name: ________________________ Signature:
FLD 31  FIRE PREVENTION AND PROTECTION PLANNING

Fire prevention and protection are key elements to any activity conducted. This FLD focuses on the understanding of fire hazards, protection and equipment options available for use, minimal inspection requirements for equipment and worksites, guidance on limiting fire hazards, training, and site-specific planning. The objectives of this program are to ensure that personnel can understand the hazards associated with fires, how to prevent fires from occurring, and how to act safely and appropriately in the event of a fire emergency.

RELATED FLDs AND PLANS

FLD 32 – Fire Extinguishers Required and Requirements
Emergency Response Plan
Health and Safety Plan

RESPONSE ACTIONS

In case of fire, immediately take the following actions:

- Evacuate the building or area in accordance with the evacuation plan. Activate fire alarms if they have not already been activated.
  - Use nearest exit.
  - Do not use elevators.
  - Close all doors behind you.
- Dial 911 or the established Fire Emergency Number from a safe location.
  - Indicate what is happening, location of fire, if any injuries.
  - Comply with requests from the 911 operator for information.
  - Do not hang up with the operator until told to do so by the operator, or they hang up first.

Upon completion of emergency phase comply with incident notification procedures.

NOTE: If the fire is small and manageable with fire extinguishing equipment at hand, and provided you are trained in the use of this equipment, you may make the decision to use this equipment while waiting for advanced assistance. Never place yourself in danger, always have a plan for escape, and never attempt to fight a fire if there are any doubts about the type of fire or your ability to successfully fight the fire. Never allow the fire to get between you and your escape route.

LIFE SAFETY

- All workers are required to follow the Emergency Action Plan (EAP) and Health and Safety Plan (HASP) developed for the respective work location.
- Exit signs must be visible from all areas of a room.
- All exits maintained unobstructed, unblocked, and unlocked.
• Adequate and reliable illumination must be available.
• Provisions must be made within local EAPs to assist any potentially physically challenged personnel or visitors.

FIRE PROTECTION (EQUIPMENT AND PROCEDURES)

Classes of Fire

• Class A: Combustibles (e.g., wood, paper, cloth).
• Class B: Flammable and combustible liquids, gasses and greases.
• Class C: Denotes presence of electrical and energized electrical equipment.
• Class D: Combustible metals
• Class K: Combustible cooking media (e.g., oils and greases).

Type(s) of Fire Protection Equipment or Systems

The following types of systems are typically used in most occupancy. In the event a different system is installed or anticipated, contact Environmental Compliance, Health, and Safety (EHS) Staff for assistance.

• Fixed Systems
  – Sprinkler Systems: Keep heat sources and dust generating sources away from sprinkler heads. Allow a minimum of 18 inches clearance below the sprinkler head. Do not paint sprinkler heads. Maintain working clearance around sprinkler control valves. Ensure that system tests are conducted in accordance with local fire code requirements.
  – Fire Hydrants and Fire Lanes: Ensure that clearance for fire fighting equipment (trucks) and fire fighters is maintained in fire lanes and around hydrants. Do not use fire hydrants for any purpose other than fire fighting unless express approval is obtained from the local fire department.

• Portable Fire Extinguishers
  – Selecting: Ensure that portable fire extinguishers are appropriate for the class and size of potential fire. Selection will be based on the more restrictive requirements of Occupational Safety and Health Administration (OSHA), NFPA, or Local fire code. Contact EHS staff for assistance as necessary.
  – Training and Education: In accordance with 29 CFR 1910.157 and NFPA Standard 10, WESTON will provide portable fire extinguisher general use education, routine inspection guidelines, and incipient fire hazard recognition and prevention training to all new employees upon initial employment and at least annually thereafter. The portable fire extinguisher training education will be documented and a record of that training will be maintained on file for a period of at least one year. Only persons who have been trained may use portable fire extinguishers.
  – Maintenance and Inspection: Maintenance and inspection will be in accordance with 29 CFR 1910.157 and NFPA Standard 10. Each portable fire extinguisher inspection documentation/tags shall include the fire extinguisher type and/or identifier, the person inspecting, date of the routine inspection, date of last recharge, and the date of the annual maintenance check by a qualified person. Each portable fire extinguisher shall document at least a monthly visual inspection by a trained inspector and shall consist of the following:
- Annual maintenance check.
- Appropriate pressure charge.
- Clean and clear discharge port or hose used in lieu thereof.
- Pressure handle pin in place and secured.
- Extinguisher properly mounted.
- Extinguisher properly identified

- Each inspection period to include both annual and routine inspections for active and stored portable fire extinguishers will be documented and documentation will be maintained on file for a period of at least one year after the last entry or the life of the shell, whichever is less. The inspection and maintenance record will be available to the assistant secretary of OSHA, or any other responsible authority upon request.

- Alarm Systems
  - Fixed alarm systems are to be installed, maintained, and tested by approved vendors.
  - In the event of a fire emergency alarm, immediately evacuate.

- Fire Doors
  - All doors designated as fire doors are to remain closed.
  - In the event of a fire, close (but do not lock) all doors while evacuating.

Incident Notifications and Actions

**Any** discharge of a portable or fixed fire extinguishing system requires Notice of Incident (NOI) reporting. Discharged extinguishers are to be replaced immediately by acceptable units and the discharged units submitted for testing and recharge.

Responsibilities

**EHS Staff**

- Assists management in determining appropriate numbers and types of fire protection equipment and/or systems based upon site or building criteria.
- Verifies through inspection that fire extinguishers and systems are properly selected, used, and maintained.
- Provides technical assistance to management and reviews plans to ensure that fire hazards are limited.

**Management (OU, Office, Project, and Site)**

- Ensure that occupancies have appropriate numbers and types of fire protection equipment and/or systems.
- Ensure that required inspections of equipment and systems are conducted.
- Ensure that any deficiencies in equipment or systems are corrected in a timely manner without impact to overall fire protection of occupancy.
• Designates a person or persons to be responsible for the selection, purchase, repair or replacement of portable fire extinguishers and as necessary, other fire protection systems for site or building/occupancies.

• Ensures, as appropriate, that personnel are trained in the use of portable fire extinguishers.

• Ensure that all affected personnel are trained in the EAP and evacuation procedures.

• Notifies EHS staff and others, as appropriate, prior to building modifications, site activities, or other tasks that impact fire prevention and protection.

• Ensures that flammable and combustible materials are used and maintained in a safe manner.

• Ensures that housekeeping is routinely conducted.

• Ensures that heat producing materials and equipment are properly rated, used, and maintained.

All Personnel

• Take all appropriate measures to limit fire hazards.

• Report all fires.

• Evacuate as trained and directed in the event of an emergency.

• Do not prop open fire doors.

• Keep exits and exit ways clean, clear, and unblocked.

• Take all appropriate measures to limit fire hazards.

• Use and store flammable and combustible materials appropriately.

FIRE PREVENTION AND PROTECTION (LIMITING HAZARDS)

Flammable and Combustible Materials (liquids, gases)

• Flammable materials must be properly labeled, stored, handled, and used.

• No smoking or use of open flame-producing devices within 50 feet of flammable and combustible materials.

• Obtain Material Safety Data Sheets (MSDS) for all flammable materials in use and ensure all personnel are aware of hazards.

• All containers are to be properly labeled with contents, the word Flammable, and in accordance with hazard communication requirements.

• Store materials in well ventilated areas that are free of ignition sources and flame or sparks.

• Ensure that incompatible materials are stored in remote locations from each other (e.g., keep flammables from oxidizers).

• Limit quantities to minimum required.

• Store cylinders in upright and secure positions.

• Bond and ground containers as (and where) necessary.

• Use proper storage cabinets for flammable and combustible materials. Contact EHS Staff for assistance.
• Use only approved containers.
• Use and dispense only in well-ventilated areas.

**Combustible Materials (solids)**

• Solid combustible materials include; wood, paper, and cloth. Proper housekeeping reduces concerns for combustion of these materials. Use proper receptacles for disposal and dispose of routinely.

**Oxidizers**

• An oxidizer is a substance that increases the flammability of materials, allowing them to burn easier. Examples include; pure oxygen, chlorine, ammonium nitrate. Store oxidizers in a remote location from flammable and combustible materials.

**Electric Appliances**

• Do not use electric appliances near flammable or combustible materials. Never place an appliance on an unstable surface. Use on UL or FM approved appliances. Follow the manufactures recommendations or requirements for use and maintenance. Obtain approval from EHS staff prior to purchase and use of portable heater units in office settings. Do not leave portable heaters on and unattended.

**Hot Work Permits**

• A permit is required for any “hot” work such as; welding, brazing, and cutting or the use of an open flame device (other than that by an FM or UL approved device used in accordance with manufacture’s requirements).

• Hot work permits will be issued by local or site EHS staff, or as designated by project management. Permits are typically associated with one task and for one shift. At the discretion of local EHS personnel, permits may be authorized for longer periods.

**Smoking**

• Smoking is prohibited indoors. Smoking is only allowed in outdoor, designated areas. Smokers are to maintain smoking areas in a clean and safe condition. Ensure that receptacles for disposal of cigarettes and other smoking materials are appropriately constructed, free of combustible debris and when necessary, are cool before emptying into waste receptacles.

**Housekeeping**

• All personnel are responsible for keeping work areas free of combustible materials and debris.
• Weeds and grass must be properly maintained to limit potential fire hazard.

**FIRE PREVENTION AND PROTECTION MINIMUM REQUIREMENTS**

OSHA outlines minimum requirements for emergency evacuation planning and fire prevention plans (see [www.osha.gov](http://www.osha.gov)). Site-specific HASPs are developed to implement these requirements.
For evacuation planning, the minimum requirements are:

- Description of routes and procedures to follow.
- Procedures for accounting of personnel.
- Procedures for evacuation of physically impaired employees where necessary.
- Procedures for those employees who must remain temporarily behind to shut down critical equipment before they evacuate.
- Alerting systems must be identified.

Training must be conducted for all employees on what to do in the event of an evacuation emergency.
FLD 32 FIRE EXTINGUISHERS REQUIRED AND REQUIREMENTS

RELATED FLDs

FLD 03 – Hot Processes - Steam, Low Temperature, Thermal Treatment Unit, and Transportable Incinerator
FLD 21 – Explosives
FLD 22 – Heavy Equipment Operation
FLD 30 – Hazardous Materials Use and Storage
FLD 31 – Fire Prevention and Protection Planning
FLD 36 – Welding/Cutting/Burning

Fire extinguishers are a key component of fire fighting. Small fires that are small can be effectively fought with properly selected and correctly located extinguishers. The Fire Department should be notified as soon as a fire is discovered, and should not be delayed by awaiting the results of the application of portable fire extinguishers.

The successful use of fire extinguishers, according to the National Fire Protection Association (NFPA) Standard 10, depends on the following conditions having been met:

1. The fire extinguisher is properly located and in working order.
2. The fire extinguisher is of the proper type for a fire that can occur.
3. The fire is discovered while still small enough for the fire extinguisher to be effective.
4. The fire is discovered by a person ready, willing, and able to use the fire extinguisher.

To select an appropriate fire extinguisher, the situation must be considered for the type of fires anticipated (based on flammable and/or combustible sources on site), the facility construction, the anticipated hazard level, as well as the ambient air temperature conditions.

FIRE TYPES

To determine the types of fires anticipated on site, NFPA classifies fires by type:

- Class A Fires – Fires in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.
- Class B Fires – Fires in flammable liquids, combustible liquids, petroleum greases, tars, oil-based solvents, lacquers, alcohols, and flammable gases.
- Class C Fires – Fires that involve energized electrical equipment.
- Class D Fires – Fires in combustible metals, such as magnesium, titanium, zirconium, sodium, lithium, and potassium.
- Class K Fires – Fires in cooking appliances that involve combustible cooking media (vegetable or animal oils and fats).

Corresponding to the types of fires, fire extinguishers are labeled to match fire types. Extinguishers suitable for Class A fires should be identified by a triangle containing the letter “A,” and green (if colored). Extinguishers suitable for Class B fires should be identified by a square containing the letter “B,” and red (if colored). Extinguishers suitable for Class C fires should be identified by a circle containing the letter “C,” and blue (if colored). Extinguishers suitable for Class D fires should be identified by a 5-pointed star containing the letter “D,” and yellow (if colored).
HAZARD CLASSIFICATION

NFPA 10 classifies hazards on three levels; Light (Low), Ordinary (Moderate), and Extra (Heavy) Hazards.

Light Hazard

Light (Low) hazard areas constitute locations where the total amount of Class A combustible materials is of minor quantity. This assumes that the majority of the items are either noncombustible or arranged so that fire is not likely to spread rapidly. An example of this hazard level would be an office setting. Small amounts of Class B flammables are included in this hazard level, provided that they are kept in closed containers, and appropriately stored.

Ordinary Hazard

Ordinary (Moderate) hazard areas are locations where the total amount of Class A combustibles and Class B flammables are present in greater amounts than expected in Light hazard areas. Examples of these areas are dining areas, light manufacturing, workshops and support service areas of Light hazard occupancies.

Extra Hazard

Extra (Heavy) hazard areas are locations where the total amount of Class A combustibles and Class B flammables present in storage, production, use, and finished product (or combination thereof) is above areas of Ordinary hazard. These areas include woodworking, vehicle repair, cooking areas, and storage and manufacturing processes.

FIRE EXTINGUISHER RATINGS

The classification and rating system describing fire extinguishers is that of Underwriters Laboratories, Inc. The class ratings correspond to the various fire types (A, B, C, D, and K), and the numerical value in front of the class rating dictates the size of fire it can extinguish. In principle, a 2-A fire extinguisher can extinguish twice as much fire as a 1-A; a 20-A fire extinguisher can extinguish 20 times as much fire. Each class rating has its own extinguishing media and corresponding volume. A 1-A fire extinguisher is the equivalent of 1¼ gallons of water, for reference.

Class B extinguishers can have gallons of foam, pounds of carbon dioxide, or pounds of a dry chemical.

Note: A fire extinguisher may be rated to fight the appropriate size fire, but the training and degree of experience of the operator influences this amount.

EXTINGUISHER SELECTION

To select the appropriate number and locations of fire extinguishers throughout a facility, work areas must be evaluated based on a minimum rated single extinguisher (dictated by hazard level), the maximum floor area per unit of Class A hazards, the maximum floor area for the extinguisher, and the maximum distance of travel to the extinguisher.
Fire Extinguisher Size and Placement for Class A Hazards

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Light Hazard</th>
<th>Ordinary Hazard</th>
<th>Extra Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum rated single extinguisher</td>
<td>2-A</td>
<td>2-A</td>
<td>4-A</td>
</tr>
<tr>
<td>Maximum floor area per unit of Class A hazards</td>
<td>3,000 square feet</td>
<td>1,500 square feet</td>
<td>1,000 square feet</td>
</tr>
<tr>
<td>Maximum floor area for extinguisher</td>
<td>11,250 feet</td>
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<tr>
<td>Maximum travel distance to extinguisher</td>
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</table>

Fire Extinguisher Size and Placement for Class B Hazards

<table>
<thead>
<tr>
<th>Type of Hazard</th>
<th>Basic Minimum Extinguisher Rating</th>
<th>Maximum Travel Distance to Extinguishers (feet)</th>
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<tbody>
<tr>
<td>Light</td>
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<td></td>
<td>10-B</td>
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<td>20-B</td>
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<td>Heavy</td>
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<tr>
<td></td>
<td>80-B</td>
<td>50</td>
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</table>

INSPECTION

Fire extinguishers shall be inspected when initially placed into service, and every 30 days thereafter. More frequent intervals can be maintained, should the situation require. Inspections should document the following:

1. Location in designated place
2. Obstructions to access or visibility
3. Operating instructions legible (with nameplate facing outwards)
4. Safety seals and tamper indicators intact
5. Fullness determined by weighing (“hefting” is acceptable)
6. Examination for obvious physical damage, corrosion, leakage, and clogged nozzle
7. Pressure gauge in the operable range or position
8. HMIS label in place

SERVICING

Only trained personnel can perform maintenance, servicing, and recharging of fire extinguishers. Trained personnel will have the appropriate tools, manuals, recharge materials, lubricants, and manufacturer’s replacement parts specifically listed for use in the fire extinguisher.
PROCEDURE

Fire extinguishers appropriate in size and classification shall be present, readily accessible, and ready for use in all areas where there is potential for fires.

Fire extinguishers must be used in conjunction with an emergency response or contingency plan.

Health and Safety Plans must identify number, type, and location of all fire extinguishers related to a specific project.
FLD 38  HAND AND POWER HAND TOOLS

REFERENCES

29 CFR 1926 Subpart I
29 CFR 1910 Subpart P
ANSI Standard A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools

RELATED FLDs

FLD 06 – Cold Stress
FLD 10 – Manual Lifting and Handling of Heavy Objects
FLD 16 – Pressure Systems: Compressed Gas Systems
FLD 35 – Electrical Safety

INTRODUCTION

Injuries from hand tools are often caused by improper use, using the wrong tool for the job, or from using a defective tool. Workers often assume that they know how to use a common hand tool. Working with something other than the simplest non-powered hand tools shall be performed only by those persons competent or qualified through formal training or documented experience.

Like all tools, hand and power tools must be maintained properly for effective use and safety. This Field Operating Procedure describes general safety guidelines for the four major categories of hand tools: cutting tools, torsion tools, impact tools, and power tools.

The use of any machinery, tool, material, or equipment which is not in compliance with any applicable OSHA 1910/1926 requirement is prohibited. Any tools or equipment identified as unsafe or defective will be “tagged or locked-out.” Controls shall be applied rendering the unsafe or defective tool or equipment inoperable. Any damaged or defective equipment shall be removed from its place of operation. Weston shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment that may be furnished by employees.

Tags shall be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations, which are out of the ordinary, unexpected, or not readily apparent. Tags shall be used until the identified hazard is eliminated or the hazardous operation is completed. Tags need not be used where signs, guarding, or other positive means of protection are being used.

GENERAL SAFETY RULES – APPLICABLE TO USE OF ALL TOOLS

- Tools will be inspected prior to each use. Tools found to be unsafe will be tagged by the inspector “Do Not Use” and either repaired or removed from the site.
- Keep the work area clear of clutter.
- Keep the work area properly illuminated.
- Maintain and keep tools sharpened, oiled, and stored in a safe, dry place.
- Wear ear and eye protection when cutting, sawing, drilling, or grinding.
- Supervisor should instruct everyone using equipment on safe procedures before they use them.
- Inspect tools, cords, and accessories regularly and document any repairs.
- Repair or replace problem equipment immediately.
- Electric power tools must have a 3-wire cord plugged into a grounded receptacle, be double-insulated or powered by a low-voltage isolation transformer, and fitted with guards and safety switches.
- Machine guards must be in-place and not removed during equipment operation.
- Do not alter factory-supplied safety features on tools.
- Install and repair equipment only if you are qualified.
- Use the right tool for the job; for instance, do not use a screwdriver as a chisel or a wrench as a hammer.
- Carry a sharp tool pointed downward or place in a tool belt or toolbox.
- Protect a sharp blade with a shield.
- Store tools in drawers or chests with cutting edge down.
- When using power tools, wear long hair in a protective manner, do not wear jewelry or loose clothing, use safety glasses, respiratory protection, hard hats, etc., as needed/specified by the manufacturer. Note that protective gloves should not be worn when operating powered woodworking tools because of the possibility of the work piece snagging the glove and pulling the hand to the cutting surface.
- All hand-held power-driven tools must be equipped with one of the following: a constant pressure switch that shuts off the power upon release (e.g., circular saws, hand-held power drills, chain saws) or an on-off switch (e.g., routers, planers, scrollsaws, jigsaws).
- Never leave a running tool unattended.
- All workers using hand and power tools must be properly trained, and training must be documented.
- Tools of a non-sparking material must be used if fire/explosion hazards exist.
- All fuel-operated tools shall be stopped and allowed to cool prior to being refueled, serviced, or maintained, and proper ventilation provided when used in enclosed spaces.
- Bench grinders shall be properly grounded. Work rests must be kept at a distance not to exceed 1/8 inch from the grinding wheel surface.
- All persons using grinders or abrasive wheels shall use approved eye-protective devices.
- Hand held grinders shall have grinding wheel guards in place during operation.
- Train personnel to recognize that tasks involving lifting, repetitive motion, excess pressure, vibration, awkward positions, and remaining stationary for prolonged periods and work in cold conditions increase the risk of musculoskeletal injury. Procedures for avoiding or minimizing risk include: using mechanical devices for lifting, following procedures in FLD 10 when manual lifting is necessary, using shock absorbing gloves when using vibrating tools, choosing tools that reduce gripping force and align joints in a neutral position or holding tools in an ergonomically neutral position, taking breaks or alternating repetitive jobs, and following procedures in FLD 06.
- Hand tools such as chisels and punches, which develop mushroomed heads during use must be taken out of service and reconditioned by qualified persons or replaced, as necessary.
- Broken or fractured handles on hammers, axes and similar equipment must be replaced promptly.
- Worn or bent wrenches must be replaced.
Handles designed for use on files and similar tools must be used.

Jacks must be checked periodically to ensure they are in good operating condition.

**TORSION TOOLS**

Torsion tools are used to grip, fasten, and turn. These include wrenches, pliers, screwdrivers, vises, and clamps. There is a variety of each type of these tools. Selection is very important. Here are a few safety precautions for common torsion tools:

- Wrenches should always be pulled and not pushed. Pushing a wrench can cause a loss of control if there is a sudden release of pressure. A short, steady pull should be used rather than quick, jerky motions. Where available, use a socket wrench instead of an adjustable or open-ended wrench. Socket wrenches are generally easier to control, are more convenient, and are less likely to damage a bolt or nut. When using an adjustable wrench, the pressure should be applied to the fixed jaw.

- Pipe wrenches can easily slip on pipes or fittings, causing injury. To prevent slipping, make sure that the pipe or fitting is clean and the wrench jaws are sharp and kept clean of oil and debris.

- Pliers should never be substituted for a wrench. They do not have the same gripping power and can easily slip on a tight object. When using cutting pliers, the object being cut can fly off and cause injury. Wear safety glasses when cutting with pliers.

- Screwdrivers are often misused. They should not be used for prying, or as punches or wedges. These misuses can damage the head of the screwdriver. A dull tip can cause the screwdriver to slip. The tip must be flat at the tip and tapered for a snug fit on the screw.

- When using vises, make sure that the vise is bolted solidly to a base (e.g., work bench). When cutting material in a vise, try to cut as close to the vise as possible to minimize vibration.

- Oil vises regularly.

**Screwdrivers**

- Most screwdrivers are not designed to be used on electrical equipment. Use an insulated screwdriver.

- Do not hold an object in the palm of one hand and press a screwdriver into it; place the object on a bench or a table.

- Never hammer with a screwdriver.

- Check for broken handles, bent blade, etc.

- Select a screwdriver of the proper size to fit the screw.

- Screwdrivers with a split or splintered handle shall not be used.

- The point shall be kept in proper shape with a file or grinding wheel.

- Screwdrivers shall not be used as a substitute punch, chisel, nail-puller, etc.

**Pliers**

- Do not use pliers as a substitute for hammers or wrenches.

- Use insulated pliers when doing electrical work.
• Inspect pliers frequently to make certain that they are free of breaks or cracks.
• Pliers shall be kept free from grease and oil and the teeth or cutting edges shall be kept clean and sharp.
• The fulcrum pin, rivet or bolt shall be snug but not tight.

**Wrenches**

• Select the correct size of wrench for the job.
• Never use a piece of pipe or another wrench as a wrench handle extension.
• Too much leverage can ruin a tool and cause injury.
• To avoid sudden slips, stand in a balanced position and always pull on the wrench instead of pushing against the fixed jaw.
• Only wrenches in good condition shall be used; a bent wrench, if straightened, has been weakened and shall not be used.
• Watch for sprung jaws on adjustable wrenches.
• Always pull toward yourself, never push, since it is easier to brace against a sudden lunge toward you should the tool slip or break.
• When using a wrench on a tight nut - first use some penetrating oil, use the largest wrench available that fits the nut, when possible pull on the wrench handle rather than pushing, and when possible apply force to the wrench with both hands while both feet are firmly placed. Always assume that you may lose your footing - check the place where you may fall for sharp objects.
• Keep all pipe wrenches clean and in good repair. The jaws of pipe wrenches should be wire brushed frequently to prevent an accumulation of dirt and grease that would otherwise build up and cause wrenches to slip.
• Never use pipe wrenches in place of a rod holding device.
• Replace hook and heel jaws when they become visibly worn.
• Position your hands so that your fingers will not be smashed between the wrench handle and the ground or other work surface; when breaking joints the wrench may slip or the joint may suddenly let go.

**IMPACT TOOLS**

Impact tools include various types of hammers such as riveting hammers, carpenter's claw hammers, and sledgehammers. The main hazard associated with all these tools is damage to the hands and arms. The following safety procedures should be employed when using hammers:

• The handle shall be securely fitted and suited for the type of job and type of hammerhead. The striking face of the hammer shall be kept well dressed according to the application.
• The handle shall be smooth and free of oil to prevent slippage.
• Safety goggles shall be worn at all times when hammering to protect from flying nails, wood chips, and metal or plastic fragments.
To properly drive a nail, hold the hammer near the end of the handle and start off with a light blow. Increase power after the nail is set.

To avoid chipping or spalling of the hammerhead, use the lightest swing possible, hammer straight and not on an angle. Inspect the head of the hammer for potential chipping and spalling.

**Hammers**

- Use the correct hammer for the type of work to be done.
- Have an unobstructed swing when using a hammer and watch for overhead interference.
- Check for defects before using.
- The head of a hammer shall be wedged securely and squarely on the handle and neither the head nor the handle shall be chipped or broken.

**CUTTING TOOLS**

The main hazard associated with cutting tools is tool slippage. A dull tool or poor tool technique can cause a slip, which can redirect the cutting part of the tool toward the body. In addition, a sudden release or change in the force applied to a tool can throw the user off balance, possibly falling into another object, which may cause injury. To prevent slippage, tools shall be kept sharp and handled in such a way that, if a slip occurs, the direction of force will be away from the body. In addition, cutting along the grain of a material can help prevent changes in the pressure applied to the tool, thereby preventing slippage.

**Chisels**

- Always wear safety goggles or a face shield when using a chisel.
- Drive wood chisel outward and away from your body.
- Do not use chisels to pry.
- Keep edges sharp for most effective work and protect when not in use.

**Knives**

- Always cut away from the body.
- Keep hands and body clear of the knife stroke.
- Use a locking blade knife when possible.
- Keep blades sharp.

- Knives and other sharp or edged tools must be maintained in proper condition. A sharp edged tool, used properly, is safer than a dull or improperly maintained tool.
- When not in immediate use edged tools must be properly secured via, sheathing, closing, capping or covering.
- Any task involving the use of an edged tool must be properly evaluated, alternatives to edged tools reviewed and training in the proper use, maintenance and handling verified by management and/or the site safety officer.
- Knives, box cutters or like tools will not be authorized for cutting plastic wire ties or tubing. Use appropriately shaped and sized wire cutters or snips.
- Remove knives from carry on luggage and place in checked baggage.
POWERED TOOLS

- Portable power tools shall be carefully inspected before use and shall be kept repaired.
- Switches and plugs must operate properly, and the cords must be clean and free from defects.
- Portable powered tools capable of receiving guards and/or designed to accommodate guards shall be equipped with guards to prevent the operator from having any part of his body in the danger zone during the operating cycle.
- Electric powered portable tools with exposed conducting parts shall be grounded. Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the equipment shall be distinctively marked.
- Hand-held powered tools of a hazardous nature such as circular saws having a blade diameter greater than two inches, chain saws, percussion tools, drills, tappers, fasteners, drivers, grinders with wheels greater than two inches in diameter, disc Sanders, belt Sanders, reciprocating saws, saber scroll saws and jig saws with blade shanks greater than one-fourth inch, and other similarly operating powered tools shall be equipped with a constant pressure switch or control (“dead-man switch”) that will shut the power off when the pressure is released.
- Portable circular saws having a blade diameter over two inches shall be equipped with guards or hoods which will automatically adjust themselves to the work when the saw is in use, so that none of the teeth are exposed to contact above the work. When withdrawn from the work, the guard shall completely cover the saw to at least the depth of the teeth. The saw shall not be used without a shoe or guide.
- Pneumatic powered portable tools shall be equipped with automatic air shut-off valves that stop the tool when the operator’s hand is no longer in contact with the tool. Safety clips, retainers, or other effective means shall be installed on pneumatic tools to prevent the tools from accidentally misfiring.
- Abrasive wheels with a diameter of more than two inches shall be used only on machines provided with safety guards. The guards shall cover the spindle end, nut, and flange projections. Guards on operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut, and other flanges are exposed.
- Explosive-actuated fastening tools’ muzzle ends shall have a protective shield or guard designed to confine any flying fragments or particles. The tool shall be so designed that it cannot be fired unless it is equipped with a protective shield or guard. Weston Solutions, Inc. employees are not permitted to use a power-actuated tool until properly trained as prescribed by the manufacturer.

Extension Cords

See FLD 35, Electric Safety, for requirements and procedures for using extension cords.

SPECIALTY TOOLS

Pneumatic Powered Tools

Tools powered by air must be inspected and maintained as described above. Hose or tubing used to deliver air to pneumatic tools must be used as required and according to procedures in FLD 16, Pressure Systems: Compressed Gas Systems.
Powder-Actuated Tools

- Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder-actuated tool.
- Powder-actuated tools shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
- Personal protective equipment shall be selected in accordance with manufacturer’s recommendations and in consideration of the potential hazards of the task.
- Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.
- Loaded tools shall not be left unattended.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.
- Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.
- Tools shall not be used in an explosive or flammable atmosphere.
- All tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.
- Powder-actuated tools used by employees shall meet all other applicable requirements of American National Standards Institute, A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools.
It is essential that workers have a means of communicating rapidly and effectively during heavy equipment operations, construction, hazardous waste operations, and other types of activities. Communication while wearing personal protective equipment can be extremely difficult. This FLD establishes guidance for uniform communication protocols to be used, as needed, in field operations.

### GENERAL HAND SIGNALS

<table>
<thead>
<tr>
<th>SIGNAL</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point index finger toward self</td>
<td>I; me</td>
</tr>
<tr>
<td>Point index finger toward object</td>
<td>It; them</td>
</tr>
<tr>
<td>Point index finger toward person</td>
<td>You; them</td>
</tr>
<tr>
<td>Circle index finger at group</td>
<td>We; us; all of us</td>
</tr>
<tr>
<td>Pointed finger on extended arm</td>
<td>Look in that direction</td>
</tr>
<tr>
<td>Beckon with index finger</td>
<td>Come here</td>
</tr>
<tr>
<td>Point with thumb in a particular direction</td>
<td>Move this way; go this way</td>
</tr>
<tr>
<td>Hold index finger up near head</td>
<td>Wait</td>
</tr>
<tr>
<td>Slowly ease palm face down</td>
<td>Relax; slow down</td>
</tr>
<tr>
<td>Put palm over brow</td>
<td>Scout it out; Check it out</td>
</tr>
<tr>
<td>Move hand far away from body</td>
<td>Stay away</td>
</tr>
<tr>
<td>Hands on top of head</td>
<td>Need assistance</td>
</tr>
<tr>
<td>Grip partners wrist or place both hands around partners arm</td>
<td>Leave area immediately.</td>
</tr>
<tr>
<td>Thumbs up</td>
<td>OK; I’m all right</td>
</tr>
<tr>
<td>Thumbs down</td>
<td>No; Negative; Bad; Not OK</td>
</tr>
<tr>
<td>Hand gripping throat</td>
<td>Cannot breathe, out of air</td>
</tr>
<tr>
<td>Wave hands over head from side-to-side</td>
<td>Attention; Stand-by for the next signal</td>
</tr>
<tr>
<td>Swing hand from direction of person receiving signal to directly overhead and through in circle</td>
<td>Come here</td>
</tr>
<tr>
<td>Clenched fist of extended arm</td>
<td>Stop motion/hold position</td>
</tr>
<tr>
<td>Draw index finger across front of throat</td>
<td>Shut off engine; cut off power/Quit</td>
</tr>
<tr>
<td>Palm down and rotated from side to side</td>
<td>Unsure; Can’t decide</td>
</tr>
<tr>
<td>Form a circle with thumb and index finger</td>
<td>OK; I understand; Agree</td>
</tr>
<tr>
<td>Military salute</td>
<td>I understand and will comply</td>
</tr>
</tbody>
</table>
EMERGENCY SIGNALS

Emergency signals are critical for alerting workers of danger and to maintain site control during an emergency. Bullhorns, radios, air horns, and similar devices may be used for emergency communications if background noise does not preclude their use. Emergency hand signals should be used as a secondary means of communication.

<table>
<thead>
<tr>
<th>SIGNAL</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>One long sound/blast of the emergency alarm signal, air horn, siren, whistle</td>
<td>Emergency situation, face safety watch and watch or listen for directions</td>
</tr>
<tr>
<td>Pause; followed by a number of short sounds, 1, 2, 3 or 4</td>
<td>Evacuate to the pre-designated emergency meeting place indicated by the number of sounds</td>
</tr>
<tr>
<td>Two long blasts of the emergency alarm signal, air horn, siren, whistle</td>
<td>All clear</td>
</tr>
<tr>
<td>Point one arm in direction of evacuation, make a large circling motion with the other arm in direction of evacuation</td>
<td>Evacuate the area</td>
</tr>
<tr>
<td>Hand clutching throat</td>
<td>Cannot breathe; out of air</td>
</tr>
<tr>
<td>Grip partners wrist or place both hands around partners arm</td>
<td>Leave area immediately</td>
</tr>
</tbody>
</table>

SIGNALS FOR VEHICLE OPERATIONS

The following signals should be used for assisting in operations with vehicles other than cranes. See FLD 23, Cranes, Rigging, and Slings for hand and body signals for crane operations compliant with 29 CFR 1926.550.

<table>
<thead>
<tr>
<th>SIGNAL</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move arm in circular (cranking motion) at waist level</td>
<td>Start engine</td>
</tr>
<tr>
<td>Move hand, palm down across throat</td>
<td>Stop engine</td>
</tr>
<tr>
<td>Circular motion with hand pointing to ground</td>
<td>Lower equipment</td>
</tr>
<tr>
<td>Circular motion with hand pointing up</td>
<td>Raise equipment</td>
</tr>
<tr>
<td>Palms in front of head at ear level, moving laterally to indicate distance to go</td>
<td>This far to go</td>
</tr>
<tr>
<td>Point to vehicle, beckon with arm motioning toward body</td>
<td>Come toward me</td>
</tr>
<tr>
<td>One hand above head, palm toward face, waving back</td>
<td>Move straight back</td>
</tr>
<tr>
<td>Both arms pointing in same direction, index fingers extended</td>
<td>Turn (direction indicated)</td>
</tr>
<tr>
<td>Put fist in air or cross arms in front of head, fists closed</td>
<td>Stop</td>
</tr>
<tr>
<td>Thrust fist upward from shoulder and downward to shoulder several times</td>
<td>Speed up</td>
</tr>
<tr>
<td>Extend arm sideways, palm down, and wave arm downward 45 degrees several times</td>
<td>Slow down</td>
</tr>
</tbody>
</table>
RADIO COMMUNICATION

When radio communication is used, personnel should be instructed in the use of the radio, which channel should be used, and in the following radio guidelines. Personnel should use the radio only for necessary work-related communication.

- Speak clearly.
- Call the name or call sign of the individual or unit you are trying to reach and identify yourself (e.g., “Unit One; this is Safety.”).
- Wait for acknowledgement (e.g., “Safety this is Unit One”) before you continue transmission.
- Proceed with your transmission. When finished, say “Over” when you expect a response. When transmission is complete and no response is expected, say “Out”.
- When receiving a radio call, acknowledge the call immediately unless doing so would interfere with safety.
- If a transmission is incomplete or not understood, request clarification.
- Emergency calls should begin with the words “Emergency, Emergency, Emergency.” Give absolute priority to emergency communication. Unless answering or aiding the emergency call, do not use the radio until certain it will not interfere with further emergency communication.
- Ensure that radios are charged and tested prior to each work shift and as necessary thereafter. Malfunctioning radios must not be used and must be replaced immediately.
- Do not transmit false information or unidentified communication.
- Profanity and indecent language are prohibited. Transmittal of sensitive information over the radio is prohibited.

Use the phonetic alphabet (below) to pronounce letters clearly.

<table>
<thead>
<tr>
<th>Letter</th>
<th>Word</th>
<th>Letter</th>
<th>Word</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Alpha</td>
<td>N</td>
<td>November</td>
</tr>
<tr>
<td>B</td>
<td>Bravo</td>
<td>O</td>
<td>Oscar</td>
</tr>
<tr>
<td>C</td>
<td>Charlie</td>
<td>P</td>
<td>Papa</td>
</tr>
<tr>
<td>D</td>
<td>Delta</td>
<td>Q</td>
<td>Quebec</td>
</tr>
<tr>
<td>E</td>
<td>Echo</td>
<td>R</td>
<td>Romeo</td>
</tr>
<tr>
<td>F</td>
<td>Foxtrot</td>
<td>S</td>
<td>Sierra</td>
</tr>
<tr>
<td>G</td>
<td>Golf</td>
<td>T</td>
<td>Tango</td>
</tr>
<tr>
<td>H</td>
<td>Hotel</td>
<td>U</td>
<td>Uniform</td>
</tr>
<tr>
<td>I</td>
<td>India</td>
<td>V</td>
<td>Victor</td>
</tr>
<tr>
<td>J</td>
<td>Juliet</td>
<td>W</td>
<td>Whiskey</td>
</tr>
<tr>
<td>K</td>
<td>Kilo</td>
<td>X</td>
<td>X-Ray</td>
</tr>
<tr>
<td>L</td>
<td>Lima</td>
<td>Y</td>
<td>Yankee</td>
</tr>
<tr>
<td>M</td>
<td>Mike</td>
<td>Z</td>
<td>Zulu</td>
</tr>
</tbody>
</table>
FLD 43 BIOLOGICAL HAZARDS - GENERAL

RELATED FLDS

FLD 44 – Biological Hazards – Bloodborne Pathogens Exposure Control Plan – First Aid Providers
FLD 45 – Biological Hazards – Bloodborne Pathogens Exposure Control Plan – Work with Infectious Waste

Field personnel and travelers may encounter biological hazards that include endemic hazards as follows: animals, insects, molds and fungus, and plants. In addition, personnel may be exposed to etiological agents (infectious diseases). An important part of health and safety planning and protection includes identifying and understanding local flora and fauna. Animals, insects, molds, fungus, and poisonous plants, and potential for exposure to infectious agents, which are also referred to as microbes, vary from site to site. Their likelihood of causing harm also varies. Risk assessment and protection protocol determinations include knowing the how, where, and what of hazardous types of plants, animals, insects, molds and fungus and infectious agents (microbes).

A set of guidance documents on the WESTON EHS Portal Site describe General Biological Hazards. While extensive, these guidance documents may not be all inclusive. They should provide a starting point for developing Accident Prevention Plans and Site-Specific Health and Safety Plans, but staff is encouraged to review additional information sources. A variety of resources are available to determine potential biological hazards at a work location, including the local health department.

Guidance documents on the EHS Portal Site provide information on the following biological hazards:

- Animals
- Insects
- Molds And Fungi
- Poisonous Plants
- Infectious Diseases (Microbes)
FLD 43A  ANIMALS

Animals represent hazards because of their poisons or venoms, size and aggressiveness, diseases transmitted, or the insects they may carry.

Feral Animals

Landfills and abandoned buildings often attract stray or abandoned dogs. These animals often become pack-oriented, very aggressive, and represent serious risk of harm to unprotected workers.

Workers entering abandoned buildings should be alert for such animals and avoid approaching them since this may provoke aggressive behavior. Avoidance and protection protocols include watching for animal dens, using good housekeeping, and using repellents.

Dangerous Wild Animals

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This FLD outlines actions that, when properly implemented, should provide a high degree of protection for WESTON employees and wildlife.

See Wildlife Hazard Recognition and Protection Procedure (Attached).

Venomous Snakes and Lizards

Venomous Shakes

Venomous snakes are common around the world. The major variables are the likelihood of encounter and the snake that is likely to be encountered. Encounters with snakes may be caused by moving containers, reaching into holes, or just walking through high grass, swampy areas, or rocks. **Do not attempt to catch any snakes.**

Symptom of venomous snake bites:

- Bloody wound discharge, blurred vision, burning, convulsions, diarrhea, dizziness, excessive sweating, fainting, fang marks in the skin, fever, increased thirst, local tissue death, loss of muscle coordination, nausea and vomiting, numbness and tingling, rapid pulse, severe pain, skin discoloration, swelling at the site of the bite, weakness.

Venom from venomous snakes and lizards can be divided into three types of toxins, however, there are some indications that snake venom may have more than one toxin and characteristics may change as a snake ages. The three types of toxins and their effects are:
**Hemotoxins** destroy blood cells and affect the circulatory system. The site of the bite rapidly becomes swollen, discolored, and painful. This is usually accompanied by swelling, discoloration, and pain progressing toward the heart.

**Neurotoxins** affect the nervous system and symptoms vary from foggy vision, dizziness, and other comparatively mild symptoms to rigid or flaccid paralysis, shortness of breath, weakness or paralysis of the lower limbs, double vision, inability to speak or swallow, drooping eyelids, and involuntary tremors of the facial muscles. Death can occur in as little as ten minutes, usually due to abrupt cessation of respiration.

**Myotoxins** destroy cells and cause muscle necrosis.

In the US, with the exception of the coral snakes which tend to have neuron-toxic venom, most venomous snakes have been categorized as having hemotoxic venom (in some areas Mojave rattlesnakes are found to have neuron-toxic venom). There is some indication that some species of rattlesnakes have both hemotoxic and neuron-toxic venom. It is also reported that venom of younger snakes may be more neuron-toxic.

There are many are highly venomous snakes worldwide, some are deadly and most can be deadly without proper care.

**Lizards**

There are two lizards recognized as venomous, the Gila monster and the Mexican Beaded Lizard. Venom of the Gila monster is considered to be neuron-toxic and that of the Mexican Beaded Lizard is considered to be hemo-toxic.

**Geographical Listing of Venomous Snakes and Lizards**

Following is a list of poisonous snakes and lizards by geographic area. This list is extensive but may not be all inclusive. In planning for work around the world, also contact local agencies to determine whether there may be additional venomous snakes or lizards.

**North America (including Mexico)**

- **Copperheads** (Broad-banded, Northern, Osage, Southern, Trans-Pecos)
- **Rattlesnakes** (Banded rock, Black-tailed, Canebrake, Diamondback [eastern and western], Massasauga [eastern and western], Mojave, Mottled rock, Pacific [northern and southern], Pigmy [southeastern and western], Prairie, Red diamond, Ridge-nosed, Sidewinder, Speckled, Tiger, Timber, Twin-spotted)
- **Coral Snake** (Arizona, Eastern, Texas, Western [red bands touching yellow “bad fellow”])
- **Cottonmouth or water moccasin** (Eastern, Florida, Western)

**North America - Lizards**

- Gila Monster

Reviewed and Revised 25 January 2008
Central and South America – Venomous Snakes

Bushmaster, Eyelash Pit Viper, Fer-de-lance, Jumping Viper, Tropical Rattlesnake

Central and South America – Venomous Lizards

Mexican Beaded Lizard

Europe

Common Adder, Long-Nosed Adder, Pallas Viper, Ursini Viper

Venomous Snakes of Africa and Asia

Boomslang, Bush Viper, Common Cobra, Egyptian Cobra, Gaboon Viper, Green Mamba, Green Tree Pit Viper, Habu Pit Viper, Horned Desert Viper, King Cobra, Krait, Levant Viper, Malayan Pit Viper, McMahon's Viper, Mole Viper or Burrowing Viper, Palestinian Viper, Puff Adder, Rhinoceros Viper or River Jack, Russel's Viper, Sand Viper, Saw-Scaled Viper, Wagler's Pit Viper or Temple Viper,

Australasia

Australian Copperhead, Death Adder, Taipan, Tiger Snake,

Poisonous Sea Snakes
Banded Sea Snake, Yellow-bellied Sea Snake

Prevention of Bites

Key factors to working safely in areas where snakes or lizards may be encountered include:

- Be alert
- Use care when reaching into or moving containers
- Use sticks or long-handled tools when reaching where you cannot see
- Be familiar with the habits and habitats of snakes in the vicinity of an incident or site
- In areas or activities where encounters with snakes are likely, wear sturdy leather or rubber work boots and snake chaps
- Do not attempt to catch snakes unless required and qualified

A snake bite warrants medical attention after administration of proper first-aid procedures. It is important to contact local medical facilities to determine where anti-venoms are located.

First-Aid

1. Keep the person calm. Restrict movement, and keep the affected area below heart level to reduce the flow of venom.
2. Remove any rings or constricting items because the affected area may swell. Create a loose splint to help restrict movement of the area.

3. If the area of the bite begins to swell and change color, the snake was probably venomous.

4. Monitor the person's vital signs -- temperature, pulse, rate of breathing, and blood pressure if possible. If there are signs of shock (such as paleness), lay the person flat, raise the feet about a foot, and cover the person with a blanket.

5. Get medical help immediately.

6. Try to photograph or identify the snake. Do not waste time hunting for the snake, and do not risk another bite. Be careful of the head of a dead snake. A snake can actually bite for up to an hour after it is dead (from a reflex).

- DO NOT allow the person to become over-exerted. If necessary, carry the person to safety.
- DO NOT apply a tourniquet.
- DO NOT apply cold compresses to a snake bite.
- DO NOT cut into a snake bite with a knife or razor.
- DO NOT try to suction the venom by mouth.
- DO NOT give stimulants or pain medications unless instructed to do so by a doctor.
- DO NOT give the person anything by mouth.
- DO NOT raise the site of the bite above the level of the person's heart
- Transport the victim to medical attention immediately

Animal Borne Diseases

Rabies

Animal borne diseases include rabies (generally found in dogs, skunks, raccoons, bats, and foxes). Rabies varies from area to area as do the animals most likely to be rabid.

Questions and Answers about Rabies

Q. What is Rabies and how is it transmitted?

A. Rabies is a viral infection most often transmitted by bites of animals infected with the virus.

Q. What animals are most likely to be infected?

A. Skunks, raccoons, foxes, and bats are wild animals most frequently found to be infected with rabies; however, any warm blooded animal can be infected. Squirrels, groundhogs, horses, cattle, and rabbits have been tested positive for rabies. Dogs and cats are frequently rabies-infected if not immunized.
Q. How can you tell if an animal is rabies-infected?

A. Rabies infection is not always apparent. Signs to look for in wild animals are over-aggressiveness or passivity. Spotting animals which are normally nocturnal (active at night) during the day and being able to approach them would be an example of unusual behavior. Finding a bat alive and on the ground is abnormal. The best precaution, however, is to observe wild animals from a safe distance, even if they are injured. Avoid dogs and cats that you do not know.

Q. What should you do if bitten by an animal you suspect is infected with rabies?

A. As quickly as possible, wash the bite area with soap and water, then disinfect with 70% alcohol and seek medical attention for follow-up. Try to capture the animal. Avoid being bitten again or contacting the mouth or any saliva of the animal. Keep the animal under surveillance and call the police for assistance to capture it. Have the animal tested.

A dead animal believed to be infected should be preserved and tested for rabies. Health departments are often sources where information can be found regarding testing.

Q. Is there a cure for rabies?

A. Rabies is preventable, even after being bitten, if treatment is begun soon enough. Getting prompt medical attention and confirming the rabies infection of an animal are very important. **Rabies is not curable once symptoms or signs of rabies appear.**

There are vaccines available that should be considered if a work assignment involves trapping animals likely to carry rabies. Medical consultants must be involved in decisions to immunize workers against rabies.

**Hantavirus**

WESTON employees or contractors/subcontractors conducting field work in areas where there is evidence of a rodent population should be aware of an increased level of concern regarding the transmission of “Hantavirus”-associated diseases. Hantavirus is associated with rodents, especially the deer mouse (*Peromyscus maniculatus*) as a primary reservoir host. Hantavirus has resulted in several deaths in the U.S.

The Hantavirus can be transmitted by infected rodents through their saliva, urine, and feces. Human infection may occur when infected wastes are inhaled as a result of aerosols produced directly from the animals. They also may come from dried materials introduced into broken skin or onto mucous membranes. Infections in humans occur most in adults and are associated with activities that provide contact with infected rodents in rural/semi-rural areas. Hantavirus begins with one or more flu-like symptoms (i.e., fever, muscle aches, headache, and/or cough) and progresses rapidly to severe lung disease. Early diagnosis and treatment are vital.

**Prevention**
Personnel involved in work areas where rodents and the presence of the Hantavirus are known or suspected will need to take personal protective measures and to develop an expanded site safety plan.

Field personnel involved in trapping or contacting rodents or their waste products will need to wear respirators with high-efficiency particulate air (HEPA) filters, eye protection, Tyvek coveralls, chemical-resistant gloves, and disposable boot covers. Strict decontamination requirements are needed. Double-bag, label, and specific handling, packaging, shipping, storage, and analytical procedures are required to minimize the risks of exposure from collected mice. More detailed procedures can be obtained from WESTON Corporate Health and Safety.

For employees and facilities in rural/semi-rural areas, the following risk-reduction strategies are appropriate:

- Eliminate rodents and reduce availability of food sources and nesting sites used by rodents.
- Store trash/garbage in rodent-proof metal or thick plastic containers with tight lids.
- Cut all grass/underbrush in proximity to buildings.
- Prevent rodents from entering buildings (e.g., use steel wool, screen, etc., to eliminate openings).

**Plague**

Described under Insects (Fleas)

**Anthrax**

Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in wild and domestic lower vertebrates (cattle, sheep, goats, camels, antelopes, and other herbivores), but it can also occur in humans when they are exposed to infected animals or tissue from infected animals.

Anthrax is most common in agricultural regions where it occurs in animals. These include South and Central America, Southern and Eastern Europe, Asia, Africa, the Caribbean, and the Middle East. When anthrax affects humans, it is usually due to an occupational exposure to infected animals or their products. Workers who are exposed to dead animals and animal products from other countries where anthrax is more common may become infected with *B. anthracis* (industrial anthrax). Anthrax in wild livestock has occurred in the U.S.

Anthrax infection can occur in three forms: cutaneous (skin), inhalation, and gastrointestinal. *B. anthracis* spores can live in the soil for many years, and humans can become infected with anthrax by handling products from infected animals or by inhaling anthrax spores from
contaminated animal products. Anthrax can also be spread by eating undercooked meat from infected animals. It is rare to find infected animals in the U.S.

**Cutaneous:** Most (about 95%) anthrax infections occur when the bacterium enters a cut or abrasion on the skin, such as when handling contaminated wool, hides, leather, or hair products (especially goat hair) of infected animals. Skin infection begins as a raised itchy bump that resembles an insect bite but within 1-2 days develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the center. Lymph glands in the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax will result in death. Deaths are rare with appropriate antimicrobial therapy.

**Inhalation:** Initial symptoms may resemble a common cold. After several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal.

**Intestinal:** The intestinal disease form of anthrax may follow the consumption of contaminated meat and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhea. Intestinal anthrax results in death in 25% to 60% of cases.

Anthrax is not known to spread from one person to another person. Communicability is not a concern in managing or visiting patients with inhalation anthrax.

**Prevention**

In countries where anthrax is common and vaccination levels of animal herds are low, humans should avoid contact with livestock and animal products and avoid eating meat that has not been properly slaughtered and cooked. Also, an anthrax vaccine has been licensed for use in humans. The vaccine is reported to be 93% effective in protecting against anthrax.

Doctors can prescribe effective antibiotics. To be effective, treatment should be initiated early. If left untreated, the disease can be fatal.

Direct person-to-person spread of anthrax is extremely unlikely; however, a patient’s clothing and body may be contaminated with anthrax spores. Effective decontamination of people can be accomplished by a thorough wash down with anti-microbial effective soap and water. Waste water should be treated with bleach or other anti-microbial agent. Effective decontamination of articles can be accomplished by boiling contaminated articles in water for 30 minutes or longer and using common disinfectants. Chlorine is effective in destroying spores and vegetative cells on surfaces. Burning the clothing is also effective. After decontamination, there is no need to immunize, treat, or isolate contacts of people ill with anthrax unless they also were also exposed to the same source of infection. Early antibiotic treatment of anthrax is essential—delay seriously lessens chances for survival. Treatment for anthrax infection and other bacterial infections includes large doses of intravenous and oral antibiotics, such as fluoroquinolones, like ciprofloxacin (cipro), doxycycline, erythromycin, vancomycin, or penicillin. In possible cases of inhalation anthrax exposure to unvaccinated personnel, early antibiotic prophylaxis treatment is crucial to prevent possible death.
No skin, especially if it has any wounds or scratches, should be exposed. Disposable personal protective equipment is preferable, but if not available, decontamination can be achieved by washing any exposed equipment in hot water, bleach and detergent. Disposable personal protective equipment and filters should be burned and buried. The size of Bacillus anthracis bacillii ranges from 0.5 $\mu$m to 5.0 $\mu$m. Anyone working with anthrax in a suspected or confirmed victim should wear respiratory equipment capable of filtering this size of particle or smaller. The U.S. National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA) approved high efficiency-respirator, such as a half-face disposable respirator with a HEPA filter, is recommended. All possibly contaminated bedding or clothing should be isolated in double plastic bags and treated as possible bio-hazard waste. Dead victims that are opened and not burned provide an ideal source of anthrax spores; the victim should be sealed in an airtight body bag. Cremating victims is the preferred way of handling body disposal. No embalming or autopsy should be attempted without a fully equipped biohazard lab and trained and knowledgeable personnel.

Delays of only a few days may make the disease untreatable and treatment should be started even without symptoms if possible contamination or exposure is suspected. Animals with anthrax often just die without any apparent symptoms. Initial symptoms may resemble a common cold – sore throat, mild fever, muscle aches and malaise. After a few days, the symptoms may progress to severe breathing problems and shock and ultimately death. Death can occur from about two days to a month after exposure with deaths apparently peaking at about 8 days after exposure. Antibiotic-resistant strains of anthrax are known.

Aerial spores can be trapped by a simple HEPA or P100 filter. Inhalation of anthrax spores can be prevented with a full-face mask using appropriate filtration. Unbroken skin can be decontaminated by washing with simple soap and water. All of these procedures do not kill the spores which are very hard to kill and require extensive treatment to eradicate them. Filters, clothes, etc. exposed to possible anthrax contaminated environments should be treated with chemicals or destroyed by fire to minimize the possibility of spreading the contamination.

In recent years there have been many attempts to develop new drugs against anthrax; but the existing supply still works fine if treatment is started soon enough.

Prevention can also be accomplished through early detection. In response to the U.S. Postal Service (USPS) anthrax attacks of October 2001, the USPS has installed BioDetection Systems (BDS) in their large-scale mail cancellation facilities. BDS response plans have been formulated by the USPS in conjunction with local responders including fire, police, hospitals, and public health. Employees of these facilities have been educated about anthrax, response actions and prophylactic medication. Because of the time delay inherent in getting final verification that anthrax has been used, prophylactic antibiotics for possibly exposed personnel should commence as soon as possible.

The ultimate in prevention is vaccination against infection but this has to be done well in advance of exposure.
Anthrax spores can survive for long periods of time in the environment after release. Methods for cleaning anthrax contaminated sites commonly use oxidizing agents such as peroxides, ethylene Oxide, Sandia Foam, chlorine dioxide (used in the Hart Senate office building), and liquid bleach products containing sodium hypochlorite. These agents slowly destroy bacterial spores. A bleach solution for treating hard surfaces has been approved by the EPA and can be prepared by mixing one part bleach (5.25%-6.00%) to one part white vinegar to eight parts water. Bleach and vinegar must not be combined together directly, rather some water must first be added to the bleach (e.g., two cups water to one cup of bleach), then vinegar (e.g., one cup), and then the rest of the water (e.g., six cups). The pH of the solution should be tested with a paper test strip; and treated surfaces must remain in contact with the bleach solution for 60 minutes (repeated applications will be necessary to keep the surfaces wet).

Chlorine dioxide has emerged as the preferred biocide against anthrax-contaminated sites, having been employed in the treatment of numerous government buildings over the past decade. Its chief drawback is the need for in situ processes to have the reactant on demand.

To speed the process, trace amounts of a non-toxic catalyst composed of iron and tetro-amido macrocyclic ligands are combined with sodium carbonate and bicarbonate and converted into a spray. The spray formula is applied to an infested area and is followed by another spray containing tertiary-butyl hydroperoxide

Using the catalyst method, a complete destruction of all anthrax spores takes 30 minutes. A standard catalyst-free spray destroys fewer than half the spores in the same amount of time. They can be heated, exposed to the harshest chemicals, and they do not easily die.

**Brucellosis**

Brucellosis, also called undulant fever or Malta fever, is a zoonosis (infectious disease transmitted from animals to humans) caused by bacteria of the genus *Brucella*. It is primarily a disease of domestic animals (goats, pigs, cattle, dogs, etc.) and humans and has a worldwide distribution.

Although brucellosis can be found worldwide, it is more common in countries that do not have good standardized and effective public health and domestic animal health programs. Areas currently listed as high risk are the Mediterranean Basin (Portugal, Spain, Southern France, Italy, Greece, Turkey, North Africa), South and Central America, Eastern Europe, Asia, Africa, the Caribbean, and the Middle East.

The disease is transmitted either through contaminated or untreated milk (and its derivates) or through direct contact with infected animals, which may include dogs, pigs, camels, and ruminants, primarily sheep, goats, cattle, and bison. This also includes contact with their carcasses.

Leftovers from parturition are also extremely rich in highly virulent brucellae. Brucellae, along with leptospira have the unique property of being able to penetrate through intact human skin, so infection by mere hand contact with infectious material is likely to occur.
The disease is now usually associated with the consumption of un-pasteurized milk and soft cheeses made from the milk of infected animals and with occupational exposure of veterinarians and slaughterhouse workers. Some vaccines used in livestock, most notably \textit{B. abortus} strain 19 also cause disease in humans if accidentally injected. Problems with vaccine induced cases in the United States declined after the release of the RB-51 strain developed in the 1990s and the relaxation of laws requiring vaccination of cattle in many states.

The incubation period of brucellosis is, usually, of one to three weeks, but some rare instances may take several months to surface.

Brucellosis induces inconstant fevers, sweating, weakness, anemia, headaches, depression and muscular and bodily pain.

The symptoms are like those associated with many other febrile diseases, but with emphasis on muscular pain and sweating. The duration of the disease can vary from a few weeks to many months or even years. In first stage of the disease, septicaemia occurs and leads to the classic triad of undulant fevers, sweating (often with characteristic smell, likened to wet hay) and migratory arthralgia and myalgia.

\textbf{Prevention}

The main way of preventing brucellosis is by using fastidious hygiene in producing raw milk products, or by pasteurization of all milk that is to be ingested by human beings, either in its pure form or as a derivate, such as cheese.

Provide protection from skin contact when handling potentially infected animals.

\textbf{Q fever}

\textbf{Q fever} is caused by infection with \textit{Coxiella burnetii}. This organism is uncommon but may be found in cattle, sheep, goats and other domestic mammals, including cats and dogs. The infection results from inhalation of contaminated particles in the air, and from contact with the vaginal mucus, milk, feces, urine or semen of infected animals. The incubation period is 9-40 days. It is considered possibly the most infectious disease in the world, as a human being can be infected by a single bacterium.

The most common manifestation is flu-like symptoms with abrupt onset of fever, malaise, profuse perspiration, severe headache, myalgia (muscle pain), joint pain, loss of appetite, upper respiratory problems, dry cough, pleuritic pain, chills, confusion and gastro-intestinal symptoms such as nausea, vomiting and diarrhea. The fever lasts approximately 7-14 days.

During the course, the disease can progress to an atypical pneumonia, which can result in a life threatening acute respiratory distress syndrome (ARDS), whereby such symptoms usually occur during the first 4-5 days of infection.
Less often the Q fever causes (granulomatous) hepatitis which becomes symptomatic with malaise, fever, liver enlargement (hepatomegaly), pain in the right upper quadrant of the abdomen and jaundice (icterus).

The chronic form of the Q fever is virtually identical with the inflammation of the inner lining of the heart (endocarditis), which can occur after months or decades following the infection. It is usually deadly if untreated. However, with appropriate treatment this lethality is around 10%.

The pathogenic agent is to be found everywhere except Antarctica and New Zealand. In Europe it appears as hepatitis rather than pneumonia as in the United States. The common way of infection is inhalation of contaminated dust, contact with contaminated milk, meat, wool and particularly birthing products. Ticks can transfer the pathogenic agent to other animals. Transfer between humans seems extremely rare and has so far been described in very few cases.

**Prevention**

Q fever is effectively prevented by intradermal vaccination with a vaccine composed of killed *Coxiella burnetii* organisms. Skin and blood tests should be done before vaccination to identify preexisting immunity; the reason is that vaccinating subjects who already have immunity can result in a severe local reaction. After a single dose of vaccine, protective immunity lasts for many years. Revaccination is not generally required. Annual screening is typically recommended.

Wear appropriate PPE when handling potentially infected animals or materials.

**Leptospirosis**

Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*.

The time between a person's exposure to a contaminated source and becoming sick is 2 days to 4 weeks. Illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases; after the first phase, with fever, chills, headache, muscle aches, vomiting, or diarrhea, the patient may recover for a time but become ill again. If a second phase occurs, it is more severe; the person may have kidney or liver failure or meningitis. This phase is also called Weil's disease.

The illness lasts from a few days to 3 weeks or longer. Without treatment, recovery may take several months. In rare cases death occurs.

Many of these symptoms can be mistaken for other diseases. Leptospirosis is confirmed by laboratory testing of a blood or urine sample.

*Leptospira* organisms have been found in cattle, pigs, horses, dogs, rodents, and wild animals. Humans become infected through contact with water, food, or soil containing waste from these infected animals. This may happen by consuming contaminated food or water or through skin
contact, especially with mucosal surfaces, such as the eyes or nose, or with broken skin. The disease is not known to be spread from person to person.

Leptospirosis occurs worldwide but is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, for example, farmers, sewer workers, veterinarians, fish workers, dairy farmers, or military personnel. It is a recreational hazard for campers or those who participate in outdoor sports in contaminated areas and has been associated with swimming, wading, and whitewater rafting in contaminated lakes and rivers. The incidence is also increasing among urban children.

The risk of acquiring leptospirosis can be greatly reduced by not swimming or wading in water that might be contaminated with animal urine.

Protective clothing or footwear should be worn by those exposed to contaminated water or soil because of their job or recreational activities.

**Prevention**

Avoid risky foods and drinks.

Buy it bottled or bring it to a rolling boil for 1 minute before drink it. Bottled carbonated water is safer than non-carbonated water.

Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.

Eat foods that have been thoroughly cooked and that are still hot and steaming.

Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well. When eating raw fruit or vegetables that can be peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings.

Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the street, and many travelers get sick from food bought from street vendors.

Leptospirosis is treated with antibiotics, such as doxycycline or penicillin, which should be given early in the course of the disease. Intravenous antibiotics may be required for persons with more severe symptoms. Persons with symptoms suggestive of leptospirosis should contact a health care provider.

**Machupo virus**

*Machupo virus, Bolivian hemorrhagic fever* (BHF), also known as *black typhus* is a hemorrhagic fever and zoonotic infectious disease occurring in Bolivia. First identified in 1959, black typhus is caused by infection with machupo virus, a negative single-stranded RNA virus of the arenaviridae family. The infection has a slow onset with fever, malaise, headache and muscular pains. Petechiae (blood spots) on the upper body and bleeding from the nose and gums
are observed when the disease progresses to the hemorrhagic phase, usually within seven days of onset. The mortality rate is estimated at 5 to 30 percent.

The vector is the vespertine mouse (*Calomys callosus*), a rodent indigenous to northern Bolivia. Infected animals are asymptomatic and shed virus in excretions, by which humans are infected. Evidence of person-to-person transmission of Machupo virus exists but is believed to be rare (Kilgore, et. al, 1995).

Measures to reduce contact between the vespertine mouse and humans have effectively limited the number of outbreaks, with no cases identified between 1973 and 1994. A vaccine being developed for the genetically related Junín virus which causes Argentine hemorrhagic fever has shown evidence of cross-reactivity with Machupo virus and may be an effective prophylactic measure for people at high risk of infection.

**Prevention**

Appropriate PPE including respiratory protection for handling animals or when there is potential exposure to wastes from the animals.

**Ebola**

Ebola is both the common term used to describe a group of viruses belonging to genus Ebolavirus, family Filoviridae, and the common name for the disease which they cause, Ebola hemorrhagic fever. Ebola viruses are morphologically similar to the Marburg virus, also in the family Filoviridae, and share similar disease symptoms. Ebola has caused a number of serious and highly publicized outbreaks since its discovery.

It is known to be a zoonotic virus as it is currently devastating the populations of lowland gorillas in Central Africa. Despite considerable effort by the World Health Organization, no animal reservoir capable of sustaining the virus between outbreaks has been identified. However, it has been hypothesized that the most likely candidate is the fruit bat.

Ebola hemorrhagic fever is potentially lethal and encompasses a range of symptoms including fever, vomiting, diarrhea, generalized pain or malaise, and sometimes internal and external bleeding. Mortality rates are extremely high, with the human case-fatality rate ranging from 50% - 89%, according to viral subtype. The cause of death is usually due to hypovolemic shock or organ failure.

Because Ebola is potentially lethal and since no approved vaccine or treatment is available, Ebola is classified as a biosafety level 4 agent, as well as a Category A bioterrorism agent by the Centers for Disease Control and Prevention.

Symptoms are varied and often appear suddenly. Initial symptoms include high fever (at least 38.8°C), severe headache, muscle joint, or abdominal pain, severe weakness and exhaustion, sore throat, nausea, and dizziness. Before an outbreak is suspected, these early symptoms are easily
mistaken for malaria, typhoid fever, dysentery, influenza, or various bacterial infections, which are all far more common and less reliably fatal.

Ebola may progress to cause more serious symptoms, such as diarrhea, dark or bloody feces, vomiting blood, red eyes due to distention and hemorrhage of sclerotic arterioles, petechia, maculopapular rash, and purpura. Other secondary symptoms include hypotension (less than 90 mm Hg systolic /60 mm Hg diastolic), hypovolemia, tachycardia, organ damage (especially the kidneys, spleen, and liver) as a result of disseminated systemic necrosis, and protinuria. The interior bleeding is caused by a chemical reaction between the virus and the platelets which creates a chemical that will cut cell sized holes into the capillary walls.

Among humans, the virus is transmitted by direct contact with infected body fluids, or to a lesser extent, skin or mucus membrane contact. The incubation period can be anywhere from 2 to 21 days, but is generally between 5 and 10 days.

Although airborne transmission between monkeys has been demonstrated by an accidental outbreak in a laboratory located in Virginia, USA, there is very limited evidence for human-to-human airborne transmission in any reported epidemics.

The infection of human cases with Ebola virus has been documented through the handling of infected chimpanzees, gorillas, and forest antelopes--both dead and alive--as was documented in Côte d'Ivoire, the Republic of Congo and Gabon. The transmission of the Ebola Reston strain through the handling of cynomolgus monkeys has also been reported.[7]

So far, all epidemics of Ebola have occurred in sub-optimal hospital conditions, where practices of basic hygiene and sanitation are often either luxuries or unknown to caretakers and where disposable needles and autoclaves are unavailable or too expensive. In modern hospitals with disposable needles and knowledge of basic hygiene and barrier nursing techniques, Ebola rarely spreads on such a large scale.

**Prevention**

Prevention methods include good hygiene in medical settings and awareness of the virus in travel areas. There is no known effective vaccine for humans.

Prevention efforts should concentrate on avoiding contact with host or vector species. Travelers should not visit locations where an outbreak is occurring. Contact with rodents should be avoided. Minimize exposure to arthropod bites by using permethrin-impregnated bed nets and insect repellents.

Strict compliance with infection control precautions (i.e., use of disposable gloves, face shields, and disposable gowns to prevent direct contact with body fluids and splashes to mucous membranes when caring for patients or handling clinical specimens; appropriate use and disposal of sharp instruments; hand washing and use of disinfectants) is recommended to avoid health care-associated infections.

Contact with dead primates should be avoided.
**Marburg Virus**

The **Marburg virus** is the causative agent of **Marburg hemorrhagic fever**. Both the disease and virus are related to Ebola and originate in Uganda and Eastern Congo. The zoonosis is of unknown origin, but fruit bats are suspected. In the spring of 2005, there was an outbreak in Angola.

Because many of the signs and symptoms of Marburg hemorrhagic fever are similar to those of other infectious diseases, such as malaria or typhoid, diagnosis of the disease can be difficult, especially if only a single case is involved.

The disease is spread through bodily fluids, including blood, excrement, saliva, and vomit.

Early symptoms are often non-specific, and usually include fever, headache and myalgia after an incubation period of 3-9 days. After five days, a macropapular rash is often present on the trunk. Later-stage Marburg infection is acute and can include jaundice, pancreatitis, weight loss, delirium and neuropsychiatric symptoms, hemorrhaging, hypovolemic shock and multi-organ dysfunction with liver failure most common.

Accounts of external hemorrhaging from bodily orifices are in fact rare. Time course varies but symptoms usually last for one to three weeks until the disease either resolves or kills the infected host. The fatality rate is between 23-90%.

**Prevention**

Prevention methods include good hygiene in medical settings and awareness of the virus in travel areas. There is no known effective vaccine for humans.

Prevention efforts should concentrate on avoiding contact with host or vector species. Travelers should not visit locations where an outbreak is occurring. Contact with rodents should be avoided. Minimize exposure to arthropod bites by using permethrin-impregnated bed nets and insect repellents.

Strict compliance with infection control precautions (i.e., use of disposable gloves, face shields, and disposable gowns to prevent direct contact with body fluids and splashes to mucous membranes when caring for patients or handling clinical specimens; appropriate use and disposal of sharp instruments; hand washing and use of disinfectants) is recommended to avoid health care-associated infections.

Contact with dead primates should be avoided.

**Rift Valley Fever.**

Rift Valley Fever (RVF) is a viral Zoonosis affects primarily domestic livestock, but can be passed to humans) causing fever. It is spread by the bite of infected mosquitoes. The disease is caused by the RVF virus, a member of the genus *Phlebovirus* (family *Bunyaviridae*).
The disease was first reported in Kenya around 1915 and has since been reported across sub-Saharan Africa. There have been outbreaks in Egypt in 1977-78, Saudi Arabia and Yemen.

In humans the virus can cause several different syndromes. Usually sufferers have either no symptoms or only a mild illness with fever, headache, myalgia and liver abnormalities. In a small percentage of cases (< 2%) the illness can progress to hemorrhagic fever syndrome, meningoencephalitis (inflammation of the brain), or affecting the eye. Patients who become ill usually experience fever, generalized weakness, back pain, dizziness, and weight loss at the onset of the illness. Typically, patients recover within 2-7 days after onset.

The vast majority of human infections result from direct or indirect contact with the blood or organs of infected animals. The virus can be transmitted to humans through the handling of animal tissue during slaughtering or butchering, assisting with animal births, conducting veterinary procedures, or from the disposal of carcasses or fetuses. Certain occupational groups such as herders, farmers, slaughterhouse workers and veterinarians are therefore at higher risk of infection. The virus infects humans through inoculation, for example via a wound from an infected knife or through contact with broken skin, or through inhalation of aerosols produced during the slaughter of infected animals. The aerosol mode of transmission has also led to infection in laboratory workers.

There is some evidence that humans may also become infected with RVF by ingesting the unpasteurized or uncooked milk of infected animals.

Human infections have also resulted from the bites of infected mosquitoes, most commonly the Aedes mosquito.

Transmission of RVF virus by hematophagous (blood-feeding) flies is also possible.

To date, no human-to-human transmission of RVF has been documented, and no transmission of RVF to health care workers has been reported when standard infection control precautions have been put in place.

There has been no evidence of outbreaks of RVF in urban areas.

**Mild form of RVF in humans**

The incubation period (interval from infection to onset of symptoms) for RVF varies from two to six days.

Those infected either experience no detectable symptoms or develop a mild form of the disease characterized by a feverish syndrome with sudden onset of flu-like fever, muscle pain, joint pain and headache.

Some patients develop neck stiffness, sensitivity to light, loss of appetite and vomiting; in these patients the disease, in its early stages, may be mistaken for meningitis.
The symptoms of RVF usually last from four to seven days, after which time the immune response becomes detectable with the appearance of antibodies and the virus gradually disappears from the blood.

**Severe form of RVF in humans**

While most human cases are relatively mild, a small percentage of patients develop a much more severe form of the disease. This usually appears as one or more of three distinct syndromes: ocular (eye) disease (0.5-2% of patients), meningoencephalitis (less than 1%) or haemorrhagic fever (less than 1%).

**Ocular form:** In this form of the disease, the usual symptoms associated with the mild form of the disease are accompanied by retinal lesions. The onset of the lesions in the eyes is usually one to three weeks after appearance of the first symptoms. Patients usually report blurred or decreased vision. The disease may resolve itself with no lasting effects within 10 to 12 weeks. However, when the lesions occur in the macula, 50% of patients will experience a permanent loss of vision. Death in patients with only the ocular form of the disease is uncommon.

**Meningoencephalitis form:** The onset of the meningoencephalitis form of the disease usually occurs one to four weeks after the first symptoms of RVF appear. Clinical features include intense headache, loss of memory, hallucinations, confusion, disorientation, vertigo, convulsions, lethargy and coma. Neurological complications can appear later (> 60 days). The death rate in patients who experience only this form of the disease is low, although residual neurological deficit, which may be severe, is common.

**Haemorrhagic fever form:** The symptoms of this form of the disease appear two to four days after the onset of illness, and begin with evidence of severe liver impairment, such as jaundice. Subsequently signs of haemorrhage then appear such as vomiting blood, passing blood in the faeces, a purpuric rash or ecchymoses (caused by bleeding in the skin), bleeding from the nose or gums, menorrhagia and bleeding from venepuncture sites. The case-fatality ratio for patients developing the haemorrhagic form of the disease is high at approximately 50%. Death usually occurs three to six days after the onset of symptoms. The virus may be detectable in the blood for up to 10 days, in patients with the hemorrhagic icterus form of RVF.

The total case fatality rate has varied widely between different epidemics but, overall, has been less than 1% in those documented. Most fatalities occur in patients who develop the haemorrhagic icterus form.

A person's chances of becoming infected can be reduced by taking measures to decrease contact with mosquitoes and other bloodsucking insects through the use of mosquito repellents and bednets. Avoiding exposure to blood or tissues of animals that may potentially be infected is an important protective measure for persons working with animals in RVF-endemic areas.

**Prevention**

Reviewed and Revised 25 January 2008
Awareness and use of PPE, good hygiene and other avoidance practices used for other zoonotic diseases should be used.

**Nipah and Hendra Viruses**

Nipah virus is a newly recognized zoonotic virus. The virus was 'discovered' in 1999. It has caused disease in animals and in humans, through contact with infectious animals. The virus is named after the location where it was first detected in Malaysia.

Nipah is closely related to another newly recognized zoonotic virus (1994), called Hendra virus, named after the town where it first appeared in Australia. Both Nipah and Hendra are members of the virus family *Paramyxoviridae*. Although members of this group of viruses have only caused a few focal outbreaks, the biologic property of these viruses to infect a wide range of hosts and to produce a disease causing significant mortality in humans has made this emerging viral infection a public health concern.

**Natural Host**

It is currently believed that certain species of fruit bats are the natural hosts of both Nipah and Hendra viruses. They are distributed across an area encompassing northern, eastern and south-eastern areas of Australia, Indonesia, Malaysia, the Philippines and some of the Pacific Islands. The bats appear to be susceptible to infection with these viruses, but do not themselves become ill. It is not known how the virus is transmitted from bats to animals.

**Transmission**

The mode of transmission from animal to animal, and from animal to human is uncertain, but appears to require close contact with contaminated tissue or body fluids from infected animals. Nipah antibodies have been detected in pigs, other domestic and wild animals. The role of species other than pigs in transmitting infection to other animals has not yet been determined.

It is unlikely that Nipah virus is easily transmitted to man, although previous outbreak reports suggest that Nipah virus is transmitted from animals to humans more readily than Hendra virus. Despite frequent contact between fruit bats and humans there is no serological evidence of human infection among bat carers. Pigs were the apparent source of infection among most human cases in the Malaysian outbreak of Nipah, but other sources, such as infected dogs and cats, cannot be excluded. Human-to-human transmission of Nipah virus has not been reported.

**Clinical Features**

Nipah Virus - The incubation period is between 4 and 18 days. In many cases the infection is mild or inapparent (sub-clinical). In symptomatic cases, the onset is usually with "influenza-like" symptoms, with high fever and muscle pains (myalgia). The disease may progress to
inflammation of the brain (encephalitis) with drowsiness, disorientation, convulsions and coma. Fifty percent of clinically apparent cases die.

Hendra Virus - respiratory illness with severe flu-like signs and symptoms

**Protection**

The risk of transmission of Nipah and virus from sick animals to humans is thought to be low, and transmission from person-to-person has not yet been documented, even in the context of a large outbreak. Therefore, the risk of transmission of Nipah virus to health care workers is thought to be low. However, transmission without percutaneous exposure (through a break in the skin barrier) is theoretically possible, as respiratory secretions contain the virus. This is why it has been categorized as a biohazardous agent that should be managed in a high-level biosecurity laboratory. It is recommended that close contact with body fluids and infected tissues be avoided if Nipah or hendra virus infection is suspected.
Bird and Bat Borne or Enhanced Diseases

See also under Molds and Fungus

Psittacosis

Psittacosis is a disease caused by a bacteria that is found in bird droppings and other secretions (often carried by pet birds). The bacteria is found worldwide.

Symptoms of psittacosis infection may include a low-grade fever that often becomes worse as the disease progresses, including anorexia, sore throat, light sensitivity, and a severe headache.

Ammonia and sodium hypochlorite based disinfectants are effective disinfectants for Psittacosis.

Where it is necessary to remove bat droppings from buildings prior to renovation or demolition it is prudent to assume infection and use the following precautions:

- Avoid areas that may harbor the bacteria, e.g., accumulations of bird or bat droppings.

- Areas known or suspected of being contaminated by *the organisms causing* Psittacosis such as bird roosts, attics, or even entire buildings that contain accumulations of bat or bird manure, should be posted with signs warning of the health risk. The building or area should be secured.

- Before an activity is started that may disturb any material that might be contaminated by Psittacosis, workers should be informed in writing of the personal risk factors that increase an individual's chances of developing these diseases. Such a written communication should include a warning that individuals with weakened immune systems are at the greatest risk of developing severe forms of these diseases become infected. These people should seek advice from their health care provider about whether they should avoid exposure to materials that might be contaminated with these organisms.

The best way to prevent exposure is to avoid situations where material that might be contaminated can become aerosolized and subsequently inhaled. A brief inhalation exposure to highly contaminated dust may be all that is needed to cause infection and subsequent development of psittacosis. Therefore, work practices and dust control measures that eliminate or reduce dust generation during the removal of bat manure from a building will also reduce risks of infection and subsequent development of disease. For example, instead of shoveling or sweeping dry, dusty material, carefully wetting it with a water spray can reduce the amount of dust aerosolized during an activity. Adding a surfactant or wetting agent to the water might reduce further the amount of aerosolized dust.

Once the material is wetted, it can be collected in double, heavy-duty plastic bags, a 55-gallon drum, or some other secure container for immediate disposal. An alternative method is use of an
industrial vacuum cleaner with a high-efficiency filter to bag contaminated material. Truck-mounted or trailer-mounted vacuum systems are recommended for buildings with large accumulations of bat or bird manure. These high-volume systems can remove tons of contaminated material in a short period. Using long, large-diameter hoses, such a system can also remove contaminated material located several stories above its waste hopper. This advantage eliminates the risk of dust exposure that can happen when bags tear accidentally or containers break during their transfer to the ground.

The removal of all material that might be contaminated from a building and immediate waste disposal will eliminate any further risk that someone might be exposed to aerosolized spores. Air sampling, surface sampling, or the use of any other method intended to confirm that no infectious agents remain following removal of bat manure is unnecessary in most cases. However, before a removal activity is considered finished, the cleaned area should be inspected visually to ensure that no residual dust or debris remains.

Spraying 1:10 bleach to water mixture on droppings and allowing it to dry is also a recommended practice for the psittacosis organisms.

Because work practices and dust control measures to reduce worker exposures to these organisms have not been fully evaluated, using personal protective equipment is still necessary during some activities. During removal of an accumulation of bat or bird manure from an enclosed area such as an attic, dust control measures should be used, but wearing a NIOSH-approved respirator and other items of personal protective equipment is also recommended to reduce further the risk of exposure to the organisms that cause Psittacosis.

Treatment

Psittacosis is often hard to diagnoses and while a concern, it does not occur with great frequency. Knowledge of the symptoms and of potential exposure is important when seeking medical follow-up for potential exposure.

There are various medical treatments for psittacosis based on extent of infection. The sooner the disease is diagnosed and treatment is begun the more effective the treatment will be.
APPENDIX A
Dangerous Animals - Wildlife Hazard Recognition and Protection

GENERAL

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This procedure outlines actions that when properly implemented should provide a high degree of protection for employees and wildlife. These procedures apply to employees who prepare Health and Safety Plans or perform fieldwork in environments in which wild animals may be encountered. However, due to the unpredictable nature of wild animals this single document cannot possibly cover all potential risks or protective measures. Therefore, prior to entering remote areas inhabited by dangerous wildlife, contact local wildlife agencies to gather additional information concerning local risks and protective measures.

REFERENCES

Alaska Administrative Code 5 AAC 92.230 and 5 AAC 92.410.
Alaska Department of Fish and Game, Division of Wildlife Conservation. http://www.state.ak.us/adfg/adfghome.htm

ATTACHMENTS

Attachments 1 through 4 outline behavioral characteristics of and outline controls that will minimize human injury, loss of property, and unnecessary destruction of wildlife, while ensuring a safe work environment. Attachment 5 provides the Project Specific Exemption for Firearms request form.

RESPONSIBILITIES

The responsibilities of personnel involved in Wildlife Hazard Recognition and Protection are:

- The Corporate EHS Manager (EHS Manager) review and approval of site health and safety plans (HSP) that require the Project Specific Exemption for Firearms.

- Project Manager / Site Manager: In addition to the safety responsibilities described in the Safety Program Implementation Plan, the Project Manager (PM) or Site Manager (SM) are responsible for ensuring that the Health and Safety Plan (HSP) addresses hazards associated with wild animal encounters, as appropriate and ensuring that persons designated to carry firearms meet the criteria outlined in this procedure. Additionally, if other approvals are necessary for carrying firearms, the PM must ensure that adequate time is allotted for the approval process.

WILDLIFE AVOIDANCE AND BASIC PROTECTIVE MEASURES

The best protective measure is simply avoidance. Large numbers of humans present deterrence to wild animals; therefore, whenever possible teams in the field should work together in groups of four or more. Whenever practical, fieldwork should be scheduled around the seasonal cycles of wildlife in the area. When wild animal avoidance cannot be achieved through scheduling,
personnel involved in field activities in which encounters with wild animals may result, will take
the following steps and will be equipped and trained, as set forth below.

**CLEAR THE AREA**
Evaluate and control the area before entry by
- Determine areas of recent sightings through local Fish and Game, state troopers, etc.;
- Conduct a site observation from an off-site elevated point, if possible;
- Conduct a controlled walk through in the area by a trained observer;
- Arrange a briefing by a local specialist, e.g., Fish and Game, etc.; and
- Utilizing appropriate noisemakers.

**BASIC EQUIPMENT**
Employees entering an environment where encounters with wild animals are possible should be provided, as a minimum:
- Noisemakers, such as air horns, bells, etc.; and
- Bear spray of not less than 16-ounce capacity (with holster), equivalent to capsicum pepper (red pepper extract), which is capable of spraying at least 15 feet. (Notes: Normally cannot be transported in side aircraft passenger compartments and may be considered a hazardous material, check with airlines and hazardous material shippers for current information).

**TRAINING**
Prior to entering and/or working in areas inhabited by dangerous wildlife each employee should receive training as outlined in this procedure. At a minimum, training must include information related to:
- Wildlife present, habitat, behavior patterns, including when wild animals are most active, etc.
- Warning signs, such as tracks, bedding areas, scat, claw marks, offspring, paths, etc.,
- Avoidance measures
- Other hazards, precautions, and protective measures as outlined in the Attachments,
- (At the jobsite) spray demonstration and safety instructions which include location of and persons designated as “bear watch”

An outline of the training content should be reviewed and approved by the Divisional EHS manager and should be documented. A record of the training will be maintained at the job site, filed with the SSHSP and in the employee’s training records.

**SUPPLEMENTAL PROTECTION**
In some areas it may be necessary (or preferred) to employ professional hunting guide services where significant possibility of encounters with wildlife exist. The PM and DSM will evaluate the need for supplemental protection. In addition to Weston’s standard minimum qualifications for subcontractors, prospective bear and wild animal protection contractors must be able to provide evidence of competency. This evidence shall include:
• Proof of firearm safety training and;
• Proficiency with firearms and;
• Should have three or more years experience providing similar services.

In addition to the above, project managers should review insurance coverage with the Risk Management office to determine whether or not additional insurances should be required.

FIREARMS USE BY WESTON PERSONNEL OR SUBCONTRACTOR EMPLOYEES

In some situations, the Project Manager (with approved exemption) and client agreement may authorize selected employees or subcontractor employees to carry firearms. Employees designated to carry firearms must demonstrate proficiency in firearm safety marksmanship through successful completion of a firearm safety training class administered by a Fish and Game Department, a local firearm range instructor, or other approved trainer. Personnel designated to carry firearms must not have been convicted of a crime that has resulted in their loss of the privilege to bear arms; therefore, they must submit to a background check through the NCIC.

Training will be documented and records of training will be maintained on site. At a minimum training must include:

• Animal behavior,
• Firearm handling and safety,
• Demonstrated marksmanship skills, and
• Safe storage of firearms and ammunition.

FIREARMS AUTHORIZED FOR SITE USE

• Will not be carried with a round in the chamber until a dangerous encounter is eminent, such as when a bear has been sited in the immediate area, and
• Must be unloaded with a trigger lock installed when not actively being used for protection to prevent unauthorized persons from using the firearm.
• Will be stored in a locked cabinet when not required for use. Only persons qualified to use firearms will have keys to the cabinet.

Military installations require the approval of their security forces before allowing a firearm to be brought onto a military installation. In addition to base requirements, some clients (e.g. AFCEE) may require their approval. The PM must determine with sufficient lead-time whether firearm protection of employees from wild animals will be required. If such is determined to be necessary, the PM must submit a request for authorization to the EHS Manager with sufficient lead-time to permit training and other steps required prior to departure for the field.

All firearms and firearm-carrying personnel shall be registered and approved by the EHS Manager in accordance with the project exemption. Copies of the approved exemption will be maintained in the supporting office. Incomplete requests for exemption will be returned to the project manager without action; therefore, thorough planning at the project level is required to ensure that the project schedule is not impacted.
APPRIOPRiate FIREARMS
Advantages and disadvantages of the firearms are discussed in Attachment 1. Firearms that are appropriate for protection against large animals include:

- A .30 caliber-magnum ("300 magnum") or larger rifle, or
- A 12-guage shotgun with rifled slugs.
- Other firearms, such as large bore handguns, will be considered on their individual merits.

AMMUNITION
The type of ammunition to be used is best determined through consultation with local fish and game agencies or professional guide services.

- The number of rounds and type of ammunition brought to job sites shall be registered with the on-site SSHO.
- When not in use, ammunition and firearms will be effectively secured/locked up in a vehicle, cabinet, etc.

PROTECTIVE MEASURES OF LAST RESORT
When non-lethal methods of deterrence have been used and / or immediate danger to an individual exists, the wild animal may have to be killed. During project planning consult local provisions of the Defense of Life or Property Regulation in your state. In Alaska, refer to 5 AAC 92.410. After contacting the appropriate fish and game agency, the SSO must submit an incident report to the Division EHS Manager. The individual who shot the animal will make the report. In the state of Alaska, the head and the hide must be salvaged and delivered the Alaska Department of Fish and Game.

VEHICLE SAFETY
Use extreme caution, particularly in darkness, when operating vehicles in areas where wild animals may be present. Collisions with large animals have been known to cause significant property damage and personal injuries to vehicle passengers, including fatalities.
ATTACHMENT 1

BEAR SAFETY – HAZARD RECOGNITION AND PRECAUTIONS

On occasion fieldwork may be conducted in a location where bears may be encountered. The following technical information, precautions, and guidelines for operations in which bears could be encountered is based on experience and conditions for field work in the state of Alaska. Bears are intelligent, wild animals and are potentially dangerous, and would rather be left alone. The more bears are understood the less they will be feared. This attachment is intended to provide information that will enable Weston to plan for bear encounters and to properly address face-to-face encounters.

Bear Life History

Although bears are creatures of habit, they are also intelligent, and each has its own personality. The way a bear reacts is often dictated by what it has learned from its mother, the experience it has had on its own, and the instincts nature has provided. Like other intelligent animals, we can make general statements about bears, but few people can accurately predict their behavior.

Bears have an incredible sense of smell, and seem to trust it more than any other sense. Hearing and sight are also important, but to a lesser degree. A bear’s hearing is probably better than ours, but not as keen as a dog’s hearing. Their sight is probably comparable to that of a human. Both black and brown bears have similar life styles, although they do not usually get along with each other. Where both species occur in the same area, black bears tend to favor forested habitats while brown bears favor open areas. Since the likelihood of encountering a polar bear is remote, this procedure addresses only black and brown bears. If the project site is in an area where polar bear encounters are a possibility, consult the fish and game department for assistance in planning for encounters.

Bears are opportunists, relying on their intelligence and their senses to find food. They use different habitats throughout the year, depending on the availability of food and other necessities. The area a bear covers in a given year is partially dependent on how far it has to go to satisfy these basic needs. In some areas, individual bears have home ranges of less than a square mile; in other areas ranges can encompass hundreds of square miles. Males usually range over larger areas than females.

In spring, bears begin coming out of hibernation. Males are usually the first bears to emerge, usually in April, and females with new cubs are usually the last, sometimes as late as late June. When bears emerge from their dens, they are lethargic for the first few days, frequently sleeping near their dens and not eating. When they do start eating, they seek carrion (dead moose, caribou, sea mammals, deer, etc.), roots, and emerging vegetation. In coastal areas, beaches become travel corridors as bears seek these foods. In early summer, bears eat new grasses and forage as they develop in higher elevations. Moose and caribou calves are also important foods where they are available. In coastal areas, salmon are the most important food from June through September. This period is one of the few times that bears are found in large groups, and it is the time that most people see bears. Bears often travel, eat, and sleep along streams for weeks at a time.
Other summer foods for bears include salmonberries, grasses, forbs, ground squirrels, and occasionally, adult moose and caribou. When bears kill or scavenge large prey, they commonly cover the portions they cannot eat with sticks and duff. A bear may remain near a food cache for days and it will defend it from intruders.

During the late summer and early fall, bears move inland and consume large amounts of blueberries, elderberries, soapberries, and other succulent fruits. As the seasons progress towards winter, a bear’s diet becomes more varied. This is the time that bears are adding final deposits of fat before their long winter naps.

In October and November, bears move into their denning areas and begin preparing a suitable den. Black bears usually den in holes under large trees or rock outcrops, or in small natural cavities. Brown bears usually dig their dens in steep alpine areas. Dens are just large enough for the bears to squeeze into. Bears rarely eat, drink, urinate, or defecate while they are denning. They sleep deeply, but do not truly hibernate, and they can be awakened by loud noises or disturbances.

Cubs are born in the den, usually in January. Black bear cubs usually stay with their mothers for a year and a half, and brown bear cubs usually stay with their mothers for 2.5 to 3.5 years. Black bears are sexually mature at age 2 and brown bears are sexually mature at age 4 – 8. Mating season is in the spring (May or June) and both species are polygamous (multiple mates). Both black and brown bears can live for 25 – 30 years, although most live less than 20 years.

**Bear and Human Interactions**

Bears generally prefer to be left alone, but they share their homes with other creatures, including humans, who intrude on virtually every aspect of the bear’s life. Bears are normally tolerant of these activities and generally find a secure way to avoid them. Humans can help bears make a graceful retreat and avoid many close encounters by letting them know we are coming. Walking in groups, talking, and wearing noise making devices, such as bear bells, all serve to warn a bear of your approach. When possible, avoid hiking and camping in areas where bears are common, such as bear trails through heavy brush or along salmon streams. Always keep an eye out for bears and bear signs. If you happen upon a dead animal, especially one that is covered with sticks and duff (a bear cache), immediately retreat the way you came, but do not run, and make a detour around the area. If you see a cub up a tree or a small bear walking alone, immediately retreat and detour around the area. Like all young animals, cubs wander away from their mothers, but females are furiously protective when they believe their cubs are threatened. Even if we do everything possible to avoid meeting a bear, sometimes bears come to us.

Bears are both intelligent and opportunistic, and they express these qualities through their curiosity. This curiosity frequently brings them into “human habitat.” When this happens, we often feel vulnerable, and the bear is sometimes viewed as a threat or nuisance. In most cases, a curious bear will investigate a “human sign,” perhaps test it out (chew on a raft, bite into some cans, etc.), and leave, never to return. If the bear was rewarded during his investigation by finding something to eat, it is hard to stop them from returning once they have had a food-reward. That is why we emphasize the importance of keeping...
human food and garbage away from bears. When in bear country, always think about the way you store, cook, and dispose of your food. **Never feed bears!** This is both illegal and foolish. Food should be stored in airtight containers, preferably away from living and sleeping areas. Garbage should be thoroughly incinerated as soon as possible. Fish and game should be cleaned well away from camp, and clothing that smells of fish and game should be stored away from sleeping areas. Menstruating women should take extra precautions to keep themselves as clean as possible, and soiled tampons and pads should be treated as another form of organic garbage. Once a bear has obtained food from people, it may continue to frequent areas occupied by people. If a bear does not find food or garbage after the next few tries, it may give up and move back into a more natural feeding pattern. Occasionally, though, the bear will continue to seek human foods and can become a “problem bear.” Some bears become bold enough to raid campsites and break into cabins to search for human food. Shooting bears in the rump with cracker shells, flares, rubber bullets, and birdshot are common methods of “aversive conditioning.” These are also very dangerous techniques, because they may seriously injure a bear if not done properly and/or they may cause a bear to attack the shooter.

**TYPES OF BEARS**
The three most prevalent species of bears are the black bear, the brown (grizzly) bear, and the polar bear. Each has a different life-style and somewhat different behavior pattern.

**Black Bear Identification:** Black bears are the smallest and most abundant of the bear species in Alaska. They are five to six feet long and stand about two to three feet high at the shoulders. They weigh from 200 to 500 pounds. While they are most commonly black, other color phases include brown (cinnamon), and, rarely, gray (blue), and white. Muzzles are usually brown. Black bears can be distinguished from brown bears by:

- Their head shape (a black bear’s nose is straight in profile, a brown bear’s is dished);
- Their claws (black bear’s claws are curved and smaller, brown bears are relatively straight and longer);
- Their body shape (when standing, a black bear’s rump seems to be higher than its shoulders; a brown bear’s shoulders are usually higher than its rump); and
- By their ears (a black bear’s ears are more prominent than a brown bear’s ears).

Range in Alaska Black bears live throughout Alaska, except on Kodiak Islands, the Alaska Peninsula, some islands, and the extreme northern and western portion of the state.

**Typical Habitat:** Black bears occupy a wide range of habitats, but seem to be most common in forested areas. Black bears are not uncommon in and around human settlements in Alaska.

**Brown Bear Identification:** Brown and grizzly bears are the same species. They can be over eight feet long and stand five feet high at the shoulder. Weights are typically 600 to 800 pounds, but can reach 1500 pounds. Colors range from blonde to dark brown. Coastal bears (referred to as brown bears) are the largest land carnivores and are usually medium-to-dark brown in color. Interior bears (referred to as grizzly bears) are smaller.
and usually have light tips on their hair, giving them a grizzled appearance. A brown bear’s muzzle is the same color as its body. Cubs frequently have a white collar around their neck and shoulders. The dished-face and large shoulder hump are distinguishing features of the brown bear.

**Range in Alaska:** Brown bears live throughout Alaska, except for the southern portion of the panhandle in southeastern Alaska, and on the Aleutians, and some other islands. Biologists estimate that there are from 30,000 and 45,000 brown bears in the state, and in most areas the numbers are stable. Highest densities occur on Admiralty Island, the Kodiak Islands, and the Alaska Peninsula.

**Typical Habitat:** Brown bears can, and do, use virtually every type of habitat. Although they are less common around human settlements than black bears, brown bears can live in close proximity to people. Polar Bear Identification

**Polar Bear Identification:** Polar bears are about the same size as coastal brown bears. Colors range from white to yellow. Black nose is prominent. Head shape is similar to that of a black bear, but their long tapering necks make polar bears’ heads appear to be small in relation to their body size.

**Range in Alaska:** Polar bears are found in coastal Alaska and offshore waters from Bristol Bay to the Arctic. Ice conditions dictate local polar bear abundance.

**Typical Habitat:** Islands, coastlines, and waters near pack ice and ice floes, rarely occurring far inland, except for denning females, are typical habitat.

**AVOIDING BEAR ENCOUNTERS WHEN**

- **The Bear sees you but you do not know the bear is around:** The bear will likely avoid detection people and will simply move away when they sense a human.

- **You see a bear and it does not know you are there:** Move away slowly. Avoid intercepting the bear if it is walking. If possible, detour around the bear. If the bear is close to you, stand where you are or back away slowly. Do not act threateningly toward the bear, it may know you are there but it has chosen to ignore you as long as you are not a threat.

- **You see the bear and the bear sees you:** Do not act threateningly, but let the bear know you are human. Wave your arms slowly, talk in a calm voice, and walk away slowly in a lateral direction, keeping an eye on the bear. Unless you are very close to a car or a building, never run from bears. In a bear’s world, when something runs it is an open invitation to chase it. Bears will chase a running object even if they have no previous intention of catching it. Bears can run as fast as a racehorse, so humans have little or no chance of outrunning a bear.

- **You see a bear; the bear sees you and stands on its hind legs:** This means that the bear is seeking more information. Bears stand on their hind legs to get a better look, or smell, at something they are uncertain of. It is your cue to help it figure out what you are. Help the bear by waving your arms slowly and talking to it. Standing is not a precursor to an attack. Bears do not attack on their hind legs. It is also important to remember that when a bear goes back down on all fours from a standing position, it may come towards you a few steps. This is normal, and probably not an aggressive act.
• **The bear sees you, recognizes you as a human, but continues to come towards you slowly:** This may mean several things, depending on the bear and the situation. It may mean that the bear does not see you as a threat, and just wants to get by you (especially if the bear is used to humans, as in a National Park); the bear wants to get food from you (if it has gotten food from people before); the bear wants to test your dominance (it views you as another bear); or may be stalking you as food (more common with black bear, but a rare occurrence). In all cases, your reaction should be to back off the trail very slowly, stand abreast if you are in a group, talk loudly, and/or use a noise-making device. If the bear continues to advance, you should stop. At this point, it is important to give the bear the message that if he continues to advance it will cost him. Continue to make loud noises and present a large visual image to the bear (standing abreast, open your coat). In bear language, bears assert themselves by showing their size. If an adult brown bear continues to come at you, climbing 20 feet or higher up a tree may also be an option if one is next to you (remember, never run from bears). Keep in mind, though, brown bear cubs and black bears can climb trees, and adult brown bears can reach 10 – 15 feet.

• **The bear recognizes you as a human and acts nervous or aggressive:** When bears are nervous or stressed they can be extremely dangerous. This is when it is important to try to understand what is going on in the bears mind. Nervous bears growl, woof, make popping sounds with their teeth, rock back and forth on their front legs, and often stand sideways to their opponent. A universal sign of a nervous bear is excessive salivation (sometimes it looks like they have white lips). When a bear shows any of these signs, stand where you are and talk in a calm voice. Do not try to imitate bear sounds, this may only serve to confuse and further agitate the bear. If you are in a group, stand abreast. If you have a firearm available, be prepared to use it.

• **The bear charges:** If all other signals fail, a bear will charge. Surprisingly, most bear charges are just another form of their language. The majority of these are “bluff charges,” that is; the bear stops before making contact with their opponent. There are many different types of bluff charges ranging from a loping uncertain gait to a full-blown charge. If a bear charges, stand still. If you have a firearm, take appropriate action, but remember, if a bear is wounded, a bluff charge may immediately turn into a real charge as the bear’s mind shifts from an offensive mode to a defensive mode.

• **The bear attacks:** When all else fails, a bear may attack. Attacks may be preceded by all of the behaviors previously described or they may be sudden. Seemingly unprovoked attacks are often the result of a bear being surprised (and feeling threatened), a bear defending its food cache, or a female defending her cubs. When a bear attacks, it typically runs with its body low to the ground, legs are stiff, ears are flattened, hair on the nape of the neck is up, and the bear moves in a fast, determined way. Front paws are often used to knock the opponent down and jaws are used to subdue it.
**AFTER A BEAR ENCOUNTER**

If a bear attacks you, your reaction depends on the type of bear that is attacking. If it is a black bear, fight vigorously, for your life may depend on it. Black bears have been known to view humans as prey, and if you struggle with the attacking black bear, it will probably go elsewhere for its meal.

Brown bears are a completely different story. Brown bears attack because they feel threatened, and they will continue to press the attack until the threat has been neutralized. If you fight and struggle, the bear will continue to fight, and a human has little or no chance to defeat a brown bear in battle. Lie on your face and stomach, place your hands behind your neck, and lie still when you are attacked. A brown bear will no longer see you as a threat and may stop the attack. Although it sounds foolish to play dead while being attacked by a bear, this has been proven to be the best way to survive a brown bear attack. It should be noted that if you fall down and play dead before a bear actually makes contact, the bear might come over to determine what is going on. Actual maulings by bears are very rare. Alaska has more bears than anywhere else in the world, and there are hundreds of thousands of people living, working, and playing in these bears’ back yard. Yet, since 1900, there have only been an average of about two people per year mauled by bears in the state, and very few of those instances have resulted in death.

As a last resort, a bear may have to be shot. When this is the only option, it will likely be in a situation that has a sudden onset. Therefore, it is important that you are familiar and comfortable with whatever firearm you decide to carry. Remember that if you wound a bear, you make the situation worse. There is an on-going debate as to what is the best firearm to use for protection from bears. The following are a few of the pros and cons for some of the more popular firearms:

- **Pistols:** Convenient to carry, always with the person, can be used in close quarters during an attack, rapid-fire is possible. However, are dangerous to humans (accidents), much practice is needed to be proficient; may not be powerful enough to stop a large bear.
- **Shotguns:** Can be loaded with a variety of projectiles, effective at close range in brushy situations, rapid-fire is possible, easy to use. They are however inaccurate and ineffective at medium to long range, heavy to carry, potentially dangerous to humans, may not be powerful enough to stop a large bear.
- **Rifles:** Very powerful calibers are available, accurate at both close and long range. However, practice is required for accuracy in an emergency, range of bullet makes it dangerous to humans, heavy and awkward to carry, rapid fire is difficult with bolt action rifles.

There are different thoughts as to the best place to shoot a charging bear. In reality, a person usually has little time to contemplate shot placement in a true bear attack. If you have a choice, it is best to aim at the shoulder and chest area. Bear’s skulls are thick and covered with large muscles, so headshots may not be effective. Once you have made the decision to shoot a bear, you have a responsibility to finish the job you have started. Keep firing until you are out of bullets or you are positive the bear is dead. A wounded bear can be dangerous to you and anyone else who comes into the area.
• **Bear Sprays:** Are easy to carry and use, little risk of permanent damage to bears and humans, effective in many situations. However, using a spray may change a false charge into a real charge, they are ineffective at ranges greater than 20 feet, ineffective in windy conditions, dangerous if accidentally discharged in a closed area such as an aircraft cockpit.

Regardless of the firearm you choose, it is imperative that you realize that the most effective tool you have against an attacking bear is your brain. Although bears are intelligent animals, we are smarter and can often think our way out of a bad situation if we try. We must never let the firearm we carry become a replacement for common sense.

**LAWS CONCERNING BEAR/HUMAN INTERACTIONS IN ALASKA**

There are two regulations governing bear and human interactions in Alaska. The first, ACC 92.230, prohibits feeding bears or leaving garbage that attracts them. The other, 5 ACC 92.410, sets guidelines for taking a bear in defense of your life or property (DLP). These DLP provisions specifically state that a bear cannot be killed legally if the problem is caused by the improper disposal of garbage or some other attractive nuisance, or if it is brought about by harassment or provocation of the animal or an unreasonable invasion of its habitat.

The regulation also defines what is considered “property.” If a bear is killed under the DLP provisions, the hide and skull are the property of the state and must be turned over to Fish and Game as soon as possible. The person who shot the bear is also required to submit a written incident report within 15 days. (Obtain a paper copy of this attachment through Corporate Health, Safety, and Environment.)
ATTACHMENT 2

HAZARDS AND PRECAUTIONS – MOOSE, ELK, AND DEER

On occasion fieldwork may be conducted in a location where moose may be encountered. The following technical information, precautions, and guidelines for operations in which Moose, Elk, or Deer may be encountered is based on experience and conditions for field work in the state of Alaska. The more these species are understood, the easier it will be to avoid contact with them thus preventing injury to ourselves and to the animals. All big game species are unpredictable and can be dangerous under certain conditions. This attachment is intended to provide information that will enable Weston to plan for encounters and to properly address face-to-face encounters.

MOOSE

Moose are the world’s largest members of the deer family. The Alaska race is the largest of all the moose. Moose are generally associated with northern forest in North America, Europe, and Russia. In Alaska, they occur in suitable habitat from the Stikine River in the Panhandle to the Colville River on the Arctic Slope, and as far south on the Alaska Peninsula as Herendeen bay. They are most abundant in recently burned areas that contain willow and birch shrubs, on timberline plateaus, and along the major rivers of South-central and interior Alaska. General Description

Moose are long-legged and heavy-bodied with a drooping nose, with a “bell” or dewlap under the chin, and a small tail. Their color ranges from golden brown to almost black, depending on the season and the age of the animal. The hair of newborn calves is generally red-brown, fading to a lighter rust color within a few weeks. Newborn calves weigh 28 to 35 pounds and within five months grow to over 300 pounds. Males in prime condition weigh from 1,200 to 1,600 pounds. Adult females weigh 800 to 1,300 pounds. Only the bull has antlers.

Life History:  Cow moose generally breed at 28 months, though some may breed as young as 16 months. Calves are born anytime from mid-May to early June. Cows give birth to twins 15 to 75 percent of the time, and triplets may occur once in every 1,000 births. The incidence of twinning is directly related to range conditions. A cow moose defends her newborn calf vigorously. Calves begin taking solid food a few days after birth. They are weaned in the fall at the time the mother is breeding again. The maternal bond is generally maintained until calves are 12 months old at which time the mother aggressively chases her offspring from the immediate area just before she gives birth. By late October, adult males have exhausted their summer accumulation of fat and their desire for female company. Once again, they begin feeding. Antlers are shed as early as November, but mostly in December and January.

Food Habits:  During fall and winter, moose consume large quantities of willow, birch, and aspen twigs. In some areas, moose actually establish a “hedge” or browse line six to eight feet above the ground by clipping most of the terminal shoots of favored food species. Spring is the time of grazing as well as browsing. Horsetail, pond weeds, and grasses. During summer, moose feed on vegetation in shallow ponds, forbs, and leaves of birch, willow, and aspen.

Reviewed and Revised 25 January 2008
Movement: Most moose make seasonal movements to calving, rutting, and wintering areas. They travel from only a few miles to as many as 60 miles during these transitions.

**WORKING SAFELY AROUND MOOSE**

Every year someone is injured by a moose and in some cases fatalities are caused by moose attacks. Most cases of moose attack are from cows defending their calves and they are well equipped to do so. Cow moose attack with their front feet and sharp hooves; they can kill wolves and in some cases drive grizzly bears away from their offspring. Bull moose attack with their massive antlers and can do great damage in a short amount of time. One should always be alert when working in moose country. If you encounter a moose, never approach too closely. Moose will generally declare their displeasure of your presence by lowering their ears and raising their hackles (the long hair on their neck and back). Immediately retreat if you see a moose displaying this behavior. If you are about to be attacked by a moose and there are trees present, stay behind the tree. A human can move around a tree faster than a moose can. Use common sense. Avoid contact with any wild animal. Most have the ability injure a human. Never play dead if attacked by a moose. Put something substantial between you and the moose.

**ROOSEVELT ELK**

Roosevelt Elk are larger, slightly darker in color, and have shorter, less symmetrical yet more massive antlers than the Rocky Mountain Elk found east of the Cascade Mountains in Canada and the United States.

**General Description:** Elk are members of the deer family and share many physical traits with deer, moose, and caribou. They are much larger than deer, but not as large as moose, which occur in Alaska. Distinguishing features include a large yellowish rump patch, a grayish to brownish body, and dark brown legs and neck. Unlike some members of the deer family, both sexes have upper canine teeth. The males have antlers, which in prime bull are very large, sweeping gracefully back over the shoulders with spikes pointing forward. Alaska elk antlers have a tendency toward crowning, the formation of the three points at the end of each antler. Elk shed their antlers during the winter each year and grow new ones the following summer. The soft growing antler is covered with velvet, which is scraped off by rubbing and jousting after the antlers harden in the fall. Bull elk on Afognak Island are estimated to weigh up to 1,300 pounds. Cow elk are similar in appearance to the bulls, but are smaller and have no antlers.

**Life History:** Elk calves are born in late May or early June when abundant food is available for the mother and the mild weather increases the calves’ chances for survival. Birth usually occurs under the cover of dense spruce forest, hidden from predators and protected from the elements. Calves are born with protective coloration (light spotted areas on the back, which act as camouflage). A few days after giving birth, the mother joins other cow elk with calves. A single cow will often “baby-sit” with the calves while the remaining cows seek food. As summer progresses, elk bands move above timberline and feed on the alpine slopes where breezes keep biting insects at bay and young plants are highly nutritious. By July, the calves, although still nursing, begin feeding on succulent forbs.

Reviewed and Revised 25 January 2008
Beginning in August, bands of elk congregate and form herds consisting of cows, calves, yearlings, and an occasional mature bull. Nearby, but separate from the heard mature bulls can be found. During September, the bulls join the main herds and mating activities (the rut) begin. Large herds are scenes of vigorous activity as mature bull challenge each other vocally, emitting a high-pitched whistle or bugle, an eerie but thrilling sound. Occasionally, pushing and shoving matches are initiated as the mature bull attempt to take advantage of the larger bull’s preoccupation and run past them to win the favors of a female. By mid-October most breeding activities have ceased. Herds may begin to disperse into smaller bands as they move into wintering areas. Winter months are spent in lower valleys and in the dense spruce forest and small openings near the coastline searching for food.

**Food:** Elk are hardy animals whose large body size and herding tendencies require tremendous amounts of food. From late spring to early fall, with a wide variety of food available, elk are mainly grazers, using grasses, forbs, and other leafy vegetation. By late fall they become browsers, feeding on sprouts and branches of shrubs and trees.

**Population:** From the original eight transplanted animals, Afognak elk have expanded to about 1,200.

**Working Safely Around Elk**

Although elk are not as widely distributed as moose in Alaska, they are large and potentially dangerous when the bulls are in the rut and when you may be near cows with young calves. Follow the same precautions as set forth above for moose. Elk bulls have a tendency to be more aggressive during the rut (September & October) than either moose or deer, and caution should be used when working near bulls during this time of year. Aggressive cows with calves should be avoided as well, since they attack in the same manner as cow moose.

**Sitka Black-Tailed Deer, Mule Deer, and White-Tailed Deer**

The Sitka black-tailed deer is native to the wet coastal rain forest of Southeast Alaska and north coastal British Columbia. Transplants have expanded its range and established population now also exist near Yakutat, in Prince William Sound, as well as Kodiak, and Afognak, and Raspberry Islands.

**General Description:** The Sitka black tailed deer is smaller, stockier, and has a shorter face than other members of the black-tailed group. Fawns are born in early June and weigh six to eight pounds at birth. The average October live weight of adults is about 80 pounds for does and 120 pounds for bucks, although dressed weight bucks of over 200 pounds have been reported. The summer coat of reddish brown is replaced by dark brownish gray in winter. Antlers are dark brown with typical black tailed branching. Normal adult antler development is three points on each side. Average life span is about 10 years, but a few are known to have attained an age of at least 15.

**Life History:** Fawns are born in late spring. After the winter snow pack recedes, deer disperse; migratory deer move to high elevation alpine/sub-alpine habitats while resident deer remain at lower elevations throughout the forest. Summer and early fall are periods
of active foraging as deer accumulate fat reserves, which will help them through the winter and early spring. With the first heavy frost, deer in the higher alpine and sub-alpine areas descend to the upper forest. The breeding season (or rut) peaks during late November. Breeding bucks spend little time foraging and by late November have used up much of their fat reserve. Does, however, generally enter December in prime condition. Does breed during their second year of life and continue producing fawns annually until they are 10 or 12 years of age. Reproductive success decreases rapidly beyond 10 to 12 years and by age 15, which is probably the maximum life expectancy, reproduction has essentially ceased. Prime age does (5 to 10 years) typically produce two fawns annually.

Throughout the rest of the winter and early spring, deer are generally restricted to uneven-aged old growth forest below 1,500 feet in elevation. The old growth forest provides optimal winter habitat because the high broken canopy intercept much snow but still provides enough light for the growth of forage plants used by deer. During winter, the distribution of deer at various elevations is influenced by changing snow depth. During extreme snow accumulations, many deer congregate in heavily timbered stands at lower elevations, and some may even move into the beach. Spring is a critical period for deer, and if winters are deep and persistent, many deer die of starvation. As snow melts in mid to late spring, deer begin to disperse, and by late spring and early summer they start rebuilding some of the fat reserves lost during winter.

**Home Range:** Summer and winter home range areas vary from 30 to 1,200 acres and average about 200 acres for radio-collared deer on Admiralty Island. Migratory deer have larger annual home ranges than resident deer. The average distance between summer and winter home ranges is five miles for migratory deer and half a mile for resident deer. Movement of deer between watersheds appears to be minimal during winter.

**Food Habits:** During summer, deer generally feed on herbaceous vegetation and the green leaves of shrubs. During winter, they are restricted to evergreen forbs and woody browse. When snow is not a problem, evergreen forbs such as bunchberry and trailing bramble are preferred. During periods of deep snow, woody browse such as blueberry, yellow cedar and hemlock, and arboreal lichens are used. Woody browse alone, however, is not an adequate diet and deer rapidly deplete their energy reserves when restricted to such forage.

**Populations:** Deer populations in Alaska are dynamic and fluctuate considerably with the severity of the winters. When winters are mild, deer numbers generally increase. Periodically, however, a severe winter will cause a major decline in the population. Deer have a high reproductive potential, and depressed populations normally recover rapidly. In some cases, however, predation may speed deer decline, as well as slow recovery to higher levels. The wolf, which occurs on the mainland and islands south of Frederick Sound, is considered the major predator of deer in Southeast Alaska. Both black and brown bears also prey on deer to some degree.
WORKING SAFELY AROUND DEER

The White-tailed deer found thought the eastern and western part of the United States have been known to attack people on many occasions. It is unknown whether Black-tailed deer have made any such attacks, but it is possible for someone to be injured by an irate buck in the breeding season (late fall). Deer are well equipped to injure humans. They are very fast. Bucks have sharp antlers and can clear amazingly high obstacles with graceful, arching leaps. They can run with remarkable speed, even in dense cover, and have excellent camouflage. When working in areas populated with deer, whether it be White-tailed, Black-tailed, or Mule deer, it is just common sense not to approach any large wild animal too closely. It is unlikely that an attack from a deer would be fatal but it is possible and serious injury is likely.
ATTACHMENT 3

AMERICAN BISON AND FERAL WILD CATTLE – HAZARD RECOGNITION AND PRECAUTIONS

American Bison (Bison), which shaped the lifestyle of the plains Indians and figured prominently in American history before they were brought to near extinction, were transplanted to Alaska from Montana in 1928. While bison were the most common large land mammal in Alaska thousands of years ago, all of Alaska’s wild bison came from 20 animals released near Delta Junction. Natural emigration and transplants have now created additional herds at Copper River, Chitina River, and Farewell. Small domestic herds are located at Healy, Kodiak Island, and on Provo Island. There were approximately 700 wild bison in the state in mid-1985.

General Description: The bison is the largest native land mammal in North America. A full-grown bull stands six feet at the shoulder, is up to 10 feet long, and can weigh more than a ton. Full-grown cows are smaller, but have been known to weigh over 1,200 pounds. A bison’s head and forequarters are massive and seem out of proportion to the smaller hind parts. Bison have vertebrae, which begins just ahead of the hips and reaches its maximum height above the front shoulder. From above the shoulder, the hump drops almost straight down to the neck. The bison’s horns curve upward. The horns of the bull are larger and heavier than the horns of the cow. As winter progresses, their coats change color and are much paler by spring. When the weather warms, the hair loosens and hangs in patches until it is completely shed and replaced with new hair by late spring. Hair on the chin resembles a goatee. Older animals tend to have more hair on their heads.

Life History: Most bison young are born in May, but calves are born from April to August or even later. Newly born calves have a reddish coat. They are able to stand when only 30 minutes old; within three hours of birth, they can run and kick their hind legs in the air. At about 6 days of age, calves start grazing. Their reddish-orange coat begins to darken at about 10 weeks, with the molt to dark brown complete about five weeks later. Cows are sexually mature at two years of age and give birth to single calves twice in three years. The gestation period is approximately 270 days. On rare occasions, a mostly white or even albino calf has been born in the Delta herd, but none has reached maturity. Bison in Alaska have been known to live to a relatively great age compared to other hoofed animals (ungulates). One tagged bull killed in the Copper River area was over 20 years old. Bison are migratory animals by nature. Alaska’s wild bison do not remain in single herds, but scatter alone or in-groups ranging up to 50 animals or more. In the Delta Junction area, they move far up the Delta River in early spring to secluded meadows where they calve. Around August they travel back downstream, eventually moving on the Delta Junction Bison Range, and finally in late fall, onto farms where they remain throughout the winter. Here they sometimes cause damage to un-harvested crops. Alaska’s other wild bison herds also have seasonal movement patterns. Bison move slowly while feeding and appear to be quite clumsy. This is pure deception, for when pursued, the bison is fleet of foot and has great endurance. A mature bull eventually captured at Delta Junction jumped a seven-foot log fence from a standing position.
Food Habits: Bison are grazing animals and in Alaska find only limited amounts of food along rivers, in recent burns, and sedge potholes. Their diet is made up mainly of various grasses and forbs like vetch, a favored summer food found on gravel bars. Sedges, silverberry, willow, and ground birch are also eaten.

Working Safely Around Bison: When working in areas where bison are present, follow the same precautions as stated above for other large potentially dangerous wild animal. Generally, where bison are present there also will be moose and Brown (Grizzly) bears sharing the same area. Partially due to the relatively sparse population, bison injure fewer people than Brown Bears or moose. Never approach bison and use caution when working near bison as they are unpredictable and can cover a lot of ground in a short amount of time. Bison can be found in timbered areas. If approached by a bison and you cannot make it to a vehicle, keep a large tree between you and the bison. You can move around the tree faster than the bison. If a single bison or heard of bison approach you or your crew, retreat to your vehicle and leave the area. Do not attempt to “drive” the bison from your area while in your vehicle. Bison have no respect for cars and could charge and damage your vehicle and the occupants. The best way to avoid contact is to use your head and give the bison the right of way.

Feral or Wild Cattle
Feral or wild cattle are only found in a few remote locations in Alaska. A population exists on Sitkinak Island on the south end of Kodiak Island, Long Island, Harvester Island, and Chirikof Island. The same caution should be used when working in areas with a population of wild cattle that would be used when working around any of Alaska’s dangerous wildlife. Never approach too closely and if they begin to approach you, clear the area as fast as possible. If you arrive at your work site and there are wild cattle close by, stay in you vehicle and remain there until they leave the area. If it is necessary to destroy a wild cow, you must notify the Department of Fish & Game. The same Defense of Life and Property (DLP) law that applies to big game species does not apply to wild domestic cattle, but you will be required to salvage the meat and make the report. Cattle reside on leased ground, and the owner of the leases must also be notified. It may also be necessary to compensate the landowner.

Wild Feral Cattle can be dangerous, and there are reports of injuries to people. Although they may look domestic cattle, they are wild and have no fear or respect for humans. Give them the right a way, use common sense, and maintain a safe distance when working where wild Feral Cattle inhabit the area.
ATTACHMENT 4

MOUNTAIN LIONS (COUGARS) – HAZARD RECOGNITION AND PRECAUTIONS

Mountain lions range throughout the Western United States and are the largest cat in North America, weighing considerably more than its cousins — the lynx, bobcat and domestic cat. Sleek and graceful, the cougar is a solitary and secretive animal rarely seen in the wild. However, in many areas humans are encroaching on wildlife habitat and cougar numbers are rebounding, the number of cougar sightings in suburban areas is on the rise.

COUGAR COUNTRY

Cougars prefer rocky terrain, dense brush and semi-open forests. The other essential ingredient, of course, is deer and elk, the cougar’s main prey. Traditionally, cougars were associated almost exclusively with deer and elk herds, but as cougar have expanded their range and adapted to semi-urban areas, smaller mammals like raccoons, coyotes and opossums supplement their diet.

Cougars are territorial animals and maintain home ranges of up to 100 square miles. The lions mark their territories with “scratch hills” or scrapes — leaves, grasses and dirt they rake together into small piles and urinate on. Most active at dawn and dusk, cougars are lone hunters designed for short bursts of speed. They prefer to ambush their prey and often drag their kills to secluded spots where they will eat it and then cover, or cache, the remains for later.

General Description:

Cougar, mountain lion, puma, panther, and catamount are common names of this large predator. The cougar is a member of the cat family and have short faces, relatively small rounded ears, and retractable claws. An adult cougar’s body length ranges from 42-54 inches with tails nearly 3 feet long (a third of the lion’s total length). Adults range from 26-31 inches tall at the shoulder. Adult males can weigh up to 200 pounds, adult females up to 120 pounds. Cougars vary in color from reddish-brown to tawny to gray with a black tip on their tail. Kittens have black spots.

Range/Habitat:

Cougars prefer rocky terrain, steep slopes and cliffs, rim rock, dense brush and semi-open forests — essentially the same general range as its prey species, the deer, elk, mountain goat and wild sheep. Over 20,000 cougars are thought to live in the Western United States.

Cougars are primarily crepuscular (active at dawn and dusk) and secretive animals. Adults, particularly the males, roam widely often covering a home range of 75-100 square miles. The lions are territorial and will “mark” their territories by urinating on scratch piles. They den in rock outcroppings, dense thickets and under uprooted trees.

Food:

Cougars are carnivores, meaning they eat mainly meat. Their diet consists primarily of deer and elk. Mountain goat, wild sheep, moose, coyotes, porcupine, raccoons, beaver, hares, rodents, and occasionally, domestic animals all supplement their diet. Cougars will cache uneaten portions of their kill or cover it for later consumption, but will not eat spoiled meat, as bears will.
Life span: Cougars 8-12 years are considered old, yet they may live up to 20 years. Cougars breed for the first time between 2 and 3 years of age. They are polygamous, meaning individuals may breed with several different cougars. The bond between male and female is short-lived and the male cougar plays no role in raising the kittens. A female’s gestation period is 88-97 days (about 3 months). The animals normally breed every other year and during no particular breeding season. Females usually give birth to two kittens, but litters may range from one to six kittens, and may be born any month of the year. Newborns are 8-12 inches long and weigh less than a pound. Kittens remain with their mother for a year and a half.

COUGARS: CLOSE ENCOUNTERS
Cougar attacks on humans are extremely rare. In North America, fewer than 20 fatalities and 75 non-fatal attacks have been reported during the past 100 years. However, more cougar attacks have been reported in the western United States and Canada over the past 20 years than in the previous 80. In Washington, of the one fatality and five non-fatal attacks reported since 1924, four attacks have occurred during the 1990’s. As cougar numbers increase in Washington and habitat dwindles, the more likely you are to encounter a lion. Young, newly independent cougars of 1 or 2 years of age, presumably having difficulty finding food for themselves, account for the majority of the cougar/human interactions reported in Washington.

IN COUGAR COUNTRY (ESPECIALLY WOODED FOOTHILLS):
• Keep pets indoors or in secure kennels at night for safety.
• If practical, bring farm animals into enclosed sheds or barns at night, especially during calving or lambing seasons.
• Do not leave pet food or food scraps outside.
• Store garbage in cans with tight-fitting lids so odors do not attract small mammals.
• When children are playing outdoors, closely supervise them and be sure they are indoors by dusk.
• Light walkways and remove any heavy vegetation or landscaping near the house.
• Avoid feeding wildlife or landscaping with shrubs and plants that deer prefer to eat. Remember, predators follow prey.

While recreating or working in cougar country you can avoid close encounters by taking the following precautions:
• Work or hike in small groups and make enough noise to prevent surprising a cougar. Avoid hiking alone.
• Keep small children close to the group, preferably in plain sight just ahead of you.
• Do not approach dead animals, especially recently killed or partially covered deer and elk.
• Be aware of your surroundings, particularly when hiking in dense cover or when sitting, crouching or lying down. Look for tracks, scratch piles, and partially covered droppings.
Keep a clean camp. Reduce odors that may attract small mammals like raccoons, which in turn attract cougars. Store meat, other foods, pet food, and garbage in double plastic bags.

Do not leave your pet tied at a campsite, which may also attract cougars. Better yet, leave “Rover” at home when camping or hiking.

**When an Encounter Occurs**

If you do come face to face with a cougar, your actions can either help or hinder a quick retreat by the lion. Here are some tips.

- Stop, stand tall and don’t run. Pick up small children immediately. Running and rapid movements may trigger an attack. Remember, a cougar’s instinct is to chase.
- Face the cougar, talk to it firmly and slowly back away. Always leave the animal an escape route.
- Try to appear larger than the cougar by getting above it. (E.g., stepping up onto a stump). If wearing a jacket, hold it open to further increase your size.
- Do not take your eyes off the animal or turn your back. Do not crouch down or try to hide.
- Never approach the animal, especially if it is near a kill or with kittens. Never corner the animal or offer it food.
- If the animal does not flee and shows signs of aggression (crouches with ears back, teeth bared, hissing, tail twitching, and hind feet pumping in preparation to jump), be more assertive. Shout, wave your arms and throw rocks. The idea is to convince the cougar that you are not prey, but a potential danger.

If the cougar attacks, fight back aggressively and try to stay on your feet. Cougars have been driven away by people who have fought back using anything within reach, including sticks, rocks, shovels, backpacks, and clothing — even your bare hands. Generally, if you are aggressive enough, a cougar will flee, realizing it has made a mistake.
ATTACHMENT 5

PROJECT SPECIFIC EXEMPTION FOR FIREARMS

Weston Corporate policy (insert OP#) specifically prohibits firearms on Weston premises or project sites. However, in some remote locations firearms may be necessary to ensure a safe work environment. When the project manager has determined that firearms are necessary the Policy # Project Specific Exemption for Firearms form (attached) must be completed and submitted with the SSHP. The Corporate EHS Manager (or designated representative in his absence) is authorized to grant a project specific exemption.

The project specific exemption applies only to projects where firearms are required and should be omitted when other controls are deemed appropriate. To obtain an exemption, complete the attached form and submit it along with the HSP to the Corporate EHS for approval.
Project Specific Exemption for Firearms

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<td>Project Narrative (Brief description of the scope of work):</td>
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<td>Justification (Brief narrative supporting firearm exemption):</td>
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The following named personnel have demonstrated proficiency in wildlife protection through training and experience (Attach copies of training documents), have voluntarily submitted to a check through the National Criminal Information Computer (NCIC) and have no convictions that prevent them from possessing firearms, have agreed to perform the duties as outlined in the HSP; therefore granted an exemption and permitted to possess firearms on the project site for the express purpose of wildlife protection.

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This document grants an exception to Roy F. Weston, Inc.’s Policy # ____ and permits firearms on this project for the express purpose of protection from Wildlife. All persons either employed by or subcontracted to Weston must adhere to the requirements for safe handling of firearms and other restrictions as outlined by this Field Operating Procedure ____ and those that may be required by the client, airline companies, and any other concerned agencies or organizations. These restrictions must be stated in the HSP.

Approvals:

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<td>Project Manager</td>
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<td>Safety Officer</td>
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Statement of Compliance: The above persons approving this document have reviewed the requirements of the project and agree that the possession and use of firearms is necessary to ensure that Weston is able to ensure a safe work environment on the stated project. Only those persons named herein shall be permitted to possess firearms.

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<td>Division EHS Manager</td>
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The Division and Corporate safety managers have reviewed this request and hereby grant a project specific waiver.

Approval Comments: (Write comments as appropriate)

This exemption does not permit or allow possession of firearms on or in vicinity of, the project location for any purpose other than protection from wildlife.
APPENDIX B - PICTURES OF POISONOUS SNAKES AND LIZARDZS

Americas

American copperhead

Coral Snakes – Western, Eastern and Texas

– Southern US
Cotton Mouth – East and Southeast US

Eastern Diamondback Rattlesnake - Southeast US

Timber Rattlesnake – Eastern US
Dusky Pygmy Rattlesnake - SE US

Mojave Rattlesnake – Southwest US Mexico

Western Diamondback Rattlesnake – SW US

Speckled Rattlesnake - SW US

Massasaug – North and South Central US

Black-tailed Rattlesnake – South Central US and Mexico
Tiger Rattlesnake – Southwest US and Mexico

Sidewinder – Southwest US

Bush Master – Central and South America, Caribbean

Eyelash Pit Viper

Fer-de-Lance – Central & South America

Jumping Viper – Central America
Lizards

- Tropical rattlesnake - Southern Mexico, Central America, and South America.
- Gila Monster – SW US
- Mexican Bearded Lizard – Mexico and Central America
Europe

Common Adder - Throughout Europe

Long nosed Adder - Italy, Yugoslavia, northern Albania, and Romania

Pellas Viper - Throughout southeastern Europe.
Ursini Viper - Most of Europe, Greece, Germany, Yugoslavia, France, Italy, Hungary, Romania, Bulgaria, and Albania.

Africa and Asia

Boomslang - sub-Saharan Africa

Bush Viper - Most of Africa, Angola, Cameroon, Uganda, Kenya, and Zaire
Africa, Iraq, Syria, and Saudi Arabia

Gaboon viper - Most of Africa

Green Mamba - Most of Africa.

Rhinoceros viper or river jack – Equatorial Africa
Green Tree Pit Viper - India, Burma, Malaya, Thailand, Laos, Cambodia, Vietnam, China, Indonesia, and Formosa.

Habu pit viper - Okinawa and neighboring islands and Kyushu

Mole or Burrowing Viper
Sudan, Ethiopia, Somaliland, Kenya, Tanganyika, Uganda, Cameroon, Niger, Congo, and Urundi.
Middle East

Puff Adder - Most of Africa, Saudi Arabia, Iraq, Lebanon, Israel, and Jordan

Sand Viper - Northern Sahara, Algeria, Egypt, Sudan, Nigeria, Chad, Somalia, and central Africa.

Saw Scaled Viper - Asia, Syria, India, Africa, Iraq, Iran, Saudi Arabia, Pakistan, Jordan, Lebanon, Sri Lanka, Algeria, Egypt, and Israel.
Field’s horned viper, False Eye-horned viper - Middle East and as far east as Pakistan

Horned Asp, (true) Desert Horned/Eye-Horn Viper, desert horned sidewinder Northern Africa and parts of the Middle East.
Desert Cobra, Desert Black Snake

Palestinian Viper - Turkey, Syria, Palestine, Israel, Lebanon, and Jordan

Levant viper or Levant adder, aka: desert or mountain adder, ‘kufi’ - Greece, Iraq, Syria, Lebanon, Turkey, Afghanistan, lower portion of the former USSR, and Saudi Arabia.
India

Cobra

Common Krait - India, Sri Lanka, and Pakistan.

Malayan Pit Viper - Thailand, Laos, Cambodia, Java, Sumatra, Malaysia, Vietnam, Burma, and China

McMahon’s Viper - West Pakistan and Afghanistan.
Russell’s Viper - Sri Lanka, south China, India, Malaysian Peninsula, Java, Sumatra, Borneo, and surrounding islands.

Wagler’s pit viper or temple viper - Malaysian Peninsula and Archipelago, Indonesia, Borneo, the Philippines, and Ryuku Islands.
Australasia

Australian Copperhead - Tasmania, South Australia, Queensland, and Kangaroo Island.

Death Adder Australia, New Guinea, and Moluccas

Taipan - Northern Australia and southern New Guinea
Sea Snakes

Banded Sea Snake Coastal waters of New Guinea, Pacific islands, the Philippines, Southeast Asia, Sri Lanka, and Japan.

Yellow Bellied Sea Snake - Throughout the Pacific Ocean from many of the Pacific islands to Hawaii and to the coast of Costa Rica and Panama.
Sting and Biting Insects

Contact with stinging insects may result in site personnel experiencing adverse health affects that range from being mildly uncomfortable to being life threatening. Therefore, stinging insects present a serious hazard to site personnel and extreme caution must be exercised whenever site and weather conditions increase the risk of encountering stinging insects. These include the following:

- Bees ("Killer" bees, honeybees, bumble bees, wasps, and hornets and wingless wasps)
- Scorpions
- Fire ants
- Spiders

Bees, Wasps, Hornets and Yellow Jackets

The severity of an insect sting reaction varies from person to person. A normal reaction will result in pain, swelling and redness confined to the sting site. Simply disinfect the area (washing with soap and water will do) and apply ice to reduce the swelling.

A large local reaction will result in swelling that extends beyond the sting site. For example, a sting on the forearm could result in the entire arm swelling twice its normal size.

Although alarming in appearance, this condition is often treated the same as a normal reaction. An unusually painful or very large local reaction may need medical attention. Because this condition may persist for two to three days, antihistamines and corticosteroids are sometimes prescribed to lessen the discomfort.

Yellow jackets, hornets and wasps can sting repeatedly. Honeybees have barbed stingers that are left behind in their victim’s skin. These stingers are best removed by a scraping action, rather than a pulling motion, which may actually squeeze more venom into the skin.

Personnel should be very cautious of "killer" bees. They have the appearance of the typical honeybee, however, they are very aggressive. These Africanized honeybees (AHB) defend their colonies much more vigorously than typical bees. The colonies are easily disturbed (sometimes just by being nearby). When they do sting, many more bees may participate, so there is a danger of receiving more stings. This can make them life threatening, especially to people allergic to stings, or with limited capacity to escape (the young, old, and handicapped).

Scorpions

Scorpion stings are a major public health problem in many underdeveloped tropical countries. For every person killed by a poisonous snake, 10 are killed by a poisonous scorpion. In Mexico, 1000 deaths from scorpion stings occur per year. In the United States, only 4 deaths in 11 years have occurred as a result of scorpion stings. Furthermore, scorpions can be found outside their
normal range of distribution, ie, when they accidentally crawl into luggage, boxes, containers, or shoes and are unwittingly transported home via human travelers.

Out of 1500 scorpion species, 50 are dangerous to humans. Scorpion stings cause a wide range of conditions, from severe local skin reactions to neurologic, respiratory, and cardiovascular collapse.

Almost all of these lethal scorpions, except the *Hemiscorpius* species, belong to the scorpion family called the Buthidae. The Buthidae family is characterized by a triangular-shaped sternum, as opposed to the pentagonal-shaped sternum found in the other 5 scorpion families. In addition to the triangular-shaped sternum, poisonous scorpions also tend to have weak-looking pincers, thin bodies, and thick tails, as opposed to the strong heavy pincers, thick bodies, and thin tails seen in nonlethal scorpions. The lethal members of the Buthidae family include the genera of *Buthus, Parabuthus, Mesobuthus, Tityus, Leiurus, Androctonus,* and *Centruroides.* These lethal scorpions are found generally in the given distribution:

<table>
<thead>
<tr>
<th><em>Centruroides</em> - Southwest USA, Mexico, Central America</th>
<th><em>Tityus</em> - Central and South America, Caribbean</th>
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<tr>
<td><em>Buthus</em> - Mediterranean area</td>
<td><em>Androctonus</em> - Northern Africa to Southeast Asia</td>
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<tr>
<td><em>Leiurus</em> - Northern Africa and Middle East</td>
<td><em>Mesobuthus</em> - Asia</td>
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<td><em>Parabuthus</em> - Western and Southern Africa</td>
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A scorpion has a flattened elongated body and can easily hide in cracks. It has 4 pairs of legs, a pair of claws, and a segmented tail that has a poisonous spike at the end. Scorpions vary in size from 1-20 cm in length.

However, scorpions may be found outside their habitat range of distribution when inadvertently transported with luggage and cargo.
Hemiscorpius (Middle East) cytotoxic

Fat Tail Scorpion (Middle East) neurotoxic

Death Stalker *Leiurus quinquestriatus* (Africa Southwest and North) neurotoxic
Black Scorpion (Middle East) deadly neurotoxin

Prevention

Preventive measures include awareness of scorpions, shaking out clothing and boots before putting them on, looking before reaching into likely hiding places and wearing gloves, long sleeved shirts and pants.

Symptoms

In mild cases, the only symptom may be a mild tingling or burning at site of sting.

In severe cases, symptoms may include:

- Eyes and ears - Double vision
- Lungs - Difficulty breathing, No breathing, Rapid breathing,
- Nose, mouth, and throat – Drooling, Spasm of the voice box, Thick-feeling tongue
- Heart and blood - High blood pressure, Increased or decreased heart rate, Irregular heartbeat
- Kidneys and bladder Urinary incontinence, Urine output, decreased
- Muscles and joints - Muscle spasms
- Nervous system – Paralysis, Random movements of head, eye, or neck, Restlessness, Seizures, Stiffness
- Stomach and intestinal tract - Abdominal cramps, Fecal incontinence
- Other -Convulsions

Treatment

1. Recognize scorpion sting symptoms:
2. Wash the area with soap and water.
3. Apply a cool compress on the area of the scorpion sting. Ice (wrapped in a washcloth or other suitable covering) may be applied to the sting location for 10 minutes. Remove compress for 10 minutes and repeat as necessary.
4. Call the Poison Control Center. If you develop symptoms of a poisonous scorpion sting, go to the nearest emergency care facility.
5. Keep your tetanus shots and boosters current.
Fire Ants

Fire ants are aggressive, reddish-brown to black ants that are 1/8 inch to 1/4 inch long. They construct nests, which are often visible as dome-shaped mounds of soil, sometimes as large as 3 feet across and 1 1/2 feet in height. In sandy soils, mounds are flatter and less visible. Fire ants usually build mounds in sunny, open areas such as lawns, pastures, cultivated fields and meadows, but they are not restricted to these areas. Mounds or nests may be located in rotting logs, around trees and stumps, under pavement and buildings, and occasionally indoors.

Fire ants use their stingers to immobilize or kill prey and to defend ant mounds from disturbance by larger animals, such as humans. Any disturbance sends hundreds of workers out to attack anything that moves. The ant grabs its victim with its mandibles (mouthparts) and then inserts its stinger. The process of stinging releases a chemical, which alerts other ants, inducing them to sting. In addition, one ant can sting several times without letting go with its mandibles.

Once stung, humans experience a sharp pain that lasts a couple of minutes, then after a while the sting starts itching and a welt appears. Fire ant venom contains alkaloids and a relatively small amount of protein. The alkaloids kill skin cells; this attracts white blood cells, which form a pustule within a few hours of being stung. The fluid in the pustule is sterile, but if the pustule is broken, the wound may become infected. The protein in the venom can cause allergic reactions that may require medical attention.

Some of the factors related to stinging insects that increase the risk associated with accidental contact are:

- The nests for these insects are frequently found in remote wooded or grassy areas and hidden in cavities
- The nests can be situated in trees, rocks, bushes or in the ground, and are usually difficult to see
- Accidental contact with these insects is highly probable, especially during warm weather conditions when the insects are most active
- If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling which can leave the worker incapacitated and in need of medical attention
- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock
- Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth and respiratory passages
- The hypersensitivity needed to cause anaphylactic shock, can in some people, accumulate over time and exposure, therefore, even if someone has been stung previously, and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again

With these things in mind, and with the high probability of contact with stinging insects, use the following safe work practices:
- If a worker knows that he is hypersensitive to bee, wasp or hornet stings, inform the site Safety officer of this condition prior to participation in site activities.
- All site personnel will be watchful for the presence of stinging insects and their nests, and will advise the Site Safety officer if a stinging insect nest is located or suspected in the area.
- Any nests located on site will be flagged off and site personnel will be notified of its presence.
- If attacked, site personnel will immediately seek shelter and stay there. Do not jump in water (bees will still be in the area when you come up). Once safe, remove stings from your skin; it does not matter how you do it, but do it as quickly as possible to reduce the amount of venom they inject. Obtain first aid treatment and contact the safety officer who will observe for signs of allergic reaction.

Treatment for fire ant stings is aimed at preventing secondary bacterial infection, which may occur if the pustule is scratched or broken. Clean the blisters with soap and water to prevent secondary infection. Do not break the blister. Topical corticosteroid ointments and oral antihistamines may relieve the itching associated with these reactions.

Site personnel with a known hypersensitivity to stinging insects will keep required emergency medication on or near their person at all times.

**Spiders**

A large variety of spiders may be encountered during site activities. Extreme caution must be used when lifting logs and debris, since spiders are typically found in these areas.

While most spider bites merely cause localized pain, swelling, reddening, and in some cases, tissue damage, there are a few spiders that, due to the severity of the physiological affects caused by their venom, are dangerous. The UXOSO will brief site personnel as to the identification and avoidance of these dangerous spiders. These species include the black widow and the brown or violin spiders.

The black widow is a coal-black bulbous spider 3/4 to 1 1/2 inches in length, with a bright red hourglass on the under side of the abdomen. The black widow is usually found in dark moist locations, especially under rocks, rotting logs and may even be found in outdoor toilets where they inhabit the underside of the seat. Victims of a black widow bite may exhibit the following signs or symptoms:

- Sensation of pinprick or minor burning at the time of the bite
- Appearance of small punctures (but sometimes none are visible)
- After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils and generalized swelling of face and extremities

The brown or violin spider is brownish to tan in color, rather flat, 1/2 to 5/8 Spider inches long. However, unlike the typical species, the ones encountered at the former Fort Ord do not have a violin or “fiddle” shaped mark on the top of the head. Of the brown spider, there are three varieties found in the United States that present a problem to site personnel. These are the brown recluse, the desert violin and the
Arizona violin. These spiders may be found in a variety of locations including trees, rocks or in dark locations. Victims of a brown or violin spider bite may exhibit the following signs or symptoms:

- Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite
- Formation of a large, red, swollen, postulating lesion with a bull's-eye appearance
- Systemic affects may include a generalized rash, joint pain, chills, fever, nausea and vomiting
- Pain may become severe after 8 hours, with the onset of tissue necrosis

There is no effective first aid treatment for either of these bites. Except for very young, very old or weak victims, spider bites are not considered to be life threatening. However, medical treatment must be sought to reduce the extent of damage caused by the injected toxins.

### Brown Recluse Spider

### Black Widow Spider

First aid should include:

- If possible, catch the spider to confirm its identity. Even if the body is crushed, save it for identification
- Clean the bitten area with soap and water or rubbing alcohol
- To relieve pain, place an ice pack over the bite
- Keep the victim quiet and monitor breathing

Seek immediate medical attention
**Sensitivity Reaction to Insect Stings or Bites**

A sensitivity reaction is one of the more dangerous and acute effects of insect bites or stings. It is the most common cause of fatalities from bites, particularly from bees, wasps, and spiders. Anaphylactic shock due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous system. This can also result in death.

Site personnel must be questioned regarding their allergic reaction to insect bites. Anyone knowingly allergic should be required to carry and know how to use a response kit. First aid providers must be instructed on how to use the kit also. The kit must be inspected to ensure it is updated.

Administer first aid and observe persons reporting stings for signs of allergic reaction, such as unusual swelling, nausea, dizziness, and shock. At the first sign of these symptoms, take the individual to a medical facility for attention.

**Insect Borne Diseases**

Diseases that are spread by insects include the following: Rocky Mountain Spotted Fever or Lyme Disease (tick); Bubonic and other forms of Plaque (fleas); Malaria, West Nile Virus and Equine Encephalitis (mosquito) and Leshmaniasis (Sand Flies)

**Tick Borne Diseases**

Lyme disease is the second most rapidly spreading disease in the U.S.

**Lyme Disease**

1. Facts

Definition:
- Bacterial infection transmitted by the bite of an infected black-legged tick more popularly known as the deer tick.

- Prevalence (nationwide and other countries).

- Three stages/sizes of deer ticks:
  - Larvae
  - Nymph
  - Adult

Tick season is May through October.

Not all ticks transmit Lyme disease (Black legged or deer tick [upper] compared to the Lone Star tick [lower])
• Ticks must be attached for several hours before Lyme disease can be transmitted.

• Being bitten by a tick does not mean you will get Lyme disease.

2. Prevention and Protection:

• Wear light-colored, tight-knit clothing.

• Wear long pants and long-sleeved shirts.

• Tuck pant legs into shoes or boots.

• Wear a hat.

• Use insect repellant containing DEET ((follow manufacturer's instructions for use).

• Check yourself daily for ticks after being in grassy, wooded areas.

• Request information from the Health and Safety Medical Section regarding Lyme Disease.

3. If Bitten:

• Remove the tick immediately with fine-tipped tweezers. Grasp the tick as close to the skin as possible. Pull gently but firmly without twisting or crushing the tick.

• Wash your hands and dab the bite with an antiseptic.

• Save the tick in a jar in some alcohol. Label the jar with the date of the bite, the area where you picked up the tick and the spot on your body where you were bitten.
• Monitor the bite for any signs of infection or rash.

4. Symptoms:

Early Signs (may vary from person to person)

• Expanding skin rash.

• Flu-like symptoms during summer or early fall that include the following:
  - Chills, fever, headache, swollen lymph nodes.
  - Stiff neck, aching joints, and muscles.
  - Fatigue.

• Later signs
  - Nervous system problems.
  - Heart problems.
  - Arthritis, especially in knees.

5. Upon Onset of Symptoms:

• Notify your Safety Officer (SO) and your supervisor.

**Rocky Mountain Spotted Fever**

The Center for Disease Control (CDC) has noted the increase of Rocky Mountain Spotted Fever (RMSF) which is caused by bites from infected ticks that live in and near wooded areas, tall grass and brush.

RMSF has occurred in 36 states, with the heaviest concentrations in Oklahoma, North Carolina, South Carolina, and Virginia. Rocky Mountain spotted fever is the most severe and most frequently reported rickettsial illness in the United States. It also occurs in Mexico and in Central and South America. It is caused by Rocky Mountain Wood Ticks and Dog Ticks that have become infected with rickettsia. Both are black in color.

The disease is caused by *Rickettsia rickettsii*, a species of bacteria that is spread to humans by ixodid (hard) ticks.

Initial signs and symptoms of the disease include sudden onset of fever, headache, and muscle pain, followed by development of rash. The disease can be difficult to diagnose in the early stages, and without prompt and appropriate treatment it can be fatal.

Prevention procedures are the same as for Lyme disease.
Ehrlichiosis

Ehrlichiosis is the general name used to describe several bacterial diseases that affect animals and humans. These diseases are caused by the organisms in the genus *Ehrlichia*. Worldwide, there are currently four ehrlichial species that are known to cause disease in humans.

In the United States, ehrlichiae are transmitted by the bite of an infected tick. The lone star tick (*Amblyomma americanum*), the blacklegged tick (*Ixodes scapularis*), and the western blacklegged tick (*Ixodes pacificus*) are known vectors of ehrlichiosis in the United States. *Ixodes ricinus* is the primary vector in Europe.

The symptoms of ehrlichiosis may resemble symptoms of various other infectious and non-infectious diseases. These clinical features generally include fever, headache, fatigue, and muscle aches. Other signs and symptoms may include nausea, vomiting, diarrhea, cough, joint pains, confusion, and occasionally rash. Symptoms typically appear after an incubation period of 5-10 days following the tick bite. It is possible that many individuals who become infected with ehrlichiae do not become ill or they develop only very mild symptoms.

Most cases of ehrlichiosis are reported within the geographic distribution of the vector ticks (see map below). Occasionally, cases are reported from areas outside the distribution of the tick vector. In most instances, these cases have involved persons who traveled to areas where the diseases are endemic, and who had been bitten by an infected tick and developed symptoms after returning home. Therefore, if you traveled to an ehrlichiosis-endemic area 2 weeks prior to becoming ill, you should tell your doctor where you traveled.

**Figure 20. Areas where human ehrlichiosis may occur based on approximate distribution of vector tick species**

A diagnosis of ehrlichiosis is based on a combination of clinical signs and symptoms and confirmatory laboratory tests. Blood samples can be sent to a reference laboratory for testing. However, the availability of the different types of laboratory tests varies considerably. Other laboratory findings indicative of ehrlichiosis include low white blood cell count, low platelet count, and elevated liver enzymes.

Reviewed and Revised 25 January 2008
Ehrlichiosis is treated with a tetracycline antibiotic, usually doxycycline.

Very little is known about immunity to ehrlichial infections. Although it has been proposed that infection with ehrlichiae confers long-term protection against reinfection, there have been occasional reports of laboratory-confirmed reinfection. Short-term protection has been described in animals infected with some *Ehrlichia* species and this protection wanes after about 1 year. Clearly, more studies are needed to determine the extent and duration of protection against reinfection in humans.

Limiting exposure to ticks reduces the likelihood of infection in persons exposed to tick-infested habitats. Prompt careful inspection of your body and removal of crawling or attached ticks is an important method of preventing disease. It may take 24–48 hours of attachment before microorganisms are transmitted from the tick to you.

**Preventive measures - Follow protection protocols for Lyme disease**

**Babesiosis**

Babesiosis is an intraerythrocytic parasitic infection caused by protozoa of the genus *Babesia* and transmitted through the bite of the *Ixodes* tick, the same vector responsible for transmission of Lyme disease. While most cases are tick-borne, transfusion and transplacental transmission have been reported. In the United States, babesiosis is usually an asymptomatic infection in healthy individuals. Several groups of patients become symptomatic, and, within these subpopulations, significant morbidity and mortality occur. The disease most severely affects patients who are elderly, immunocompromised, or asplenic. Among those symptomatically infected, the mortality rate is 10% in the United States and 50% in Europe.

The primary vectors of the parasite are ticks of the genus *Ixodes*. In the United States, the black-legged tick, *Ixodes scapularis* (also known as *Ixodes dammini*) is the primary vector for the parasite; in Europe, *Ixodes ricinus* appears to be the primary tick vector. In each location, the *Ixodes* tick vector for *Babesia* is the same vector that locally transmits *Borrelia burgdorferi*, the agent implicated in Lyme disease. The primary US animal reservoir is the white-footed mouse, *Peromyscus leucopus*. Additionally, white-tailed deer serve as transport hosts for the adult tick vector, *I. scapularis*. In Europe, the primary animal reservoir is cattle.

The Ixodid ticks ingest *Babesia* during feeding from the host, multiply the protozoa in their gut wall, and concentrate it in their salivary glands. The tick inoculates a new host when feeding again. The parasite then infects red blood cells (RBCs) and differentiated and undifferentiated trophozoites are produced. The former produce 2-4 merozoites that disrupt the RBC and go on to invade other RBCs. This leads to hemolytic anemia, thrombocytopenia, and atypical lymphocyte formation. Alterations in RBC membranes cause decreased deformability and increased red cell adherence, which can lead to development of acute respiratory distress syndrome (ARDS) among those severely affected.
The first US case of babesiosis was reported on Nantucket Island in 1966. An increasing trend over the past 30 years may be the result of restocking of the deer population, curtailment of hunting, and an increase in outdoor recreational activities. Between 1968 and 1993, more than 450 cases of *Babesia* infections were confirmed in the United States. However, the actual prevalence of this disease is unknown because most infected patients are asymptomatic.

The first case of human babesiosis was reported in 1957 from the former Yugoslavia in an asplenic farmer. Approximately 40 cases have been reported since then, mostly in Ireland, the United Kingdom, and France. Sporadic case reports of babesiosis in Japan, Korea, China, Mexico, South Africa, and Egypt have also been documented.

The signs and symptoms mimic malaria and range in severity from asymptomatic to septic shock.

Symptoms include: Generalized weakness, fatigue, depression, fever, anorexia and weight loss, CNS - Headache, photophobia, neck stiffness, altered sensorium, pulmonary - Cough, shortness of breath, GI - Nausea, vomiting, abdominal pain, Musculoskeletal - Arthralgia and myalgia and Renal - Dark urine

**Prevention**

Prevention measures are the same as for Lyme and other insect borne diseases

**Tularemia**

*Tularemia* (also known as "rabbit fever") is a serious infectious disease caused by the bacterium *Francisella tularensis*. The disease is endemic in North America, and parts of Europe and Asia. The primary vectors are ticks and deer flies, but the disease can also be spread through other arthropods. Animals such as rabbits, prairie dogs, hares and muskrats serve as reservoir hosts. The disease is named after Tulare County, California.

Depending on the site of infection, tularemia has six characteristic clinical syndromes: ulceroglandular, glandular, oropharyngeal, pneumonic, oculoglandular, and typhoidal.

The disease has a very rapid onset, with headache, fatigue, dizziness, muscle pains, loss of appetite and nausea. Face and eyes redden and become inflamed. Inflammation spreads to the lymph nodes, which enlarge and may suppurate (mimicking bubonic plague). Lymph node involvement is accompanied by a high fever. Death may result.

*Francisella tularensis* is one of the most infective bacteria known; fewer than ten organisms can cause disease leading to severe illness. The bacteria penetrate into the body through damaged skin and mucous membranes, or through inhalation. Humans are most often infected by tick bite or through handling an infected animal. Ingesting infected water, soil, or food can also cause infection. Tularemia can also be acquired by inhalation; hunters are at a higher risk for this...
disease because of the potential of inhaling the bacteria during the skinning process. Tularemia is not spread directly from person to person. No vaccine is available to the general public. The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellant to prevent tick bites.

Prevention

No vaccine is available to the general public. The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellant to prevent tick bites.

Flea Borne Diseases

Plague

- **Bubonic plague**: enlarged, tender lymph nodes, fever, chills and prostration
- **Septicemic plague**: fever, chills, prostration, abdominal pain, shock and bleeding into skin and other organs
- **Pneumonic plague**: fever, chills, cough and difficulty breathing; rapid shock and death if not treated early

Introduction: Plague is an infectious disease of animals and humans caused by a bacterium named *Yersinia pestis*.

People usually get plague from being bitten by a rodent flea that is carrying the plague bacterium or by handling an infected animal. Millions of people in Europe died from plague in the Middle Ages, when human homes and places of work were inhabited by flea-infested rats. Today, modern antibiotics are effective against plague, but if an infected person is not treated promptly, the disease is likely to cause illness or death.

Risk: Wild rodents in certain areas around the world are infected with plague. Outbreaks in people still occur in rural communities or in cities. They are usually associated with infected rats and rat fleas that live in the home. In the United States, the last urban plague epidemic occurred in Los Angeles in 1924-25. Since then, human plague in the United States has occurred as mostly scattered cases in rural areas (an average of 10 to 15 persons each year). Globally, the
World Health Organization reports 1,000 to 3,000 cases of plague every year. In North America, plague is found in certain animals and their fleas from the Pacific Coast to the Great Plains, and from southwestern Canada to Mexico. Most human cases in the United States occur in two regions: 1) northern New Mexico, northern Arizona, and southern Colorado; and 2) California, southern Oregon, and far western Nevada. Plague also exists in Africa, Asia, and South America (see map).

**Diagnosis:** The typical sign of the most common form of human plague is a swollen and very tender lymph gland, accompanied by pain. The swollen gland is called a "bubo." Bubonic plague should be suspected when a person develops a swollen gland, fever, chills, headache, and extreme exhaustion, and has a history of possible exposure to infected rodents, rabbits, or fleas.

A person usually becomes ill with bubonic plague 2 to 6 days after being infected. When bubonic plague is left untreated, plague bacteria invade the bloodstream. As the plague bacteria multiply in the bloodstream, they spread rapidly throughout the body and cause a severe and often fatal condition. Infection of the lungs with the plague bacterium causes the pneumonic form of plague, a severe respiratory illness. The infected person may experience high fever, chills, cough, and breathing difficulty and may expel bloody sputum. If plague patients are not given specific antibiotic therapy, the disease can progress rapidly to death. About 14% (1 in 7) of all plague cases in the United States are fatal.

**Prevention and Control**

**Risk reduction:** Attempts to eliminate fleas and wild rodents from the natural environment in plague-infected areas are impractical. However, controlling rodents and their fleas around places where people live, work, and play is very important in preventing human disease. Therefore, preventive measures are directed to home, work, and recreational settings where the risk of acquiring plague is high. A combined approach using the following methods is recommended: environmental sanitation educating the public on ways to prevent plague exposures preventive antibiotic therapy

**Environmental Sanitation:** Effective environmental sanitation reduces the risk of persons being bitten by infectious fleas of rodents and other animals in places where people live, work, and recreate. It is important to remove food sources used by rodents and make homes, buildings, warehouses, or feed sheds rodent-proof. Applying chemicals that kill fleas and rodents is effective but should usually be done by trained professionals. Rats that inhabit ships and docks should also be controlled by trained professionals who can inspect and, if necessary, fumigate cargoes.

**Public Health Education:** In the western United States, where plague is widespread in wild rodents, people living, working, or playing where the infection is active face the greatest threat. Educating the general public and the medical community about how to avoid exposure to disease-bearing animals and their fleas is very important and should include the following preventive recommendations:
• Watch for plague activity in rodent populations where plague is known to occur. Report any observations of sick or dead animals to the local health department or law enforcement officials.

• Eliminate sources of food and nesting places for rodents around homes, work places, and recreation areas; remove brush, rock piles, junk, cluttered firewood, and potential-food supplies, such as pet and wild animal food. Make your home rodent-proof.

• If you anticipate being exposed to rodent fleas, apply insect repellents to clothing and skin, according to label instructions, to prevent flea bites. Wear gloves and tyvek coveralls when handling potentially infected animals.

• If you live in areas where rodent plague occurs, treat pet dogs and cats for flea control regularly and not allow these animals to roam freely.

• Health authorities may use appropriate chemicals to kill fleas at selected sites during animal plague outbreaks.

**Prophylactic (preventive) antibiotics:** Health authorities advise that antibiotics be given for a brief period to people who have been exposed to the bites of potentially infected rodent fleas (for example, during a plague outbreak) or who have handled an animal known to be infected with the plague bacterium. Such experts also recommend that antibiotics be given if a person has had close exposure to a person or an animal (for example, a house cat) with suspected plague pneumonia.

Persons who must be present in an area where a plague outbreak is occurring can protect themselves for 2 to 3 weeks by taking antibiotics. The preferred antibiotics for prophylaxis against plague are the tetracyclines or the sulfonamides.

**Other diseases primarily transmitted by Arthropods (Ticks, mites, lice etc.)**

**Rickettsial Infections**

Description

Many species of Rickettsia can cause illnesses in humans (Table below). The term “rickettsiae” conventionally embraces a polyphyletic group of microorganisms in the class Proteobacteria, comprising species belonging to the genera *Rickettsia*, *Orientia*, *Ehrlichia*, *Anaplasma*, *Neorickettsia*, *Coxiella*, and *Bartonella*. These agents are usually not transmissible directly from person to person except by blood transfusion or organ transplantation, although sexual and placental transmission has been proposed for *Coxiella*. Transmission generally occurs via an infected arthropod vector or through exposure to an infected animal reservoir host.

Some of the diseases transmitted in this manner (Typhus, Rocky Mountain Spotted Fever, Q Fever, Ehrlichiosis;) are discussed in detail in this and other Biological Hazard FLDs. A summary of these diseases is included in Attachment 1.
**Thyphus** (Not to be confused with Typhoid Fever [discussed in these FLDs])

*For the unrelated disease caused by Salmonella typhi, see Typhoid fever. For the unrelated disease caused by Salmonella paratyphi, please refer to Paratyphoid fever. For the monster of Greek mythology, see Typhus (monster).*

**Typhus** is any one of several similar diseases caused by louse-borne bacteria. The name comes from the Greek *typhos*, meaning smoky or lazy, describing the state of mind of those affected with typhus. *Rickettsia* is endemic in rodent hosts, including mice and rats, and spreads to humans through mites, fleas and body lice. The arthropod vector flourishes under conditions of poor hygiene, such as those found in prisons or refugee camps, amongst the homeless, or until the middle of the 20th century, in armies in the field. In tropical countries, typhus is often mistaken for dengue fever.

**Epidemic typhus**

Epidemic typhus (also called "Jail Fever", "Hospital Fever", "Ship fever", "Famine fever", "Petechial Fever", and "louse-borne typhus") is so named because the disease often causes epidemics following wars and natural disasters. The causative organism is *Rickettsia prowazekii*, transmitted by the human body louse (*Pediculus humanus corporis*). Feeding on a human who carries the bacillus infects the louse. *R. prowazekii* grows in the louse's gut and is excreted in its feces. The disease is then transmitted to an uninfected human who scratches the louse bite (which itches) and rubs the feces into the wound. The incubation period is one to two weeks. *R. prowazekii* can remain viable and virulent in the dried louse feces for many days. Typhus will eventually kill the louse, though the disease will remain viable for many weeks in the dead louse.

The symptoms set in quickly, and are among the most severe of the typhus family. They include severe headache, a sustained high fever, cough, rash, severe muscle pain, chills, falling blood pressure, stupor, sensitivity to light, and delirium. A rash begins on the chest about five days after the fever appears, and spreads to the trunk and extremities but does not reach the palms and soles. A symptom common to all forms of typhus is a fever which may reach 39°C (102°F).

The infection is treated with antibiotics. Intravenous fluids and oxygen may be needed to stabilize the patient. The mortality rate is 10% to 60%, but is vastly lower if antibiotics such as tetracycline are used early. Infection can also be prevented via vaccination. Brill-Zinsser disease is a mild form of epidemic typhus which recurs in someone after a long period of latency (similar to the relationship between chickenpox and shingles). This type of recurrence can also occur in immunosuppressed patients.

**Endemic typhus**

Endemic typhus (also called "flea-borne typhus" and "murine typhus" or "rat flea typhus") is caused by the bacteria *Rickettsia typhi*, and is transmitted by the fleas that infest rats. Less often, endemic typhus is caused by *Rickettsia felis* and transmitted by fleas carried by cats or possums.
Symptoms of endemic typhus include headache, fever, chills, myalgia, nausea, vomiting, and cough.

Endemic typhus is highly treatable with antibiotics. Most people recover fully, but death may occur in the elderly, severely disabled or patients with a depressed immune system.

**Scrub typhus**

Scrub typhus (also called "chigger-borne typhus") is caused by Orientia tsutsugamushi and transmitted by chiggers, which are found in areas of heavy scrub vegetation. Symptoms include fever, headache, muscle pain, cough, and gastrointestinal symptoms. More virulent strains of *O. tsutsugamushi* can cause hemorrhaging and intravascular coagulation.

**Prevention**

Limiting exposures to vectors or animal reservoirs remains the best means for reducing the risk for disease. Travelers and persons working in areas where organisms may be present should implement prevention based on avoidance of vector-infested habitats, use of repellents and protective clothing, prompt detection and removal of arthropods from clothing and skin, and attention to hygiene.

Typhus fever was categorized by the Center for Disease Control (CDC) as a Category B biological weapons agent. Rickettsia prowazekii is highly infectious and could be fatal but cannot be passed from person to person.

**Encephalitis Arboviral Encephalitides**

**Perspectives**

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the Togaviridae (genus Alphavirus, Flaviviridae, and Bunyaviridae).

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).
Arboviral encephalitides have a global distribution, but there are four main virus agents of encephalitis in the United States: eastern equine encephalitis (EEE), western equine encephalitis (WEE), St. Louis encephalitis (SLE) and La Crosse (LAC) encephalitis, all of which are transmitted by mosquitoes. Another virus, Powassan, is a minor cause of encephalitis in the northern United States, and is transmitted by ticks. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

There is expanded discussion of several of these diseases (West Nile and Eastern Equine Encephalitis elsewhere in this document. A more general discussion is found in Attachment 2.
Mosquito Borne Diseases

Malaria

Malaria is a mosquito-borne disease caused by a parasite. Four kinds of malaria parasites can infect humans: Plasmodium falciparum, P. vivax, P. ovale, and P. malariae.

People with malaria often experience fever, chills, and flu-like illness. Left untreated, they may develop severe complications and die. Each year 350-500 million cases of malaria occur worldwide, and over one million people die, most of them young children in sub-Saharan Africa. Infection with any of the malaria species can make a person feel very ill; infection with P. falciparum, if not promptly treated, may be fatal. Although malaria can be a fatal disease, illness and death from malaria are largely preventable.

This sometimes fatal disease can be prevented and cured. Bed nets, insecticides, and anti-malarial drugs are effective tools to fight malaria in areas where it is transmitted. Travelers to a malaria-risk area should avoid mosquito bites and take a preventive anti-malarial drug. Malaria was eradicated from the United States in the early 1950s. However, malaria is common in many developing countries and travelers who visit these areas risk getting malaria.

Returning travelers and arriving immigrants could also reintroduce the disease in the United States if they are infected with malaria when they return. The mosquito that transmits malaria, Anopheles, is found throughout much of the United States. If local mosquitoes bite an infected person, those mosquitoes can, in turn, infect local residents (introduced malaria).

Because the malaria parasite is found in red blood cells, malaria can also be transmitted through blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood. Malaria may also be transmitted from a mother to her fetus before or during delivery ("congenital" malaria).

Malaria is not transmitted from person to person like a cold or the flu. You cannot get malaria from casual contact with malaria-infected people.

Prevention and control

You can prevent malaria by:
• keeping mosquitoes from biting you, especially at night
• taking anti-malarial drugs to kill the parasites
• eliminating places where mosquitoes breed
• spraying insecticides on walls to kill adult mosquitoes that come inside
• sleeping under bed nets - especially effective if they have been treated with insecticide,
• wearing insect repellent and long-sleeved clothing if out of doors at night

The surest way for you and your health-care provider to know whether you have malaria is to have a diagnostic test where a drop of your blood is examined under the microscope for the presence of malaria parasites. If you are sick and there is any suspicion of malaria (for example, if you have recently traveled in a malaria-risk area) the test should be performed without delay.

The disease should be treated early in its course, before it becomes severe and poses a risk to the patient's life. Several good anti-malarial drugs are available, and should be administered early on. The most important step is to think about malaria, so that the disease is diagnosed and treated in time.

West Nile Virus

West Nile virus (WNV) is a potentially serious illness. Experts believe WNV is established as a seasonal epidemic in North America that flares up in the summer and continues into the fall. This fact sheet contains important information that can help you recognize and prevent WNV.

The easiest and best way to avoid WNV is to prevent mosquito bites.

• When you are outdoors, use insect repellent containing an EPA-registered active ingredient. Follow the directions on the package.

• Many mosquitoes are most active at dusk and dawn. Be sure to use insect repellent and wear long sleeves and pants at these times or consider staying indoors during these hours.

• Make sure you have good screens on your windows and doors to keep mosquitoes out.

• Get rid of mosquito breeding sites by emptying standing water from buckets, barrels and drainage ditches.

About one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.

Up to 20 percent of the people who become infected have symptoms such as fever, headache, and body aches, nausea, vomiting, and sometimes swollen lymph glands or a skin rash on the
chest, stomach and back. Symptoms can last for as short as a few days, though even healthy people have become sick for several weeks.

Approximately 80 percent of people (about 4 out of 5) who are infected with WNV will not show any symptoms at all. Most often, WNV is spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then spread WNV to humans and other animals when they bite.

In a very small number of cases, WNV also has been spread through blood transfusions, organ transplants, breastfeeding and even during pregnancy from mother to baby.

WNV is not spread through casual contact such as touching or kissing a person with the virus.

Symptoms typically develop between 3 - 14 days after being bitten by an infected mosquito.

There is no specific treatment for WNV infection. In cases with milder symptoms, people experience symptoms such as fever and aches that pass on their own, although even healthy people have become sick for several weeks. In more severe cases, people usually need to go to the hospital where they can receive supportive treatment including intravenous fluids, help with breathing and nursing care.

Milder WNV illness improves on its own, and people do not necessarily need to seek medical attention for this infection though they may choose to do so. If you develop symptoms of severe WNV illness, such as unusually severe headaches or confusion, seek medical attention immediately. Severe WNV illness usually requires hospitalization. Pregnant women and nursing mothers are encouraged to talk to their doctor if they develop symptoms that could be WNV. People over the age of 50 are more likely to develop serious symptoms of WNV if they do get sick and should take special care to avoid mosquito bites.

The more time you're outdoors, the more time you could be bitten by an infected mosquito. Pay attention to avoiding mosquito bites if you spend a lot of time outside, either working or playing.

All donated blood is checked for WNV before being used. The risk of getting WNV through blood transfusions and organ transplants is very small, and should not prevent people who need surgery from having it. If you have concerns, talk to your doctor.

**Equine Encephalitis**

Eastern equine encephalitis (EEE) is a mosquito-borne viral disease. EEE virus (EEEV) occurs in the eastern half of the United States where it causes disease in humans, horses, and some bird species. Because of the high mortality rate, EEE is regarded as one of the most serious mosquito-borne diseases in the United States.

EEEV is transmitted to humans through the bite of an infected mosquito. It generally takes from
3 to 10 days to develop symptoms of EEE after being bitten by an infected mosquito. The main EEEV transmission cycle is between birds and mosquitoes.

Many species of mosquitoes can become infected with EEEV. The most important mosquito species in maintaining the bird-mosquito transmission cycle is *Culiseta melanura*, which reproduces in freshwater hardwood swamps. *Culiseta melanura*, however, is not considered to be an important vector of EEEV to horses or humans because it feeds almost exclusively on birds.

Transmission to horses or humans requires mosquito species capable of creating a “bridge” between infected birds and uninfected mammals such as some *Aedes*, *Coquillettidia*, and *Culex* species.

Horses are susceptible to EEE and some cases are fatal. EEEV infections in horses, however, are not a significant risk factor for human infection because horses are considered to be “dead-end” hosts for the virus (i.e., the amount of EEEV in their bloodstreams is usually insufficient to infect mosquitoes).

Eastern equine encephalitis virus is a member of the family Togaviridae, genus *Alphavirus* closely related to Western equine encephalitis virus and Venezuelan equine encephalitis virus.

Many persons infected with EEEV have no apparent illness. In those persons who do develop illness, symptoms range from mild flu-like illness to inflammation of the brain, coma and death.

The mortality rate from EEE is approximately one-third, making it one of the most deadly mosquito-borne diseases in the United States.

There is no specific treatment for EEE; optimal medical care includes hospitalization and supportive care (for example, expert nursing care, respiratory support, prevention of secondary bacterial infections, and physical therapy, depending on the situation).

Approximately half of those persons who survive EEE will have mild to severe permanent neurologic damage.

Incidence rate includes:

- Approximately 220 confirmed cases in the US 1964-2004, Average of 5 cases/year, with a range from 0-15 cases
- States with largest number of cases are Florida, Georgia, Massachusetts, and New Jersey.
- EEEV transmission is most common in and around freshwater hardwood swamps in the Atlantic and Gulf Coast states and the Great Lakes region.
- Human cases occur relatively infrequently, largely because the primary transmission cycle takes place in and around swampy areas where human populations tend to be limited.
Risk Groups:

- Residents of and visitors to endemic areas (areas with an established presence of the virus)
- People who engage in outdoor work and recreational activities in endemic areas.
- Persons over age 50 and younger than age 15 seem to be at greatest risk for developing severe EEE when infected with the virus.

Prevention

- A vaccine is available to protect equines.
- People should avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers’ instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active (some bridge vectors of EEEV are aggressive day-biters), and removing standing water that can provide mosquito breeding sites.
- There are laboratory tests to diagnosis EEEV infection including serology, especially IgM testing of serum and cerebrospinal fluid (CSF), and neutralizing antibody testing of acute- and convalescent-phase serum.

Yellow Fever

Yellow fever is an acute viral disease. It is an important cause of hemorrhagic illness in many African and South American countries despite existence of an effective vaccine. The yellow refers to the jaundice symptoms that affect some patients.

Yellow fever is caused by an arbovirus of the family Flaviviridae, a positive single-stranded RNA virus. Human infection begins after deposition of viral particles through the skin in infected arthropod saliva. The mosquitoes involved are *Aedes simpsaloni*, *A. africanus*, and *A. aegypti* in Africa, the Haemagogus genus in South America.

The virus remains silent in the body during an incubation period of three to six days. There are then two disease phases. While some infections have no symptoms the first, acute phase is normally characterized by fever, muscle pain (with prominent backache), headache, shivers, loss of appetite, and nausea or vomiting. The high fever is often paradoxically associated with a slow pulse (known as Faget's sign). After three or four days most patients improve and their symptoms disappear.

Fifteen percent of patients, however, enter a toxic phase within 24 hours. Fever reappears and several body systems are affected. The patient rapidly develops jaundice and complains of abdominal pain with vomiting. Bleeding can occur from the mouth, nose, eyes, and stomach. Once this happens, blood appears in the vomit and feces. Kidney function deteriorates; this can range from abnormal protein levels in the urine (proteinuria) to complete kidney failure with no
urine production (anuria). Half of the patients in the "toxic phase" die within fourteen days. The remainder recover without significant organ damage.

Yellow fever is difficult to recognize, especially during the early stages. It can easily be confused with malaria, typhoid, rickettsial diseases, haemorrhagic viral fevers (e.g. Lassa), arboviral infections (e.g. dengue), leptospirosis, viral hepatitis and poisoning (e.g. carbon tetrachloride). A laboratory analysis is required to confirm a suspect case.

**Prevention**

There is a vaccine for yellow fever that gives a ten-year or more immunity from the disease and effectively protects people traveling to affected areas. The vaccination may be required for entry to some countries, however, the vaccine may be contra-indicated for person over 60 years of age.

Use precautions as for other mosquito borne diseases. Avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers’ instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active and removing standing water that can provide mosquito breeding sites.

**Meningitis**

Meningitis is a viral disease that can affect the central nervous system.

Meningitis is encountered in agricultural regions of Asia.

Meningitis is transmitted through the bite from an infected mosquito.

Symptoms can be nonexistent or severe and flu-like, with fever, chills, tiredness, headache, nausea and vomiting. If not treated promptly the disease can be fatal.

**Prevention**

- A vaccine is available. It’s 80% effective after a single dose and 97.5% effective after a second dose.

  Use precautions as for other mosquito borne diseases. Avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers’ instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active and removing standing water that can provide mosquito breeding sites.
Sand Flies

Leishmaniasis

Leishmaniasis (LEASH-ma-NIGH-a-sis) is a parasitic disease spread by the bite of infected sand flies. There are several different forms of leishmaniasis. The most common forms are cutaneous leishmaniasis, which causes skin sores, and visceral leishmaniasis, which affects some of the internal organs of the body (for example, spleen, liver, bone marrow).

People who have cutaneous leishmaniasis have one or more sores on their skin. The sores can change in size and appearance over time. They often end up looking somewhat like a volcano, with a raised edge and central crater. Some sores are covered by a scab. The sores can be painless or painful. Some people have swollen glands near the sores (for example, under the arm if the sores are on the arm or hand).

People who have visceral leishmaniasis usually have fever, weight loss, and an enlarged spleen and liver (usually the spleen is bigger than the liver). Some patients have swollen glands. Certain blood tests are abnormal. For example, patients usually have low blood counts, including a low red blood cell count (anemia), low white blood cell count, and low platelet count.

The number of new cases of cutaneous leishmaniasis each year in the world is thought to be about 1.5 million. The number of new cases of visceral leishmaniasis is thought to be about 500,000.

Leishmaniasis is found in parts of about 88 countries. Approximately 350 million people live in these areas. Most of the affected countries are in the tropics and subtropics. The settings in which leishmaniasis is found range from rain forests in Central and South America to deserts in West Asia. More than 90 percent of the world's cases of visceral leishmaniasis are in India, Bangladesh, Nepal, Sudan, and Brazil.

Leishmaniasis is found in some parts of the following areas:
- in Mexico, Central America, and South America -- from northern Argentina to Texas (not in Uruguay, Chile, or Canada)
- southern Europe (leishmaniasis is not common in travelers to southern Europe)
- Asia (not Southeast Asia)
- the Middle East
- Africa (particularly East and North Africa, with some cases elsewhere)

Leishmaniasis is not found in Australia or Oceania (that is, islands in the Pacific, including Melanesia, Micronesia, and Polynesia).

It is possible but very unlikely that you would get leishmaniasis in the United States. Very rarely, people living in Texas have developed skin sores from cutaneous leishmaniasis.

No cases of visceral leishmaniasis are known to have been acquired in the United States.

Leishmaniasis is spread by the bite of some types of phlebotomine sand flies. Sand flies become infected by biting an infected animal (for example, a rodent or dog) or person. Since sand flies do not make noise when they fly, people may not realize they are present. Sand flies are very small and may be hard to see; they are only about one-third the size of typical mosquitoes. Sand flies usually are most active in twilight, evening, and night-time hours (from dusk to dawn). Sand flies are less active during the hottest time of the day. However, they will bite if they are disturbed, such as when a person brushes up against the trunk of a tree where sand flies are resting. Rarely, leishmaniasis is spread from a pregnant woman to her baby. Leishmaniasis also can be spread by blood transfusions or contaminated needles.

People of all ages are at risk for leishmaniasis if they live or travel where leishmaniasis is found. Leishmaniasis usually is more common in rural than urban areas; but it is found in the outskirts of some cities. The risk for leishmaniasis is highest from dusk to dawn because this is when sand flies are the most active. All it takes to get infected is to be bitten by one infected sand fly. This is more likely to happen the more people are bitten, that is, the more time they spend outside in rural areas from dusk to dawn.

People with cutaneous leishmaniasis usually develop skin sores within a few weeks (sometimes as long as months) of when they were bitten.

People with visceral leishmaniasis usually become sick within several months (rarely as long as years) of when they were bitten.

The skin sores of cutaneous leishmaniasis will heal on their own, but this can take months or even years. The sores can leave ugly scars. If not treated, infection that started in the skin rarely spreads to the nose or mouth and causes sores there (mucosal leishmaniasis). This can happen with some of the types of the parasite found in Central and South America. Mucosal leishmaniasis might not be noticed until years after the original skin sores healed. The best way to prevent mucosal leishmaniasis is to treat the cutaneous infection before it spreads.
If not treated, visceral leishmaniasis can cause death. It is very rare for travelers to get visceral leishmaniasis.

If you think you might have leishmaniasis, report to your Safety Officer to ensure appropriate follow-up. The first step is to find out if you have traveled to a part of the world where leishmaniasis is found. The health care provider will ask you about any signs or symptoms of leishmaniasis you may have, such as skin sores that have not healed. If you have skin sores, the health care provider will likely want to take some samples directly from the sores. These samples can be examined for the parasite under a microscope, in cultures, and through other means. A blood test for detecting antibody (immune response) to the parasite can be helpful, particularly for cases of visceral leishmaniasis. However, tests to look for the parasite itself should also be done. Diagnosing leishmaniasis can be difficult. Sometimes the laboratory tests are negative even if a person has leishmaniasis.

The health care provider can talk with CDC staff about whether a case of leishmaniasis should be treated, and, if so, how. Most people who have cutaneous leishmaniasis do not need to be hospitalized during their treatment.

**Prevention**

The best way prevent leishmaniasis is by protecting against sand fly bites. Vaccines and drugs for preventing infection are not yet available. To decrease risk of being bitten:

- Stay in well-screened or air-conditioned areas as much as possible. Avoid outdoor activities, especially from dusk to dawn, when sand flies are the most active.

- When outside, wear long-sleeved shirts, long pants, and socks. Tuck your shirt into your pants.

- Apply insect repellent on uncovered skin and under the ends of sleeves and pant legs. Follow the instructions on the label of the repellent. The most effective repellents are those that contain the chemical DEET (N,N-diethylmetatoluamide). The concentration of DEET varies among repellents. Repellents with DEET concentrations of 30-35% are quite effective, and the effect should last about 4 hours. Lower concentrations should be used for children (no more than 10% DEET). Repellents with DEET should be used sparingly on children from 2 to 6 years old and not at all on children less than 2 years old.

- Spray clothing with permethrin-containing insecticides. The insecticide should be reapplied after every five washings.

- Spray living and sleeping areas with an insecticide to kill insects.

- If you are not sleeping in an area that is well screened or air-conditioned, use a bed net and tuck it under your mattress. If possible, use a bed net that has been soaked in or sprayed with permethrin. The permethrin will be effective for several months if the bed net is not washed. Keep in mind that sand flies are much smaller than mosquitoes and therefore can get through
smaller holes. Fine-mesh netting (at least 18 holes to the inch; some sources say even finer) is needed for an effective barrier against sand flies. This is particularly important if the bed net has not been treated with permethrin. However, it may be uncomfortable to sleep under such a closely woven bed net when it is hot.

**NOTE:** Bed nets, repellents containing DEET, and permethrin may need to be purchased before traveling and can be found in hardware, camping, and military surplus stores.

**Deer Flies (See Tularemia above)**
ATTACHMENT 1

RICKETTSIAL INFECTIONS
**Rickettsial Infections**

Description

Many species of Rickettsia can cause illnesses in humans (Table below). The term “rickettsiae” conventionally embraces a polyphyletic group of microorganisms in the class Proteobacteria, comprising species belonging to the genera *Rickettsia*, *Orientia*, *Ehrlichia*, *Anaplasma*, *Neorickettsia*, *Coxiella*, and *Bartonella*. These agents are usually not transmissible directly from person to person except by blood transfusion or organ transplantation, although sexual and placental transmission has been proposed for *Coxiella*. Transmission generally occurs via an infected arthropod vector or through exposure to an infected animal reservoir host. However, sennetsu fever is acquired following consumption of raw fish products. The clinical severity and duration of illnesses associated with different rickettsial infections vary considerably, even within a given antigenic group. Rickettsioses range in severity from diseases that are usually relatively mild (rickettsialpox, cat scratch disease, and African tick-bite fever) to those that can be life-threatening (epidemic and murine typhus, Rocky Mountain spotted fever, scrub typhus and Oroya fever), and they vary in duration from those that can be self-limiting to chronic (Q fever and bartonelloses) or recrudescent (Brill-Zinsser disease). Most patients with rickettsial infections recover with timely use of appropriate antibiotic therapy.

Travelers may be at risk for exposure to agents of rickettsial diseases if they engage in occupational or recreational activities which bring them into contact with habitats that support the vectors or animal reservoir species associated with these pathogens.

The geographic distribution and the risks for exposure to rickettsial agents are described below and in the Table below.

**Epidemic Typhus and Trench Fever**

Epidemic typhus and trench fever, which are caused by *Rickettsia prowazkeii* and *Bartonella quintanta*, respectively, are transmitted from one person to another by the human body louse. Contemporary outbreaks of both diseases are rare in most developed countries and generally occur only in communities and populations in which body louse infestations are frequent, especially during the colder months when louse-infested clothing is not laundered. Foci of trench fever have also been recognized among homeless populations in urban centers of industrialized countries. Travelers who are not at risk of exposure to body lice or to persons with lice are unlikely to acquire these illnesses. However, health-care workers who care for these patients may be at risk for acquiring louse-borne illnesses through inhalation or inoculation of infectious louse feces into the skin or conjunctiva. In the eastern United States, campers, inhabitants of wooded areas, and wildlife workers can acquire sylvatic epidemic typhus if they come in close contact with flying squirrels, their ectoparasites, or their nests, which can be made in houses, cabins, and tree-holes.
Murine Typhus and Cat-Flea Rickettsiosis

Murine typhus, which is caused by infection with *Rickettsia typhi*, is transmitted to humans by rat fleas, particularly during exposure in rat-infested buildings (3). Flea-infested rats can be found throughout the year in humid tropical environments, especially in harbor or riverine environments. In temperate regions, they are most common during the warm summer months. Similarly, cat-flea rickettsiosis, which is caused by infection with *Rickettsia felis*, occurs worldwide from exposure to flea-infested domestic cats and dogs, as well as peridomestic animals, and is responsible for a murine typhus-like febrile disease in humans.

Scrub Typhus

Mites (“chiggers”) transmit *Orientia tsutsugamushi*, the agent of scrub typhus, to humans. These mites occur year-round in a large area from South Asia to Australia and in much of East Asia, including Japan, China, Korea, Maritime Provinces and Sakhalin Island of Russia, and Tajikistan. Their prevalence, however, fluctuates with temperature and rainfall. Infection may occur on coral atolls in both the Indian and Pacific Oceans, in rice paddies and along canals and fields, on oil palm plantations, in tropical to desert climates and in elevated river valleys. Humans typically encounter the arthropod vector of scrub typhus in recently disturbed habitat (e.g., forest clearings) or other persisting mite foci infested with rats and other rodents.

Tick-Borne Rickettsioses

Tick-borne rickettsial diseases are most common in temperate and subtropical regions. These diseases include numerous well-known classical spotted fever rickettsioses and an expanding group of newly recognized diseases (Table belwo). In general, peak transmission of tick-borne rickettsial pathogens occurs during spring and summer months. Travelers who participate in outdoor activities in grassy or wooded areas (e.g., trekking, camping, or going on safari) may be at risk for acquiring tick-borne illnesses, including those caused by *Rickettsia, Anaplasma*, and *Ehrlichia* species (see below).

**TABLE** Epidemiologic features and symptoms of rickettsial diseases

<table>
<thead>
<tr>
<th>ANTIGENIC GROUP</th>
<th>DISEASE</th>
<th>AGENT</th>
<th>PREDOMINANT SYMPTOMS*</th>
<th>VECTOR OR ACQUISITION MECHANISM</th>
<th>ANIMAL RESERVOIR</th>
<th>GEOGRAPHIC DISTRIBUTION OUTSIDE THE US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhus fevers</td>
<td>Epidemic typhus, Sylvatic typhus</td>
<td><em>Rickettsia prowazekii</em></td>
<td>Headache, chills, fever, prostration, confusion, photophobia, vomiting, rash (generally starting on trunk)</td>
<td>Human body louse, squirrel flea and louse</td>
<td>Humans, flying squirrels (US)</td>
<td>Cool mountainous regions of Africa, Asia, and Central and South America</td>
</tr>
<tr>
<td></td>
<td>Murine typhus</td>
<td><em>R. typhi</em></td>
<td>As above, generally less severe</td>
<td>Rat flea</td>
<td>Rats, mice</td>
<td>Worldwide</td>
</tr>
<tr>
<td>Spotted fevers</td>
<td>African tickbite fever</td>
<td><em>R. africae</em></td>
<td>Fever, eschar(s), regional adenopathy</td>
<td>Tick</td>
<td>Rodents</td>
<td>Sub-Saharan Africa</td>
</tr>
<tr>
<td>ANTIGENIC GROUP</td>
<td>DISEASE</td>
<td>AGENT</td>
<td>PREDOMINANT SYMPTOMS*</td>
<td>VECTOR OR ACQUISITION MECHANISM</td>
<td>ANIMAL RESERVOIR</td>
<td>GEOGRAPHIC DISTRIBUTION OUTSIDE THE US</td>
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</tr>
<tr>
<td></td>
<td>Aneruptive fever</td>
<td><em>R. helvetica</em></td>
<td>Maculopapular or vesicular rash substle or absent</td>
<td>Tick</td>
<td>Rodents</td>
<td>Old World</td>
</tr>
<tr>
<td></td>
<td>Australian spotted fever</td>
<td><em>R. marmionii</em></td>
<td>Fever, eschar, maculopapular or vesicular rash, adenopathy</td>
<td>Tick</td>
<td>Rodents, reptiles</td>
<td>Australia</td>
</tr>
<tr>
<td></td>
<td>Cat flea rickettsiosis</td>
<td><em>R. felis</em></td>
<td>As murine typhus, generally less severe</td>
<td>Tick</td>
<td>Domestic cats, opossums</td>
<td>Europe, South America</td>
</tr>
<tr>
<td></td>
<td>Far Eastern spotted fever</td>
<td><em>R. helongjiangensis</em></td>
<td>Fever, eschar, maculopapular rash, lymphadenopathy, enlarged lymph nodes</td>
<td>Tick</td>
<td>Rodents</td>
<td>Far East of Russia, Northern China</td>
</tr>
<tr>
<td></td>
<td>Flinders Island spotted fever, Thai tick typhus</td>
<td><em>R. honei</em></td>
<td>Mild spotted fever, eschar and adenopathy are rare</td>
<td>Tick</td>
<td>Not defined</td>
<td>Australia, Thailand</td>
</tr>
<tr>
<td></td>
<td>Lymphangitis associated rickettsiosis</td>
<td><em>R. sibirica</em> subsp. mongolotimonae</td>
<td>Fever, multiple eschars, regional adenopathy and lymphangitis, maculopapular rash</td>
<td>Tick</td>
<td>Rodents</td>
<td>Southern France, Portugal, Asia, Africa</td>
</tr>
<tr>
<td></td>
<td>Maculatum infection</td>
<td><em>R. parkeri</em></td>
<td>Fever, eschar, rash maculopapular to vesicular</td>
<td>Tick</td>
<td>Rodents</td>
<td>Brazil, Uruguay</td>
</tr>
<tr>
<td></td>
<td>Mediterranean spotted fevers‡</td>
<td><em>R. conorii</em></td>
<td>Fever, eschar, regional adenopathy, maculopapular rash on extremities</td>
<td>Tick</td>
<td>Dogs, rodents</td>
<td>Africa, India, Europe, Middle East, Mediterranean</td>
</tr>
<tr>
<td></td>
<td>North Asian tick typhus</td>
<td><em>R. sibirica</em></td>
<td>Fever, eschar(s), regional adenopathy, maculopapular rash</td>
<td>Tick</td>
<td>Rodents</td>
<td>Russia, China, Mongolia</td>
</tr>
<tr>
<td></td>
<td>Oriental spotted fever</td>
<td><em>R. japonica</em></td>
<td>As above</td>
<td>Tick</td>
<td>Rodents</td>
<td>Japan</td>
</tr>
<tr>
<td></td>
<td>Queensland tick</td>
<td><em>R. australis</em></td>
<td>Fever, eschar,</td>
<td>Tick</td>
<td>Not defined</td>
<td>Australia,</td>
</tr>
<tr>
<td>ANTIGENIC GROUP</td>
<td>DISEASE</td>
<td>AGENT</td>
<td>PREDOMINANT SYMPTOMS*</td>
<td>VECTOR OR ACQUISITION MECHANISM</td>
<td>ANIMAL RESERVOIR</td>
<td>GEOGRAPHIC DISTRIBUTION OUTSIDE THE US</td>
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</tr>
<tr>
<td>typhus</td>
<td></td>
<td></td>
<td>regional adenopathy, rash on extremities</td>
<td></td>
<td></td>
<td>Tasmania</td>
</tr>
<tr>
<td>Rickettsialpox</td>
<td>R. akari</td>
<td></td>
<td>Fever, eschar, adenopathy, disseminated vesicular rash</td>
<td>Mite</td>
<td>House mice</td>
<td>Russia, South Africa, Korea, Turkey, Balkan countries</td>
</tr>
<tr>
<td>Rocky Mountain spotted fever, Sao Paulo exanthematic typhus, Minas Gerais exanthematic typhus, Brazilian spotted fever</td>
<td>R. rickettsii</td>
<td></td>
<td>Headache, fever, abdominal pain, macular rash progressing into papular or petechial (generally starting on extremities)</td>
<td>Tick</td>
<td>Rodents</td>
<td>Mexico, Central, and South America</td>
</tr>
<tr>
<td>Tick-borne lymphadenopathy (TIBOLA), Dermacentor-borne necrosis and lymphadenopathy (DEBONEL)</td>
<td>R. slovaca</td>
<td></td>
<td>Necrosis erythema, cervical lymphadenopathy and enlarged lymph nodes, rare maculopapular rash</td>
<td>Tick</td>
<td>Lagomorphs, rodents</td>
<td>Europe, Asia</td>
</tr>
<tr>
<td>Unnamed rickettsiosis</td>
<td>R. aeschlimannii</td>
<td></td>
<td>Fever, eschar, maculopapular rash</td>
<td>Tick</td>
<td>Domestic and wild animals</td>
<td>Africa</td>
</tr>
<tr>
<td>Orientia Scrub typhus</td>
<td>Orientia tsutsugamushi</td>
<td></td>
<td>Fever, headache, sweating, conjunctival injection, adenopathy, eschar, rash (starting on trunk), respiratory distress</td>
<td>Mite</td>
<td>Rodents</td>
<td>South, Central, Eastern, and Southeast Asia and Australia</td>
</tr>
<tr>
<td>Coxiella Q fever</td>
<td>Coxiella burnetii</td>
<td></td>
<td>Fever, headache, chills, sweating, pneumonia, hepatitis, endocarditis</td>
<td>Most human infections are acquired by inhalation of infectious aerosols; tick</td>
<td>Goats, sheep, cattle, domestic cats, other</td>
<td>Worldwide</td>
</tr>
<tr>
<td>ANTIGENIC GROUP</td>
<td>DISEASE</td>
<td>AGENT</td>
<td>PREDOMINANT SYMPTOMS*</td>
<td>VECTOR OR ACQUISITION MECHANISM</td>
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</tr>
<tr>
<td>Bartonella</td>
<td>Cat-scratch disease</td>
<td><em>Bartonella henselae</em></td>
<td>Fever, adenopathy, neuroretinitis, encephalitis</td>
<td>Cat flea</td>
<td>Domestic cats</td>
<td>Worldwide</td>
</tr>
<tr>
<td></td>
<td>Trench fever</td>
<td><em>B. quintana</em></td>
<td>Fever, headache, pain in shins, splenomegaly, disseminated rash</td>
<td>Human body louse</td>
<td>Humans</td>
<td>Worldwide</td>
</tr>
<tr>
<td>Ehrlichia</td>
<td>Oroya fever</td>
<td><em>B. bacilliformis</em></td>
<td>Fever, headache, anemia, shifting joint and muscle pain, nodular dermal eruption</td>
<td>Sand fly</td>
<td>Unknown</td>
<td>Peru, Ecuador, Colombia</td>
</tr>
<tr>
<td>Anaplasma</td>
<td>Anaplasmosis</td>
<td><em>Anaplasma phagocytophilum</em></td>
<td>Fever, headache, nausea, occasionally rash</td>
<td>Tick</td>
<td>Various large and small mammals, including deer and rodents</td>
<td>Worldwide</td>
</tr>
<tr>
<td>Neorickettsia</td>
<td>Sennetsu fever</td>
<td><em>Neorickettsia sennetsu</em></td>
<td>Fever, chills, headache, sore throat, insomnia</td>
<td>Fish, fluke</td>
<td>Fish</td>
<td>Japan, Malaysia</td>
</tr>
</tbody>
</table>

This represents only a partial list of symptoms. Patients may have different symptoms or only a few of those listed.

‡ Includes 4 different subspecies that can be distinguished serologically and by PCR assay, and respectively are the etiologic agents of Boutonneuse fever and Mediterranean tick fever in Southern Europe and Africa (*R. conorii* subsp. *conorii*), Indian tick typhus in South Asia (*R. conorii* subsp. *indica*), Israeli tick typhus in Southern Europe and Middle East (*R. conorii* subsp. *israelensis*), and Astrakhan spotted fever in the North Caspian region of Russia (*R. conorii* subsp. *caspiae*).

# Organisms antigenically related to these species are associated with ehrlichial diseases outside the continental United States.

**Rickettsialpox**

Rickettsialpox is generally an urban, mite-vectored disease associated with *R. akari*-infected house mice, although feral rodent-mite reservoirs also have been described (3). Outbreaks of this illness have occurred shortly after rodent extermination programs or natural viral infections that depleted rodent populations and caused the mites to seek new hosts. *R. akari*-infected rodents have been found in urban centers in the former Soviet Union, South Africa, Korea, Croatia, and the United States. Travelers may be at risk for exposure to rodent mites when staying in old urban hostels and cabins.
Anaplasmosis and Ehrlichiosis

Human ehrlichiosis and anaplasmosis are acute tick-borne diseases, associated with the lone star tick, *Amblyomma americanum*, and *Ixodes* ticks, respectively. Because one tick may be infected with more than one tick-borne pathogen (e.g. *Borrelia burgdorferi*, the causative agent of Lyme disease, or various *Babesia* species, agent of human babesiosis), patients may present with atypical clinical symptoms that complicate treatment. Ehrlichioses and anaplasmosis are characterized by infection of different types of leukocytes, where the causative agent multiplies in cytoplasmic membrane-bound vacuole called morulae. Morulae can sometimes be detected in Giemsa-stained blood smears.

Q Fever

Q fever occurs worldwide, most often in persons who have contact with infected goat, sheep, cat and cattle, particularly parturient animals (especially farmers, veterinarians, butchers, meat packers, and seasonal workers). Travelers who visit farms or rural communities can be exposed to *Coxiella burnetii*, the agent of Q fever, through airborne transmission (via animal-contaminated soil and dust) or less commonly through consumption of unpasteurized milk products or by exposure to infected ticks. These infections may initially result in only mild and self-limiting influenza-like illnesses, but if untreated, infections may become chronic, particularly in persons with preexisting heart valve abnormalities or with prosthetic valves. Such persons can develop chronic and potentially fatal endocarditis.

Cat-Scratch Disease and Oroya Fever

Cat-scratch disease is contracted through scratches and bites from domestic cats, particularly kittens, infected with *Bartonella henselae*, and possibly from their fleas (3,4). Exposure can therefore occur wherever cats are found. Oroya fever is transmitted by sandflies infected with *B. bacilliformis*, which is endemic in the Andean highlands.

Symptoms

Clinical presentations of rickettsial illnesses vary (Table above), but common early symptoms, including fever, headache, and malaise, are generally nonspecific. Illnesses resulting from infection with rickettsial agents may go unrecognized or are attributed to other causes. Atypical presentations are common and may be expected with poorly characterized non-indigenous agents, so appropriate samples for examination by specialized reference laboratories should be obtained. A diagnosis of rickettsial diseases is based on two or more of the following: 1) clinical symptoms and an epidemiologic history compatible with a rickettsial disease, 2) the development of specific convalescent-phase antibodies reactive with a given pathogen or antigenic group, 3) a positive polymerase chain reaction test result, 4) specific immunohistologic detection of rickettsial agent, or 5) isolation of a rickettsial agent. Ascertaining the likely place and the nature of potential exposures is particularly helpful for accurate diagnostic testing.
Prevention

With the exception of the louse-borne diseases described above, for which contact with infectious arthropod feces is the primary mode of transmission (through autoinoculation into a wound, conjunctiva, or inhalation), travelers and health-care providers are generally not at risk for becoming infected via exposure to an ill person. Limiting exposures to vectors or animal reservoirs remains the best means for reducing the risk for disease. Travelers and persons working in areas where organisms may be present should implement prevention based on avoidance of vector-infested habitats, use of repellents and protective clothing, prompt detection and removal of arthropods from clothing and skin, and attention to hygiene.

Q fever and Bartonella group diseases may pose a special risk for persons with abnormal or prosthetic heart valves, and Rickettsia, Ehrlichia, and Bartonella for persons who are immunocompromised.
ATTACHMENT 2

ENCEPHALITIS ARBOVIRAL ENCEPHALITIDES
Encephalitis Arboviral Encephalitides

Perspectives

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the Togaviridae (genus Alphavirus, Flaviviridae, and Bunyaviridae).

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).

Arboviral encephalitides have a global distribution, but there are four main virus agents of encephalitis in the United States: eastern equine encephalitis (EEE), western equine encephalitis (WEE), St. Louis encephalitis (SLE) and La Crosse (LAC) encephalitis, all of which are transmitted by mosquitoes. Another virus, Powassan, is a minor cause of encephalitis in the northern United States, and is transmitted by ticks. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

The majority of human infections are asymptomatic or may result in a nonspecific flu-like syndrome. Onset may be insidious or sudden with fever, headache, myalgias, malaise and occasionally prostration. Infection may, however, lead to encephalitis, with a fatal outcome or permanent neurologic sequelae. Fortunately, only a small proportion of infected persons progress to frank encephalitis.

Experimental studies have shown that invasion of the central nervous system (CNS), generally follows initial virus replication in various peripheral sites and a period of viremia. Viral transfer from the blood to the CNS through the olfactory tract has been suggested. Because the arboviral encephalitides are viral diseases, antibiotics are not effective for treatment and no effective antiviral drugs have yet been discovered.
Prevention

Arboviral encephalitis can be prevented in two major ways: personal protective measures and public health measures to reduce the population of infected mosquitoes. Personal measures include reducing time outdoors particularly in early evening hours, wearing long pants and long sleeved shirts and applying mosquito repellent to exposed skin areas. Public health measures often require spraying of insecticides to kill juvenile (larvae) and adult mosquitoes.

Selection of mosquito control methods depends on what needs to be achieved; but, in most emergency situations, the preferred method to achieve maximum results over a wide area is aerial spraying. In many states aerial spraying may be available in certain locations as a means to control nuisance mosquitoes. Such resources can be redirected to areas of virus activity. When aerial spraying is not routinely used, such services are usually contracted for a given time period. Financing of aerial spraying costs during large outbreaks is usually provided by state emergency contingency funds. Federal funding of emergency spraying is rare and almost always requires a federal disaster declaration. Such disaster declarations usually occur when the vector-borne disease has the potential to infect large numbers of people, when a large population is at risk and when the area requiring treatment is extensive. Special large planes maintained by the United States Air Force can be called upon to deliver the insecticide(s) chosen for such emergencies. Federal disaster declarations have relied heavily on risk assessment by the CDC.

There are no commercially available human vaccines for these U.S. diseases. There is a Japanese encephalitis vaccine available in the U.S. A tick-borne encephalitis vaccine is available in Europe. An equine vaccine is available for EEE, WEE and Venezuelan equine encephalitis (VEE).

La Crosse Encephalitis

La Crosse (LAC) encephalitis was discovered in La Crosse, Wisconsin in 1963. Since then, the virus has been identified in several Midwestern and Mid-Atlantic states. During an average year, about 75 cases of LAC encephalitis are reported to the CDC. Most cases of LAC encephalitis occur in children under 16 years of age. LAC virus is a Bunyavirus and is a zoonotic pathogen cycled between the daytime-biting treehole mosquito, *Aedes triseriatus*, and vertebrate amplifier hosts (chipmunks, tree squirrels) in deciduous forest habitats. The virus is maintained over the winter by transovarial transmission in mosquito eggs. If the female mosquito is infected, she may lay eggs that carry the virus, and the adults coming from those eggs may be able to transmit the virus to chipmunks and to humans.

Historically, most cases of LAC encephalitis occur in the upper Midwestern states (Minnesota, Wisconsin, Iowa, Illinois, Indiana, and Ohio). Recently, more cases are being reported from states in the mid-Atlantic (West Virginia, Virginia and North Carolina) and southeastern (Alabama and Mississippi) regions of the country. It has long been suspected that LAC encephalitis has a broader distribution and a higher incidence in the eastern United States, but is under-reported because the etiologic agent is often not specifically identified.
LAC encephalitis initially presents as a nonspecific summertime illness with fever, headache, nausea, vomiting and lethargy. Severe disease occurs most commonly in children under the age of 16 and is characterized by seizures, coma, paralysis, and a variety of neurological sequelae after recovery. Death from LAC encephalitis occurs in less than 1% of clinical cases. In many clinical settings, pediatric cases presenting with CNS involvement are routinely screened for herpes or enteroviral etiologies. Since there is no specific treatment for LAC encephalitis, physicians often do not request the tests required to specifically identify LAC virus, and the cases are reported as aseptic meningitis or viral encephalitis of unknown etiology. Also found in the United States, Jamestown Canyon and Cache Valley viruses are related to LAC, but rarely cause encephalitis.

**Eastern Equine Encephalitis**

Eastern equine encephalitis (EEE) is also caused by a virus transmitted to humans and equines by the bite of an infected mosquito. EEE virus is an alphavirus that was first identified in the 1930's and currently occurs in focal locations along the eastern seaboard, the Gulf Coast and some inland Midwestern locations of the United States. While small outbreaks of human disease have occurred in the United States, equine epizootics can be a common occurrence during the summer and fall.

It takes from 4-10 days after the bite of an infected mosquito for an individual to develop symptoms of EEE. These symptoms begin with a sudden onset of fever, general muscle pains, and a headache of increasing severity. Many individuals will progress to more severe symptoms such as seizures and coma. Approximately one-third of all people with clinical encephalitis caused by EEE will die from the disease and of those who recover, many will suffer permanent brain damage with many of those requiring permanent institutional care.

In addition to humans, EEE virus can produce severe disease in: horses, some birds such as pheasants, quail, ostriches and emus, and even puppies. Because horses are outdoors and attract hordes of biting mosquitoes, they are at high risk of contracting EEE when the virus is present in mosquitoes. Human cases are usually preceded by those in horses and exceeded in numbers by horse cases which may be used as a surveillance tool.

EEE virus occurs in natural cycles involving birds and *Culiseta melanura*, in some swampy areas nearly every year during the warm months. Where the virus resides or how it survives in the winter is unknown. It may be introduced by migratory birds in the spring or it may remain dormant in some yet undiscovered part of its life cycle. With the onset of spring, the virus reappears in the birds (native bird species do not seem to be affected by the virus) and mosquitoes of the swamp. In this usual cycle of transmission, virus does not escape from these areas because the mosquito involved prefers to feed upon birds and does not usually bite humans or other mammals.

For reasons not fully understood, the virus may escape from enzootic foci in swamp areas in birds or bridge vectors such as *Coquillettidia perturbans* and *Aedes sollicitans*. These species feed on both birds and mammals and can transmit the virus to humans, horses, and other hosts. Other mosquito species such as *Ae. vexans* and *Culex nigripalpus* can also transmit EEE virus.
When health officials maintain surveillance for EEE virus activity, this movement out of the swamp can be detected, and if the level of activity is sufficiently high, can recommend and undertake measures to reduce the risk to humans.

**Western Equine Encephalitis**

The alphavirus western equine encephalitis (WEE) was first isolated in California in 1930 from the brain of a horse with encephalitis, and remains an important cause of encephalitis in horses and humans in North America, mainly in western parts of the USA and Canada. In the western United States, the enzootic cycle of WEE involves passerine birds, in which the infection is inapparent, and culicine mosquitoes, principally *Cx. tarsalis*, a species that is associated with irrigated agriculture and stream drainages. The virus has also been isolated from a variety of mammal species. Other important mosquito vector species include *Aedes melanimon* in California, *Ae. dorsalis* in Utah and New Mexico and *Ae. campestris* in New Mexico.

Expansion of irrigated agriculture in the North Platte River Valley during the past several decades has created habitats and conditions favorable for increases in populations of granivorous birds such as the house sparrow, *Passer domesticus*, and mosquitoes such as *Cx. tarsalis*, *Aedes dorsalis* and *Aedes melanimon*. All of these species may play a role in WEE virus transmission in irrigated areas. In addition to *Cx. tarsalis, Ae. dorsalis and Ae. melanimon*, WEE virus also has been isolated occasionally from some other mosquito species present in the area. Two confirmed and several suspect cases of WEE were reported from Wyoming in 1994. In 1995, two strains of WEE virus were isolated from *Culex tarsalis* and neutralizing antibody to WEE virus was demonstrated in sera from pheasants and house sparrows. During 1997, 35 strains of WEE virus were isolated from mosquitoes collected in Scotts Bluff County, Nebraska.

Human WEE cases are usually first seen in June or July. Most WEE infections are asymptomatic or present as mild, nonspecific illness. Patients with clinically apparent illness usually have a sudden onset with fever, headache, nausea, vomiting, anorexia and malaise, followed by altered mental status, weakness and signs of meningeal irritation. Children, especially those under 1 year old, are affected more severely than adults and may be left with permanent sequelae, which is seen in 5 to 30% of young patients. The mortality rate is about 3%.

**St. Louis Encephalitis**

In the United States, the leading cause of epidemic flaviviral encephalitis is St. Louis encephalitis (SLE) virus. SLE is the most common mosquito-transmitted human pathogen in the U.S. While periodic SLE epidemics have occurred only in the Midwest and southeast, SLE virus is distributed throughout the lower 48 states. Since 1964, there have been 4,437 confirmed cases of SLE with an average of 193 cases per year (range 4 - 1,967). However, less than 1% of SLE viral infections are clinically apparent and the vast majority of infections remain undiagnosed. Illness ranges in severity from a simple febrile headache to meningoencephalitis, with an overall case-fatality ratio of 5-15 %. The disease is generally milder in children than in adults, but in those children who do have disease, there is a high rate of encephalitis. The elderly are at highest risk for severe disease and death. During the summer season, SLE virus is maintained in a mosquito-bird-mosquito cycle, with periodic amplification by peridomestic birds and *Culex*.
mosquitoes. In Florida, the principal vector is *Cx. nigripalpus*, in the Midwest, *Cx. pipiens pipiens* and *Cx. p. quinquefasciatus* and in the western United States, *Cx. tarsalis* and members of the *Cx. pipiens* complex.

**Powassan Encephalitis**

Powassan (POW) virus is a flavivirus and currently the only well documented tick-borne transmitted arbovirus occurring in the United States and Canada. Recently a Powassan-like virus was isolated from the deer tick, *Ixodes scapularis*. Its relationship to POW and its ability to cause human disease has not been fully elucidated. POW's range in the United States is primarily in the upper tier States. In addition to isolations from man, the virus has been recovered from ticks (*Ixodes marxi, I. cookei* and *Dermacentor andersoni*) and from the tissues of a skunk (*Spilogale putorius*). It is a rare cause of acute viral encephalitis. POW virus was first isolated from the brain of a 5-year-old child who died in Ontario in 1958. Patients who recover may have residual neurological problems.

**Venezuelan Equine Encephalitis**

Like EEE and WEE viruses, Venezuelan equine encephalitis (VEE) is an alphavirus and causes encephalitis in horses and humans and is an important veterinary and public health problem in Central and South America. Occasionally, large regional epizootics and epidemics can occur resulting in thousands of equine and human infections. Epizootic strains of VEE virus can infect and be transmitted by a large number of mosquito species. The natural reservoir host for the epizootic strains is not known. A large epizootic that began in South America in 1969 reached Texas in 1971. It was estimated that over 200,000 horses died in that outbreak, which was controlled by a massive equine vaccination program using an experimental live attenuated VEE vaccine. There were several thousand human infections. A more recent VEE epidemic occurred in the fall of 1995 in Venezuela and Colombia with an estimated 90,000 human infections. Infection of man with VEE virus is less severe than with EEE and WEE viruses, and fatalities are rare. Adults usually develop only an influenza-like illness, and overt encephalitis is usually confined to children. Effective VEE virus vaccines are available for equines.

Enzootic strains of VEE virus have a wide geographic distribution in the Americas. These viruses are maintained in cycles involving forest dwelling rodents and mosquito vectors, mainly *Culex (Melanoconion)* species. Occasional cases or small outbreaks of human disease are associated with these viruses, the most recent outbreaks were in Venezuela in 1992, Peru in 1994 and Mexico in 1995-96.
Other Arboviral Encephalitides

Many other arboviral encephalitides occur throughout the world. Most of these diseases are problems only for those individuals traveling to countries where the viruses are endemic.

Japanese Encephalitis

Japanese encephalitis (JE) virus is a flavivirus, related to SLE, and is widespread throughout Asia. Worldwide, it is the most important cause of arboviral encephalitis with over 45,000 cases reported annually. In recent years, JE virus has expanded its geographic distribution with outbreaks in the Pacific. Epidemics occur in late summer in temperate regions, but the infection is enzootic and occurs throughout the year in many tropical areas of Asia. The virus is maintained in a cycle involving culicine mosquitoes and waterbirds. The virus is transmitted to man by *Culex* mosquitoes, primarily *Cx. tritaeniorhynchus*, which breed in rice fields. Pigs are the main amplifying hosts of JE virus in peridomestic environments.

The incubation period of JE is 5 to 14 days. Onset of symptoms is usually sudden, with fever, headache and vomiting. The illness resolves in 5 to 7 days if there is no CNS involvement. The mortality in most outbreaks is less than 10%, but is higher in children and can exceed 30%. Neurologic sequelae in patients who recover are reported in up to 30% of cases. A formalin-inactivated vaccine prepared in mice is used widely in Japan, China, India, Korea, Taiwan and Thailand. This vaccine is currently available for human use in the United States, for individuals who might be traveling to endemic countries.

Tick-Borne Encephalitis

Tick-borne encephalitis (TBE) is caused by two closely related flaviviruses which are distinct biologically. The eastern subtype causes Russian spring-summer encephalitis (RSSE) and is transmitted by *Ixodes persulcatus*, whereas the western subtype is transmitted by *Ixodes ricinus* and causes Central European encephalitis (CEE). The name CEE is somewhat misleading, since the condition can occur throughout much of Europe. Of the two subtypes, RSSE is the more severe infection, having a mortality of up to 25% in some outbreaks, whereas mortality in CEE seldom exceeds 5%.

The incubation period is 7 to 14 days. Infection usually presents as a mild, influenza-type illness or as benign, aseptic meningitis, but may result in fatal meningoencephalitis. Fever is often biphasic, and there may be severe headache and neck rigidity, with transient paralysis of the limbs, shoulders or less commonly the respiratory musculature. A few patients are left with residual paralysis. Although the great majority of TBE infections follow exposure to ticks, infection has occurred through the ingestion of infected cows' or goats' milk. An inactivated TBE vaccine is currently available in Europe and Russia.

West Nile Encephalitis

Discussed elsewhere in this document
MOLD

Mold from Moisture

Molds are a form of fungus. Molds are simple, microscopic organisms, found virtually everywhere, indoors and outdoors. Molds can be found on plants, foods, dry leaves, and other organic material. Molds are needed for breaking down dead material. Mold spores are very tiny and lightweight, and this allows them to travel through the air. Mold growths can often be seen in the form of discoloration, ranging from white to orange and from green to brown and black. When molds are present in large quantities, they can cause allergic symptoms similar to those caused by plant pollen.

When airborne mold spores are present in large numbers, they can cause allergic reactions, asthma episodes, infections, and other respiratory problems for people. Exposure to high spore levels can cause the development of an allergy to the mold. Mold can also cause structural damage to your home. Similarly, when wood goes through a period of wetting, then drying, it can eventually warp and cause walls to crack or become structurally weak.

For mold to grow, it needs:
- food sources - such as leaves, wood, paper, or dirt
- a source of moisture
- a place to grow

Normal healthy people are generally not affected by normal levels of mold. People who are sensitive to mold may experience stuffy nose, irritated eyes, wheezing, or skin irritation. People allergic to mold may have difficulty in breathing and shortness of breath. People with weakened immune systems and with chronic lung diseases, such as obstructive lung disease, may develop mold infections in their lungs.

Identification

There are sampling procedures for detecting and identifying mold, however, You may recognize mold by: **Sight** (Walls, ceiling, floors, carpeting, etc. discolored, or show signs of mold growth or water damage); or **Smell** (A bad odor, such as a musty, earthy smell or a foul stench)

Prevention

If mold is encountered in work situations (investigations of buildings for mold, surveys in buildings after flooding, remediation or demolition) the following procedures are recommended for protection.
Mold Remediation (For Mold from Clean Water)

The procedures below are for use in remediation of mold caused by “clean” water (not contaminated with chemicals or sanitary waste) If chemical contamination or sanitary waste contamination is possible, assessments should consider these hazards, assess the risk of exposure and adjust Health and Safety Planning accordingly.

In all situations, the underlying cause of water accumulation must be rectified or fungal growth will recur. Any initial water infiltration should be stopped and cleaned immediately. An immediate response (within 24 to 48 hours) and thorough clean up, drying, and/or removal of water damaged materials will prevent or limit mold growth. If the source of water is elevated humidity, relative humidity should be maintained at levels below 60% to inhibit mold growth.31 Emphasis should be on ensuring proper repairs of the building infrastructure, so that water damage and moisture buildup does not recur.

The following procedures are based on information from the NYC Department of Health and EPA. Five different levels of abatement are described below. The size of the area impacted by fungal contamination primarily determines the type of remediation. The sizing levels below are based on professional judgment and practicality; currently there is not adequate data to relate the extent of contamination to frequency or severity of health effects. The goal of remediation is to remove or clean contaminated materials in a way that prevents the emission of fungi and dust contaminated with fungi from leaving a work area and entering an occupied or non-abatement area, while protecting the health of workers performing the abatement. The listed remediation methods were designed to achieve this goal, however, due to the general nature of these methods it is the responsibility of the people conducting remediation to ensure the methods enacted are adequate. The listed remediation methods are not meant to exclude other similarly effective methods. Any changes to the remediation methods listed in these guidelines, however, should be carefully considered prior to implementation.

Non-porous (e.g., metals, glass, and hard plastics) and semi-porous (e.g., wood, and concrete) materials that are structurally sound and are visibly moldy can be cleaned and reused. Cleaning should be done using a detergent solution. Porous materials such as ceiling tiles and insulation, and wallboards with more than a small area of contamination should be removed and discarded. Porous materials (e.g., wallboard, and fabrics) that can be cleaned, can be reused, but should be discarded if possible. A professional restoration consultant should be contacted when restoring porous materials with more than a small area of fungal contamination. All materials to be reused should be dry and visibly free from mold. Routine inspections should be conducted to confirm the effectiveness of remediation work.

The use of gaseous, vapor-phase, or aerosolized biocides for remedial purposes is not recommended. The use of biocides in this manner can pose health concerns for people in occupied spaces of the building and for people returning to the treated space if used improperly. Furthermore, the effectiveness of these treatments is unproven and does not address the possible health concerns from the presence of the remaining non-viable mold. For additional information on the use of biocides for remedial purposes, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control."
**Level I: Small Isolated Areas** (10 sq. ft or less) - e.g., ceiling tiles, small areas on walls

1. Remediation persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

2. Respiratory protection, in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.

3. The work area should be unoccupied. Vacating people from spaces adjacent to the work area is recommended.

4. Containment of the work area is not necessary. Use dust suppression methods, such as misting (not soaking) surfaces prior to remediation.

5. Contaminated materials that cannot be cleaned should be removed from the building in a sealed plastic bag. Check local regulations for requirements for the disposal of moldy materials.

6. The work area and areas used by remedial workers for egress should be cleaned with a damp cloth and/or mop and a detergent solution.

7. All areas should be left dry and visibly free from contamination and debris.

**Level II: Mid-Sized Isolated Areas** (10 - 30 sq. ft.) - e.g., individual wallboard panels.

1 – 3 Follow Level I steps 1-3

4. The work area should be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.

5. Use dust suppression methods, such as misting (not soaking) surfaces prior to remediation.

6. Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. Check local regulations for requirements for the disposal of moldy materials.

7. The work area and areas used by remedial workers for egress should be HEPA vacuumed (a vacuum equipped with a High-Efficiency Particulate Air filter) and cleaned with a damp cloth and/or mop and a detergent solution.

8. All areas should be left dry and visibly free from contamination and debris.

**Level III: Large Isolated Areas** (30 - 100 square feet) - e.g., several wallboard panels.

1. A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for the project.

The following procedures *at a minimum* are recommended:

2-4 Follow steps 1-3 for level I
5. The work area and areas directly adjacent should be covered with a plastic sheet(s) and taped before remediation, to contain dust/debris.

6. Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting.

7. The work area and areas directly adjacent should be unoccupied. Further vacating of people from spaces near the work area is recommended.

8. Use dust suppression methods, such as misting (not soaking) surfaces prior to remediation.

9. Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. Check local regulations for requirements for the disposal of moldy materials.

10. The work area and surrounding areas should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.

11. All areas should be left dry and visibly free from contamination and debris.

If abatement procedures are expected to generate a lot of dust (e.g., abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of the fungi is heavy (blanket coverage as opposed to patchy), then it is recommended that the remediation procedures for Level IV are followed.

**Level IV: Extensive Contamination** (greater than 100 contiguous square feet in an area)

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for the project. Use the following procedures:

1. Personnel trained in the handling of hazardous materials equipped with:
   - Full-face respirators with high efficiency particulate air (HEPA) cartridges,
   - Disposable protective clothing covering both head and shoes, and
   - Gloves

2. Containment of the affected area:
   - Completely isolate work area from occupied spaces using plastic sheeting sealed with duct tape (including ventilation ducts/grills, fixtures, and any other openings)
   - Use an exhaust fan with a HEPA filter to generate negative pressurization
   - Use airlocks and decontaminate the room.
   -Vacating people from spaces adjacent to the work area.

3. Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. The outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed in the decontamination chamber prior to their transport to uncontaminated areas of the building. Check local regulations for requirements for the disposal of materials.

4. The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth and/or mop with a detergent solution and be visibly clean prior to the removal of isolation barriers.

5. Air monitoring should be conducted prior to occupancy to determine if the area is fit to reoccupy.
Level V: Remediation of HVAC Systems

A. Small Isolated Area of Contamination (<10 square feet) in the HVAC System

1 – 3  Follow steps 1-3 for Level I

4. The HVAC system should be shut down prior to any remedial activities.

5. The work area should be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.

6. Use dust suppression methods, such as misting (not soaking) surfaces prior to remediation.

7. Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, should be removed. Other contaminated materials that cannot be cleaned should be removed in sealed plastic bags. Check local regulations for requirements for the disposal of moldy materials.

8. The work area and areas immediately surrounding the work area should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.

9. All areas should be left dry and visibly free from contamination and debris.

A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers should be consulted for the products they recommend for use in their systems.

B. Areas of Contamination (>10 square feet) in the HVAC System

1. A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for remediation projects involving more than a small isolated area in an HVAC system. The following procedures are recommended:

2. Personnel trained in the handling of hazardous materials equipped with:

   b. Gloves and eye protection
   c. Full-face respirators with HEPA cartridges and disposable protective clothing covering both head and shoes should be worn if contamination is greater than 30 square feet.

3. The HVAC system should be shut down prior to any remedial activities.
4. Containment of the affected area:
   
a. Complete isolation of work area from the other areas of the HVAC system using plastic sheeting sealed with duct tape.
   
b. The use of an exhaust fan with a HEPA filter to generate negative pressurization. Use airlocks and decontaminate the room if contamination is greater than 30 square feet.

5. Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, should be removed. Other contaminated materials that cannot be cleaned should be removed in sealed plastic bags.

6. When a decontamination chamber is present, the outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed prior to their transport to uncontaminated areas of the building.

   Check local regulations for requirements for the disposal of moldy materials.

7. The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution prior to the removal of isolation barriers.

8. All areas should be left dry and visibly free from contamination and debris.

9. Air monitoring should be conducted prior to re-occupancy with the HVAC system in operation to determine if the area(s) served by the system are fit to reoccupy.

A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers should be consulted for the products they recommend for use in their systems.

**Hazard Communication**

When fungal growth requiring large-scale remediation is found, the building owner, management, and/or employer should notify occupants in the affected area(s) of its presence. Notification should include a description of the remedial measures to be taken and a timetable for completion. Group meetings held before and after remediation with full disclosure of plans and results can be an effective communication mechanism.
**Bird and Bat Borne or Enhanced Diseases**

In addition to the previously discussed animal inhabitants of old buildings, which are often part of hazardous materials and construction sites, birds and bats often invade the buildings leaving behind debris and droppings which may contain molds and fungi in dry forms. Inhalation of this easily airborne dust can result in serious diseases such as Cryptococcosis and histoplasmosis.

**Cryptococcosis**

Cryptococcosis is a disease caused by a fungus that naturally occurs in the soil and grows in bird and bat droppings.

Cryptococcosis symptoms include meningitis, severe headache, mental disturbances, fever, blurred vision, and cough. This disease is most common in individuals with compromised immune systems.

**Histoplasmosis**

Histoplasmosis is a disease caused by a fungus that naturally occurs in the soil and grows in bird and bat droppings.

Most individuals who acquire histoplasmosis have no symptoms. Symptoms that do occur will vary, depending on the form of the disease. Acute histoplasmosis is characterized by respiratory symptoms, general malaise, fever, chest pains, and a dry non-productive cough. The chronic form of histoplasmosis infection resembles chronic pulmonary tuberculosis and progresses over months or years.

The fungi which cause Cryptococcosis and Histoplasmosis are found worldwide.

**Prevention and Exposure Protection**

While the organisms can be found outdoors in bird roosting areas, preventing birds from roosting is impractical. Disinfection of soil while possible is also often impractical. Preventing birds from roosting and nesting in buildings is an important prevention method. Encountering potentially infected droppings in construction and demolition is a frequent occurrence. There are analytical methods for detecting the organisms, however, the analysis time may be prohibitive because of time needed, making disinfection and use of PPE necessary.

Formalin is the only substance known to be effective as a soil disinfectant for histoplasmosis, however, formalin is a carcinogen and introduces a hazard which also needs to be controlled. Ammonia and sodium hypochlorite based disinfectants are effective against the cryptococosis organisms on impermeable and semi-permeable surfaces.

Where it is necessary to remove bird droppings from buildings prior to renovation or demolition it is prudent to assume infection and use the following precautions:
• Avoid areas that may harbor the fungus, e.g., accumulations of bird or bat droppings.

• Areas known or suspected of being contaminated by the organisms causing Cryptococcosis or Histoplasmosis, such as bird roosts, attics, or even entire buildings that contain accumulations of bird manure, should be posted with signs warning of the health risk. The building or area should be secured

• Before an activity is started that may disturb any material that might be contaminated by Cryptococcosis or Histoplasmosis, workers should be informed in writing of the personal risk factors that increase an individual's chances of developing these diseases. Such a written communication should include a warning that individuals with weakened immune systems are at the greatest risk of developing severe forms of these diseases become infected. These people should seek advice from their health care provider about whether they should avoid exposure to materials that might be contaminated with these organisms.

The best way to prevent exposure to *H. capsulatum* spores is to avoid situations where material that might be contaminated can become aerosolized and subsequently inhaled. A brief inhalation exposure to highly contaminated dust may be all that is needed to cause infection and subsequent development of histoplasmosis. Therefore, work practices and dust control measures that eliminate or reduce dust generation during the removal of bat or bird manure from a building will also reduce risks of infection and subsequent development of disease. For example, instead of shoveling or sweeping dry, dusty material, carefully wetting it with a water spray can reduce the amount of dust aerosolized during an activity. Adding a surfactant or wetting agent to the water might reduce further the amount of aerosolized dust.

Once the material is wetted, it can be collected in double, heavy-duty plastic bags, a 55-gallon drum, or some other secure container for immediate disposal. An alternative method is use of an industrial vacuum cleaner with a high-efficiency filter to bag contaminated material. Truck-mounted or trailer-mounted vacuum systems are recommended for buildings with large accumulations of bat or bird manure. These high-volume systems can remove tons of contaminated material in a short period. Using long, large-diameter hoses, such a system can also remove contaminated material located several stories above its waste hopper. This advantage eliminates the risk of dust exposure that can happen when bags tear accidentally or containers break during their transfer to the ground.

The removal of all material that might be contaminated by *H. capsulatum* or the cryptococosis fungi from a building and immediate waste disposal will eliminate any further risk that someone might be exposed to aerosolized spores. Air sampling, surface sampling, or the use of any other method intended to confirm that no infectious agents remain following removal of bat or bird manure is unnecessary in most cases. However, before a removal activity is considered finished, the cleaned area should be inspected visually to ensure that no residual dust or debris remains.

During windy periods or other times when typical dust suppression techniques are ineffective, earthmoving activities should be interrupted. All earthmoving equipment (e.g., bulldozers, trucks, and front-end loaders) should have cabs with air-conditioning (if available) to protect
their operators. Air filters on air-conditioners should be inspected on a regular schedule and cleaned or replaced as needed. During filter cleaning or replacement of exceptionally dusty air filters, respiratory protection should be worn by the maintenance person if there is a potential for the dust to be aerosolized. Beds of all trucks carrying dirt or debris from a work site should be covered, and all trucks should pass through a wash station before leaving the site. When at a dump site, a truck operator should ensure that all individuals in the vicinity are in an area where they will not be exposed to dust aerosolized while the truck is emptied.

Spraying 1:10 bleach to water mixture on droppings and allowing it to dry is also a recommended practice for the cryptococcis and may have some effect on histoplasmosis to reduce risk.

Because work practices and dust control measures to reduce worker exposures to these organisms have not been fully evaluated, using personal protective equipment is still necessary during some activities. During removal of an accumulation of bat or bird manure from an enclosed area such as an attic, dust control measures should be used, but wearing a NIOSH-approved respirator and other items of personal protective equipment is also recommended to reduce further the risk of exposure to the organisms that cause Cryptococcosis and Histoplasmosis.

**Treatment**

These diseases are often hard to diagnoses and while a concern, they do not occur with great frequency. Knowledge of the symptoms and of potential exposure is important when seeking medical follow-up for potential exposure.

There are medical treatments for aboth diseases. The sooner the diseases are diagnosed and treatment is begun the more effective the treatment will be.

**Endemic Fungus**

**Valley Fever (Coccidiomycosis)**

There is a fungus that grows in soil indigenous to the San Joaquin Valley, parts of southern California, Arizona, and New Mexico. This organism can produce a disease called "Fever", "Valley Fever", or, technically, Coccidiomycosis when inhaled. Growing up in infected areas apparently provides a degree of resistance, which newcomers to the areas do not have.

The soil-borne fungus that causes valley fever is stirred into the air by farming, construction and wind, and then breathed into the lungs. Valley fever can cause fever, chest pain and coughing, among other symptoms. Most people who inhale the valley fever fungus have few, if any, problems. But some, especially pregnant women, people with weakened immune systems, and those of Asian, Hispanic and African descent, may develop a serious or even fatal illness from valley fever.

Valley fever occurs in three forms: acute, chronic and disseminated.
**Acute valley fever**

The acute form is often mild, with few, if any, symptoms. When symptoms do occur, they tend to resemble those of the flu, and can range from minor to severe:

- Fever.
- Cough.
- Chest pain, which can vary from a mild feeling of constriction to intense pressure resembling a heart attack.
- Chills and Night sweats.
- Headache.
- Fatigue.
- Shortness of breath.
- Joint aches.

Rash. Some people develop painful red bumps that may later turn brown — mainly on the lower legs but sometimes on the chest, arms and back. Others may have a raised red rash with blisters or eruptions that look like pimples.

People who don't become ill from valley fever, may only learn that they've been infected until a later positive skin or blood test or when small areas of residual infection (nodules) show up on a routine chest X-ray. Although they don't cause problems in and of themselves, nodules can look like cancer on X-ray, leading to unnecessary biopsies.

In the event of symptoms, especially severe ones, the course of the disease is uncertain. It can take from six months to a year to fully recover, and fatigue and joint aches can last even longer.

The severity of the disease depends on several factors, including your overall health and the number of fungus spores you inhale.

**Chronic valley fever**

Appearing as many as 20 years after the initial infection, chronic valley fever is most common in people with diabetes or a weakened immune system. You're likely to have periods of worsening symptoms alternating with periods of recovery. Signs and symptoms are similar to those of tuberculosis:

- Low-grade fever
- Weight loss
- Cough
- Chest pain
- Blood-tinged sputum
- Nodules in the lungs

**Disseminated valley fever**

The most serious form of the disease, disseminated valley fever occurs when the infection
spreads beyond the lungs to other parts of the body, most often the skin, bones, liver, brain, heart and the membranes that protect the brain and spinal cord (meninges).

The signs and symptoms of disseminated disease depend on which parts of your body are affected and may include:

- Nodules, ulcers and skin lesions that are more serious than the rash that sometimes occurs with other forms of the disease
- Painful lesions in the skull, spine or other bones
- Painful, swollen joints, especially in the knees or ankles

Meningitis — an infection of the membranes and fluid surrounding the brain and spinal cord and the most

Awareness of a hazard and the prudent use of respiratory protection are key factors to protection.
HAZARDOUS PLANTS

A number of hazardous plants may be encountered during field operations. The ailments associated with these plants range from mild hay fever to contact dermatitis. Plants that present the greatest risk to site workers are those that produce allergic reactions and tissue injury.

Plants That Cause Skin and Tissue Injury

Contact with sharp leaves and thorns are of special concern to site personnel. This concern stems from the fact that punctures, cuts, and even minor scrapes caused by accidental contact may result in skin lesions and the introduction of fungi or bacteria through the skin. This is especially important in light of the fact that the warm moist environment created inside protective clothing is ideal for the propagation of fungal and bacterial infection. Personnel receiving any of the injuries listed above, even minor scrapes shall report immediately for continued observation and care. Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

Plants That Cause an Allergic Reaction

The poisonous plants of greatest concern are poison ivy, poison oak, and poison sumac. Contact with the poisonous sap of these plants produces a severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim also may develop a high fever and may be very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours.

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. In certain seasons, both plants also have greenish-white flowers and berries that grow in clusters. Poison sumac is a tall shrub or small tree with 6 to 12 leaflets arranged in pairs with a single leaflet at the end. This plant grows in wooded, swampy areas.

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<thead>
<tr>
<th>Poison Ivy</th>
<th>Poison Oak</th>
<th>Poison Sumac</th>
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<td><img src="image1" alt="Poison Ivy" /></td>
<td><img src="image2" alt="Poison Oak" /></td>
<td><img src="image3" alt="Poison Sumac" /></td>
</tr>
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The reaction associated with exposure to these plants will generally cause the following signs and symptoms:
• Blistering at the site of contact, usually occurring within 12 to 48 hours after contact
• Reddening, swelling, itching and burning at the site of contact
• Pain, if the reaction is severe
• Conjunctivitis, asthma, and other allergic reactions if the person is extremely sensitive to the poisonous plant toxin

If the rash is scratched, secondary infections can occur. Preventive measures that are effective for most site personnel include:

• Avoid contact with any poisonous plants on site, and keep a steady watch to identify, report and mark poisonous plants found on site
• Wash hands, face or other exposed areas at the beginning of each break period and at the end of each workday
• Avoid contact with, and wash on a daily basis, contaminated tools, equipment and clothing
• Barrier creams, detoxification/wash solutions and orally administered desensitization may prove effective and should be tried to find the best preventive solution

Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

Plants That are Poisonous

There are a number of plants worldwide beside poison ivy, oak and sumac which have poisonous properties. In many cases consumption of these plants or parts of these plants can result in poisoning. In other cases, contact with the plants may be poisonous. The following is a listing with pertinent information on poisonous properties and locations of a number of plants.

In general, when working in the outdoors or where you may come in contact with household plants or where your families may come in contact with these plants, it is important that as soon as possible after contact the area or areas should be thoroughly washed and hands must be thoroughly washed before eating drinking, smoking or any other hand to mouth contact.

In keeping with our 24/7 BBS concept, it is important to remember that children are particularly vulnerable to many of the poisonous parts of these plants. Many of these poisonous parts resemble non-poisonous food items such as berries and are attractive.

As with most lists there is extensive information but the list may not include all poisonous plants.

It is important to remember that this document is a starting point to be supplemented with local information. The majority of this information is from a list found in Wikipedia an on line Dictionary readily accessible via Google. The website has pictures of these plants as well as links to other information sources.
POISONOUS PLANTS

From Wikipedia,

This is a list of plants containing poisonous parts that pose a serious risk of illness, injury, or death to humans.

Poisonous Food Plants

- **Apple** (*Malus domestica*) **Found worldwide in cooler climates.** Seeds contain cyanogenic glycosides; although the amount found in most apples won't kill a person.

- **Cherry** (*Prunus cerasus*), as well as other species (*Prunus spp*) such as peach (*Prunus persica*), plum (*Prunus domestica*), almond (*Prunus dulcis*) and apricot (*Prunus armeninaca*). There are around 430 species of *Prunus*, spread throughout the northern temperate regions of the globe. Leaves and seeds contain cyanogenic glycosides.

- **Potato** (*Solanum tuberosum*) **Potatoes originated in the area of modern day Peru and then spread from South America to Spain and from there to the rest of the world after European colonization in the late 1400s and early 1500s.** Foliage and green-tinged tubers are toxic, containing the glycoalkaloid solanine, which develops as a result of exposure to light. Causes intense digestive disturbances, nervous symptoms.

- **Rhubarb** (*Rheum rhaponticum*) **Found worldwide.** Leaves, but not stems, contain oxalic acid salts, causing kidney disorders, convulsions, coma. Rarely fatal.

- **Tomato** (*Solanum lycopersicum*) **Found worldwide.** Foliage and vines contain alkaloid poisons which cause digestive upset and nervous excitement.

Other Poisonous Plants

- **Aconite (wolfsbane, monkshood)** (*Aconitum napellus*) **Chiefly natives of the mountainous parts of the northern hemisphere, growing in moisture retentive but well draining soils on mountain meadows.** The poison is concentrated in the unripe seed pods and roots, but all parts are poisonous. Causes digestive upset, nervous excitement. The juice in plant parts is often fatal.

- **Autumn crocus. Europe, North America and Middle East.** The bulbs are poisonous and cause nausea, vomiting, diarrhea. **Can be fatal.**

- **Azalea** **Found Worldwide.** All parts of the plant are poisonous and cause nausea, vomiting, depression, breathing difficulties, coma. Rarely fatal.

- **Bittersweet nightshade** **It is native to Europe and Asia, and widely naturalised elsewhere, including North America.** All parts are poisonous, containing solanine and causing fatigue, paralysis, convulsions and diarrhea. Rarely fatal.
• Bleeding heart / Dutchman's breeches. **North America.** Leaves and roots are poisonous and cause convulsions and other nervous symptoms.

• Black locust. **Southeastern United States, also widely planted and naturalized elsewhere in temperate North America, Europe and Asia.** Pods are toxic.

• Black nightshade (Solanum nigrum) **Native to Eurasia and also introduced in the Americas. In Hawaii it is called popolo.** All parts of the plant except the ripe fruit contain the toxic glycoalkaloid solanine.

• Angel's Trumpet (Brugmansia). **Native to subtropical regions of South America, along the Andes from Colombia to northern Chile, and also in southeastern Brazil.** All parts of the plant contains the tropane alkaloids scopolamine and atropine. Often fatal.

• Caladium / Elephant ear. **Indigenous to Brazil and to neighboring areas of South America and Central America Cultivated as ornamental plants in temperate North America.** All parts of the plant are poisonous. Symptoms are generally irritation, pain, and swelling of tissues. If the mouth or tongue swell, breathing may be fatally blocked.

• Castor Oil Plant (Ricinus communis) **Castor Oil Plant.** **Indigenous to the southeastern Mediterranean region and Eastern Africa, today it is widespread throughout tropical regions and is found Worldwide.** The phytotoxin is **ricin**, an extremely toxic water soluble protein, which is concentrated in the seed. Also present are ricinine, an alkaloid, and an irritant oil. Causes burning in mouth and throat, convulsions, and is often fatal.

• Daffodil. **Native to Europe, North Africa, and Asia, found worldwide.** The bulbs are poisonous and cause nausea, vomiting, and diarrhea. **Can be fatal.**

• Daphne (Daphne sp.) **Native to Asia, Europe, and north Africa, also found as ornamental plant worldwide.** The berries (either red or yellow) are poisonous, causing burns to mouth and digestive tract, followed by coma. **Often fatal.**

• Darnel/Poison Ryegrass (Lolium temulentum) **Usually grows in the same production zones as wheat and is considered a weed.** The seeds and seed heads of this common garden weed may contain the alkaloids temuline and lolilne. Some experts also point to the fungus ergot or fungi of the genus **endoconidium** both of which grow on the seed heads of rye grasses as an additional source of toxicity.

• Datura nightshade. **Found in temperate and tropical regions of the globe, but is most likely restricted to the Americas, from the United States south through Mexico (where the highest species diversity occurs) to the mid-latitudes of South America. Found in China, It also grows naturally throughout India and most of Australia.** Contains the alkaloids scopolamine and atropine. Datura has been used as a hallucinogenic drug, eg by the native peoples of the Americas.
Deadly nightshade (*Atropa belladonna*) Native to Europe, North Africa, and Western Asia, and has become naturalized in parts of North America. All parts of the plant contain the toxic alkaloid atropine. The young plants and seeds are especially poisonous, causing nausea, muscle twitches, paralysis; often fatal.

Deathcamas / black snakeroot/Star Lily Found in North America and Asia. All parts of the plant are poisonous, causing nausea, severe upset.

Delphinium/Larkspur Contains the alkaloid Delsoline. Native throughout the Northern Hemisphere and also on the high mountains of tropical Africa. Young plants and seeds are poisonous, causing nausea, muscle twitches, paralysis, often fatal.

Doll's eyes/White Baneberry). Native to eastern North America. Berries are highly poisonous, as well as all other parts.

Dumbcane / dieffenbachia. Found in tropical areas and popular as house plants. All parts are poisonous, causing intense burning, irritation, and immobility of the tongue, mouth, and throat. Swelling can be severe enough to block breathing leading to death.

Elderberry Native to temperate to subtropical regions of both the Northern Hemisphere and the Southern Hemisphere; the genus is more widespread in the Northern Hemisphere, with Southern Hemisphere occurrence restricted to parts of Australasia and South America. The roots are poisonous and cause nausea and digestive upset.

European Holly (*Ilex aquifolium*) Native to western and southern Europe, northwest Africa and southwest Asia widely planted in New Zealand, the cooler areas of Australia, and North America. The berries are poisonous, causing gastroenteritis.

Foxglove (*Digitalis purpurea*). Native to Europe, western and central Asia, and northwestern Africa (widely grown as an ornamental plant. The leaves, seeds, and flowers are poisonous, containing cardiac or other steroid glycosides. These cause irregular heartbeat, and generally digestive upset and confusion. Can be fatal.

Gifblaar (*Dichapetalum cymosum*). Found in South Africa; this plant contains the metabolic poison fluoroacetic acid and appears to be a hazard primarily to livestock. Fluoroacetic acid is also found in at least 40 Australian plant species.

Hemlock (*Conium maculatum*). Native to Europe and the Mediterranean region (*C. maculatum*), and to southern Africa (*C. chaerophyllum*). Poison hemlocks have also been cultivated in much of Asia, North America and Australia. All parts of the plant contain the relatively simple alkaloid conine which causes stomach pains, vomiting, progressive paralysis of the central nervous system. Can be fatal; it is the poison which killed Socrates.
- Henbane **Originated in Eurasia though it is now globally distributed.** Seeds and foliage poisonous. An anesthetic as well as having psychoactive properties. Toxic effects of henbane use in humans include hallucinations, dilated pupils, restlessness, and flushed skin and potentially tachycardia, convulsions, vomiting, hypertension, hyperpyrexia and ataxia.

- Horse-chestnut. **Native to a small area in the mountains of the Balkans in southeast Europe, in small areas in northern Greece, Albania, the Republic of Macedonia, Serbia, and Bulgaria.** It is widely cultivated throughout the temperate world. All parts of the plant are poisonous, causing nausea, muscle twitches, and sometimes, paralysis.

- Hyacinth. **Native to southwestern Asia, in southern and central Turkey, northwestern Syria and Lebanon.** It is widely cultivated throughout the world. The bulbs are poisonous, causing nausea, vomiting, gasping, convulsions, and possibly death.

- Ivy. Native to the Atlantic Islands, western, central and southern Europe, northwestern Africa, across central-southern Asia east to Japan and parts of North America where winters are not severe. The leaves and berries are poisonous, causing stomach pains, labored breathing, possible coma.

- Jequirity **Tropical areas of in Africa, in Asia and in the Americas.** The seed is highly poisonous. Toxicity is similar to that of ricin, however, more toxic and deadly. Berries are used for beads. A puncture with an object contaminated with the toxin can be deadly.

- Jerusalem cherry **USA, NC, South America** All parts, especially the berries, are poisonous, causing nausea and vomiting. **Looks like a cherry tomato.** It is occasionally fatal, especially to children.

- Jimson weed / datura / thorn apple / stinkweed / gypsum wees/Jamestown weed (*Datura stramonium*) It is found throughout much of the United States, most commonly in the South except for Texas. *Datura stramonium* is also found throughout many other parts of the world. All parts of the plant are poisonous, causing abnormal thirst, vision distortions, delirium, incoherence, coma. Often fatal.

- Laburnum **native to the mountains of southern Europe from France to the Balkan Peninsula. Cultivated worldwide as an ornamental.** Some botanists include a third species, *Laburnum caramanicum*, but this native of southeast Europe and Asia Minor is usually treated in a distinct genus *Podocytisus*, more closely allied to the brooms. All parts, especially the seeds, are poisonous, causing excitement, staggering, convulsions, coma, occasionally fatal.

- Larkspur (both *Delphinium* and *Consolida*). **Native throughout the Northern Hemisphere and also on the high mountains of tropical Africa.** Young plants and seeds are poisonous, causing nausea, muscle twitches, paralysis. Often fatal.

- Lilies **Worldwide** There are some 3500 species that comprise the lily (Lilaceae) family. Some are beneficial including (foods such as onion, shallot, garlic, chives [all *Allium* spp] and asparagus) and some with medicinal uses (colchicine and red squill) Many produse alkalids which are poisonous, especially to cats.
• Manchineel (*Hippomane mancinella*) **Native to the Caribbean (including Florida, Puerto Rico and the Virgin Islands)** also found in Central America, South America and **Western Africa**. It is one of the most poisonous trees in the world. All parts of this tree including the fruit contain toxic phorbol esters typical of the Euphorbiaceae. Sap may cause burning of the skin and smoke form burning may cause eye irritation and blindness. Fruits, which are similar in appearance to an apple, are green or greenish-yellow when ripe.

• Mayapple (*Podophyllum peltatum*) **Native to the eastern part of North America**. Green portions of the plant, unripe fruit, and especially the rhizome contain the non-alkaloid toxin podophyllotoxin which causes diarrhea, severe digestive upset.

• Monkshood. See Aconite above.

• Moonseed. Native to North America, East Asia, and Mexico. The fruits and seeds are poisonous, causing nausea and vomiting. **Often fatal.**

• Oleander (*Nerium oleander*) **Native to a broad area from Morocco and Portugal eastward through the Mediterranean region and southern Asia to Yunnan in southern parts of China. Cultivated worldwide as an ornamental.** All parts are toxic, containing neroside, oleandroside, saponins, cardiac glycosides, but especially the leaves and woody stems. They cause severe digestive upset, heart trouble, contact dermatitis. **Often fatal.**

• Oak Worldwide Most species foliage and acorns are mildly poisonous, causing digestive upset, heart trouble, contact dermatitis. Rarely fatal.

• Poison-ivy (*Toxicodendron radicans*), Poison-oak (*T. diversilobum*), and Poison Sumac (*T.vernix*) **North America** All parts of these plants contain a highly irritating oil with urushiol (this is actually not a poison but an allergen). Skin reactions can include blisters and rashes. It spreads readily to clothes and back again, and has a very long life. Infections can follow scratching.

• Pokeweed (*Phytolacca sp.*) **Native to North America, South America, East Asia and New Zealand.** Leaves, berries and roots contain phytolaccatoxin and phytolaccigenin - toxin in young leaves is reduced with each boiling and draining.

• Privet (*Ligustrum sp.*) **Native to Europe, north Africa, Asia and Australasia, with the centre of diversity in China, the Himalaya, Japan and Taiwan. Cultivated worldwide.** Berries and leaves are poisonous. Berries contain ligustrin and syringin, which causes digestive disturbances, nervous symptoms. **Can be fatal.**

• Water hemlock/Cowbane) **Native to temperate regions of the Northern Hemisphere mainly North America.** All parts **extremely poisonous.**
• **White snakeroot.** Native to eastern North America. All parts are poisonous, causing nausea and vomiting. **Often fatal.**

• **Yellow Jessamine/Yellow Jasmine.** Native plant in the southeastern United States as far west as Texas, tropical America from Guatemala north. All parts are poisonous, causing nausea and vomiting. Often fatal. It's possible to become ill from ingesting honey made from jessamine nectar.

• **Yew (Taxus baccata).** Native to western, central and southern Europe, northwest Africa, northern Iran and southwest Asia. Used Worldwide as an ornamental. All parts of the plant, except for the fleshy red bit of the fruit, contain taxane alkaloids. The seeds are especially poisonous and are quickly fatal when ingested.
Etiologic agents are those microorganisms and microbial toxins that cause disease in humans and include bacteria, bacterial toxins, viruses, fungi, rickettsiae, protozoans, and parasites. These disease-causing microorganisms may also be referred to as infectious agents. Arthropods and other organisms that transmit pathogens to animals (including humans) are called vectors.

Microbial hazards can occur when the materials handled by workers contain biological contamination. Biological contamination can be a problem if a chemical spill is mixed with sewage. Most bacteria that affects humans prefer a neutral environment (pH 7). Thus, an extremely acid or alkaline environment should destroy or inhibit bacterial growth. However, during neutralization, the environment could become more conducive to bacteria growth. In these situations, normal decontamination procedures will usually alleviate problems associated with worker contamination, although additional decontamination measures may be required for certain biological exposures.

**Primarily Hazardous Through the Injection or Penetration**

**STAPHYLOCOCCUS**

*Staphylococcus aureus*, often referred to simply as "staph," is a type of bacteria commonly carried on the skin or in the nose of healthy people. Sometimes, staph can cause an infection. Staph bacteria are one of the most common causes of skin infections in the United States. Most of these skin infections are minor (such as pustules and boils) and can be treated without antibiotics. However, staph bacteria also can cause serious infections (such as surgical wound infections, bloodstream infections, and pneumonia).

**Prevention**

In most cases the body is able to effectively respond and prevent staph infections. When the immune system is stressed or open wounds are not properly cared for, infections can set in. **There are also indications that risk of infection increases when people are tired or stressed. Response to emergencies increase stress and often result in fatigue due to long work hours.**

Getting adequate rest and reducing stress are two ways of reducing risk and preventing infection.

Getting good first aid for even minor injuries is important and even more so when stress increases or a person is tired. Obtaining medical evaluation at the first sign of infection is also critical.

In emergency responses, implement a fatigue Management Program as soon as possible.

**Treatment**

Beyond first aid, treatment consists of medically managed use of antibiotics. Over use of antibiotics may result in immunity, hence medical management is very important.
MRSA (Methicillin-resistant *Staphylococcus aureus*)

Methicillin-resistant *Staphylococcus aureus* (MRSA) refers to types of staph that are resistant to a type of antibiotic methicillin. MRSA is often resistant to other antibiotics, as well. While 25% to 30% of the population is colonized with staph (meaning that bacteria are present, but not causing an infection with staph), approximately 1% is colonized with MRSA.

Staph infections, including MRSA, occur most frequently among persons in hospitals and healthcare facilities (such as nursing homes and dialysis centers) who have weakened immune systems. These healthcare-associated staph infections include surgical wound infections, urinary tract infections, bloodstream infections, and pneumonia.

Staph and MRSA can also cause illness in persons outside of hospitals and healthcare facilities. MRSA infections that are acquired by persons who have not been recently (within the past year) hospitalized or had a medical procedure (such as dialysis, surgery, catheters) are known as community-associated MRSA infections. Staph or MRSA infections in the community are usually manifested as skin infections, such as pimples and boils, and occur in otherwise healthy people.

MRSA skin infections can occur anywhere. However, some settings have factors that make it easier for MRSA to be transmitted. These factors, referred to as the 5 C’s, are as follows: Crowding, frequent skin-to-skin Contact, Compromised skin (i.e., cuts or abrasions), Contaminated items and surfaces, and lack of Cleanliness. Locations where these conditions are common include schools, dormitories, military barracks, households, correctional facilities, and daycare centers.

**Prevention**

Prevention includes good sanitation in eating, living, and working facilities, frequent hand washing and good personal hygiene.

**Staphylococcal Food Poisoning**

Staphylococcal food poisoning is a gastrointestinal illness. It is caused by eating foods contaminated with toxins produced by *Staphylococcus aureus*. The most common way for food to be contaminated with *Staphylococcus* is through contact with food workers who carry the bacteria or through contaminated milk and cheeses. *Staphylococcus* is salt tolerant and can grow in salty foods like ham. As the germ multiplies in food, it produces toxins that can cause illness.

Staphylococcal toxins are resistant to heat and cannot be destroyed by cooking. Foods at highest risk of contamination with *Staphylococcus aureus* and subsequent toxin production are those that are made by hand and require no cooking. Some examples of foods that have caused staphylococcal food poisoning are sliced meat, puddings, some pastries and sandwiches.

Staphylococcal toxins are fast acting, sometimes causing illness in as little as 30 minutes.
Symptoms usually develop within one to six hours after eating contaminated food. Patients typically experience several of the following: nausea, vomiting, stomach cramps, and diarrhea. The illness is usually mild and most patients recover after one to three days. In a small minority of patients the illness may be more severe.

Patients with this illness are not contagious. Toxins are not transmitted from one person to another.

**Prevention**

It is important to prevent the contamination of food with *Staphylococcus* before the toxin can be produced.

Wash hands and under fingernails vigorously with soap and water before handling and preparing food.

Do not prepare food if you have a nose or eye infection.

Do not prepare or serve food for others if you have wounds or skin infections on your hands or wrists.

Keep kitchens and food-serving areas clean and sanitized.

If food is to be stored longer than two hours, keep hot foods hot (over 140°F) and cold foods cold (40°F or under).

Store cooked food in a wide, shallow container and refrigerate as soon as possible.

Staphylococcal enterotoxin B (SEB) (*Staphylococcus infections from natural occurring exposures are discussed above*). SEB are toxins produced by staphylococcus bacteria which can cause intoxication from natural exposure, SEB has also been researched as a biological weapon and is rated by CDC as Category B Agent. (See discussions later on in this document on Biological Warfare Agents)

The following information is based on laboratory produced infections. This would suggest that not only could the staphylococcus bacteria be present in medical wastes but the SEB could be present as well.

Clinical symptoms from SEB may vary and are dependent on the dosage and route of exposure. While inhaling SEB may result in fever, pulmonary, and gastrointestinal symptoms; ingestion of staphylococcal enterotoxins generally results mainly with gastrointestinal symptoms. The gastrointestinal symptoms noted in two persons with ocular or percutaneous exposures (or both) suggest that gastrointestinal symptoms from SEB may occur by a nonoral route, although transmission of SEB to the gastrointestinal tract via the lacrimal duct cannot be entirely excluded. Also, recurring symptoms of ocular irritation and erythema when in the presence of
SEB, and immediate resolution of symptoms when no longer in an SEB area, suggests a possible hypersensitivity to SEB.

Toxic and lethal doses of SEB vary greatly between animal species, mostly because of differences in receptor-binding affinities, and also vary depending on the route of exposure (14). In humans, the estimated 50% lethal dose (LD50) is 0.02 µg/kg and 50% effective dose (ED50) is 0.0004 µg/kg by aerosolized exposure. No data exist on the LD50 and ED50 in humans by other routes of exposure. The ED50 is estimated to be 0.03–0.26 µg/kg in monkeys and 12–40 µg in chimpanzees, by intraperitoneal or intravenous challenge. The extrapolation of the estimated values of ED50 of nonhuman primates to humans would suggest that 2 µg versus 840 µg of SEB would be needed to cause symptoms in a 70-kg person through the ocular or cutaneous route. Occurrence of symptoms in two persons after exposure to dosages of SEB <50 µg provides support that the lower ED50 value in monkeys may also apply to humans.

As exposure to low dosages of SEB can produce symptoms, these recently reported symptoms have importance both to safety officers and healthcare workers evaluating laboratory workers at risk with potential exposures to staphylococcal enterotoxins. SEB intoxication can mimic an infectious process.

**Prevention**

Personal protective measures such as bio-safety cabinets, respirators, gloves, and eye protection are paramount when working with SEB.

**Treatment**

For most patients, staphylococcal food poisoning will cause a brief illness. The best treatments for these patients are rest, plenty of fluids, and medicines to calm their stomachs. Highly susceptible patients, such as the young and the elderly, are more likely to have severe illness requiring intravenous therapy and care in a hospital.

Antibiotics are not useful in treating this illness. The toxin is not affected by antibiotics.

**TETANUS**

Tetanus, commonly called lockjaw, is caused by a bacterial toxin, or poison, that affects the nervous system. It is contracted through a cut or wound that becomes contaminated with tetanus bacteria. The bacteria can get in through even a tiny pinprick or scratch, but deep puncture wounds or cuts like those made by nails or knives are especially susceptible to infection with tetanus. Tetanus bacteria are present worldwide and are commonly found in soil, dust and manure. Tetanus causes severe muscle spasms, including “locking” of the jaw so the patient cannot open his/her mouth or swallow, and may lead to death by suffocation. Tetanus is not transmitted from person to person.
Symptoms

Common first signs of tetanus include muscular stiffness in the jaw (lockjaw) followed by stiffness of the neck, difficulty in swallowing, rigidity of abdominal muscles, generalized spasms, sweating and fever. Symptoms usually begin 7 days after bacteria enter the body through a wound, but this incubation period may range from 3 days to 3 weeks.

Prevention

Vaccination is the only way to protect against tetanus. Due to widespread immunization, tetanus is now a rare disease in the U.S. A booster immunization against tetanus is recommended every 10 years. A new combination vaccine, called Tdap, protects against tetanus, diphtheria and pertussis, and should be used for persons 11 to 64 years instead of Td (tetanus-diphtheria vaccine). Td should be used for adults 65 years and older. Adolescents and adults who have never received immunization against tetanus should start with a 3-dose primary series given over 7 to 12 months.

The wound must be cleaned. Dead and infected tissue should be removed by surgical debridement. Metronidazole treatment decreases the number of bacteria but has no effect on the bacterial toxin. Penicillin was once used to treat tetanus, but is no longer the treatment of choice because of a theoretical risk of increased spasms. It should still be used if metronidazole is not available. Passive immunization with human anti-tetanospasmin immunoglobulin or tetanus immune globulin is crucial. If specific anti-tetanospasmin immunoglobulin is not available, then normal human immunoglobulin may be given instead. All tetanus victims should be vaccinated against the disease or offered a booster shot.

It takes 2-14 days for symptoms to develop after infection. Symptoms peak 17 days after infection.

Mild tetanus

Mild cases of tetanus can be treated with:

Tetanus immune globulin IV or IM
metronidazole IV for 10 days
diazepam
tetanus vaccination

Severe tetanus

Severe cases will require admission to intensive care. In addition to the measures listed above for mild tetanus
MELIOIDOSIS

Melioidosis is an infectious disease caused by a Gram-negative bacterium, *Burkholderia pseudomallei*, found in soil and water. It is of public health importance in endemic areas, particularly in Thailand and northern Australia. It exists in acute and chronic forms. The causative organism, *Burkholderia pseudomallei*, was thought to be a member of the *Pseudomonas* genus and was previously known as *Pseudomonas pseudomallei*. This organism is phylogenetically related closely to *Burkholderia mallei*, the organism that causes glanders.

Melioidosis is endemic in parts of south east Asia (including Thailand, Singapore, Malaysia, Burma and Vietnam) and northern Australia. Multiple cases have also been described in southern China and Hong Kong, Brunei, Taiwan, India, and Laos, and sporadic cases in Central and South America, the Middle East, the Pacific and several African countries. Although only one case of melioidosis has ever been reported in Bangladesh, at least five cases have been imported to the UK from that country, which suggests that melioidosis is endemic to that country and that there is a serious problem of under diagnosis or under-reporting in that country, most likely due to a lack of adequate laboratory facilities.

Acute melioidosis

In the subgroup of patients where an inoculating event was noted, the mean incubation period of acute melioidosis was 9 days (range 1-21 days). Patients with latent melioidosis may be symptom free for decades; the longest period between presumed exposure and clinical presentation is 62 years. The potential for prolonged incubation was recognized in US servicemen involved in the Vietnam War, and was referred to as the "Vietnamese time-bomb". There is a wide spectrum of severity; in chronic presentations, symptoms may last months, but fulminant infection, particularly associated with near-drowning, may present with severe symptoms over hours.

A patient with active melioidosis usually has a fever. Pain or other symptoms may be suggestive of a clinical focus, which is found in around 75% of patients. Such symptoms include cough or pleuritic chest pain suggestive of pneumonia, bone or joint pain suggestive of osteomyelitis or septic arthritis, or cellulitis. Intra-abdominal infection (including liver and/or splenic abscesses, or prostatic abscesses) do not usually present with focal pain, and imaging of these organs using ultrasound or CT should be performed routinely. It has been suggested that *B. pseudomallei* abscesses have a characteristic honeycomb architecture (hypoechoic, multi-septate, multiloculate).

There are regional variations in disease presentation: parotid abscesses characteristically occur in Thai children but this presentation has only been described once in Australia. [19] Conversely, prostatic abscesses are found in up to 20% of Australian males but are rarely described elsewhere. An encephalomyelitis syndrome is recognised in northern Australia. Patients with melioidosis usually have risk factors for disease, such as diabetes, thalassemia, hazardous alcohol use or renal disease, and frequently give a history of occupational or recreational exposure to mud or pooled surface water. However, otherwise healthy patients, including children, may also get melioidosis.
In up to 25% of patients, no focus of infection is found and the diagnosis is usually made on blood cultures or throat swab. Melioidosis is said to be able to affect any organ in the body except the heart valves (endocarditis). Although meningitis has been described secondary to ruptured brain abscesses, primary meningitis has not been described. Less common manifestation include intravascular infection, lymph node abscesses (1.2–2.2%), pyopericardium and myocarditis, mediastinal infection, and thyroid and scrotal abscesses and ocular infection.

**Chronic melioidosis**

Chronic melioidosis is usually defined by a duration of symptoms greater than 2 months and occurs in approximately 10% of patients. The clinical presentation of chronic melioidosis is protean and includes such presentations as chronic skin infection, skin ulcers and lung nodules or chronic pneumonia, closely mimicking tuberculosis, sometimes being called "Vietnamese tuberculosis".

**Prevention**

A vaccine is not yet available

There are only few unusual cases documented for person-to-person transmission; no isolation is required for patients with melioidosis. Lab workers should handle *Burkholderia pseudomallei* under biosafety level (BSL)-3 isolation conditions, as laboratory acquired melioidosis has been described. Following laboratory exposure, post exposure prophylaxis with cotrimoxazole has been suggested but has not been evaluated by clinical trials.

In endemic areas, people (rice-paddy farmers in particular) are warned to avoid contact with soil, mud and surface water where possible. Case clusters have been described following flooding and cyclones and probably relate to exposure. Other case clusters have related to contamination of drinking water supplies. Populations at risk include patients with diabetes mellitus, chronic renal failure, chronic lung disease or patients with an immune deficiency of any kind. The effectiveness of measures to reduce exposure to the causative organism have not been established.
Food and Water Borne Disease Often Associated With Poor or Compromised Sanitation

Waterborne and foodborne diseases can be a problem if adequate precautions are not taken. Examples of waterborne diseases are cholera, typhoid fever, viral hepatitis, salmonellosis, bacillary dysentery, and amoebic dysentery. In an emergency response related to a disaster, water supplies may be affected. The source of water for a long-term remedial action is also important. In some locations, it may be necessary to transport water and food to the site. The food and water must be handled properly and come from an uncontaminated source.

Sanitation includes providing adequate supplies of potable drinking water, provisions for proper food storage and provision of properly designed lavatory facilities. Note that OSHA requires proper sanitation measures at temporary job sites.

SALMONELLOSIS

Salmonellosis is an infection with a bacteria called Salmonella. Most persons infected with Salmonella develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts 4 to 7 days, and most persons recover without treatment. However, in some persons the diarrhea may be so severe that the patient needs to be hospitalized. In these patients, the Salmonella infection may spread from the intestines to the blood stream, and then to other body sites and can cause death unless the person is treated promptly with antibiotics. The elderly, infants, and those with impaired immune systems are more likely to have a severe illness.

The Salmonella germ is actually a group of bacteria that can cause diarrheal illness in humans. They are microscopic living creatures that pass from the feces of people or animals, to other people or other animals. There are many different kinds of Salmonella bacteria. Salmonella is found worldwide. Salmonella serotype Typhimurium and Salmonella serotype Enteritidis are the most common in the United States.

Every year, approximately 40,000 cases of salmonellosis are reported in the United States. Because many milder cases are not diagnosed or reported, the actual number of infections may be thirty or more times greater. Salmonellosis is more common in the summer than winter. Children are the most likely to get salmonellosis. Young children, the elderly, and the immunocompromised are the most likely to have severe infections. It is estimated that approximately 600 persons die each year with acute salmonellosis.

Many different kinds of illnesses can cause diarrhea, fever, or abdominal cramps. Determining that Salmonella is the cause of the illness depends on laboratory tests that identify Salmonella in the stools of an infected person.

Salmonella infections usually resolve in 5-7 days and often do not require treatment unless the patient becomes severely dehydrated or the infection spreads from the intestines. Persons with severe diarrhea may require rehydration, often with intravenous fluids. Antibiotics are not usually necessary unless the infection spreads from the intestines, then it can be treated with ampicillin, gentamicin, trimethoprim/sulfamethoxazole, or ciprofloxacin. Unfortunately, some
Salmonella bacteria have become resistant to antibiotics, largely as a result of the use of antibiotics to promote the growth of feed animals.

Persons with diarrhea usually recover completely. A small number of persons who are infected with Salmonella, will go on to develop pains in their joints, irritation of the eyes, and painful urination. This is called Reiter's syndrome. It can last for months or years, and can lead to chronic arthritis which is difficult to treat. Antibiotic treatment does not make a difference in whether or not the person later develops arthritis.

Salmonella live in the intestinal tracts of humans and other animals, including birds. Salmonella are usually transmitted to humans by eating foods or drinking water contaminated with animal feces. Contaminated foods usually look and smell normal. Contaminated foods are often of animal origin, such as beef, poultry, milk, or eggs, but all foods, including vegetables may become contaminated. Many raw foods of animal origin are frequently contaminated, but fortunately, thorough cooking kills Salmonella. Food may also become contaminated by the unwashed hands of an infected food handler, who forgot to wash his or her hands with soap after using the bathroom.

There is no vaccine to prevent salmonellosis. Since foods of animal origin may be contaminated with Salmonella, people should not eat raw or undercooked eggs, poultry, or meat. Raw eggs may be unrecognized in some foods such as homemade hollandaise sauce, caesar and other homemade salad dressings, tiramisu, homemade ice cream, homemade mayonnaise, cookie dough, and frostings. Poultry and meat, including hamburgers, should be well-cooked, not pink in the middle. Persons also should not consume raw or unpasteurized milk or other dairy products. Produce should be thoroughly washed before consuming.

Cross-contamination of foods should be avoided. Uncooked meats should be keep separate from produce, cooked foods, and ready-to-eat foods. Hands, cutting boards, counters, knives, and other utensils should be washed thoroughly after handling uncooked foods. Hand should be washed before handling any food, and between handling different food items.

People who have salmonellosis should not prepare food or pour water for others until they have been shown to no longer be carrying the Salmonella bacterium.

People should wash their hands after contact with animal feces. Since reptiles are particularly likely to have Salmonella, everyone should immediately wash their hands after handling reptiles. Reptiles (including turtles) are not appropriate pets for small children and should not be in the same house as an infant.

**Prevention**

Cook poultry, ground beef, and eggs thoroughly before eating. Do not eat or drink foods containing raw eggs, or raw un-pasteurized milk.

Wash hands, kitchen work surfaces, and utensils with soap and water immediately after they have been in contact with raw meat or poultry.
ESCHERICHIA COLI (O157:H7)

*E. coli* O157:H7 is one of hundreds of strains of the bacterium *Escherichia coli*. Although most strains are harmless, this strain produces a powerful toxin that can cause severe illness. *E. coli* O157:H7 has been found in the intestines of healthy cattle, deer, goats, and sheep. The combination of letters and numbers in the name of the bacterium refers to the specific markers found on its surface and distinguishes it from other types of *E. coli*.

*Escherichia coli* O157:H7 is a leading cause of foodborne illness worldwide. Based on a 1999 estimate, 73,000 cases of infection and 61 deaths occur in the United States each year.

Infection with *E. coli* often leads to bloody diarrhea, and occasionally to kidney failure. People can become infected with *E. coli* O157:H7 in a variety of ways. Though most illness has been associated with eating undercooked, contaminated ground beef, people have also become ill from eating contaminated bean sprouts or fresh leafy vegetables such as lettuce and spinach. Person-to-person contact in families and child care centers is also a known mode of transmission. In addition, infection can occur after drinking raw milk and after swimming in or drinking sewage-contaminated water.

**Prevention**

*E. coli* O157:H7 infection can be prevented by thoroughly cooking ground beef, avoiding unpasteurized milk, and by washing hands carefully before preparing or eating food. Fruits and vegetables should be washed well, but washing may not remove all contamination.

**BOTULISM**

Botulism is a rare but serious paralytic illness caused by a nerve toxin that is produced by the bacterium *Clostridium botulinum*. There are three main kinds of botulism. Foodborne botulism is caused by eating foods that contain the botulinum toxin. Wound botulism is caused by toxin produced from a wound infected with *Clostridium botulinum*. Infant botulism is caused by consuming the spores of the botulinum bacteria, which then grow in the intestines and release toxin. All forms of botulism can be fatal and are considered medical emergencies.

*Clostridium botulinum* is the name of a group of bacteria commonly found in soil. These rod-shaped organisms grow best in low oxygen conditions. The bacteria form spores which allow them to survive in a dormant state until exposed to conditions that can support their growth. There are seven types of botulism toxin designated by the letters A through G; only types A, B, E and F cause illness in humans.

The Botulism organism is found worldwide, however, most cases are reported in the United States. In the United States an average of 110 cases of botulism are reported each year. Of these, approximately 25% are foodborne, 72% are infant botulism, and the rest are wound botulism. Outbreaks of foodborne botulism involving two or more persons occur most years and usually caused by eating contaminated home-canned foods. The number of cases of foodborne and infant botulism has changed little in recent years, but wound botulism has increased because of the use of black-tar heroin, especially in California.

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The classic symptoms of botulism include double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, and muscle weakness. These are all symptoms of the muscle paralysis caused by the bacterial toxin. If untreated, these symptoms may progress to cause paralysis of the arms, legs, trunk and respiratory muscles. In foodborne botulism, symptoms generally begin 18 to 36 hours after eating a contaminated food, but they can occur as early as 6 hours or as late as 10 days. Botulism can result in death due to respiratory failure. Patients who survive an episode of botulism poisoning may have fatigue and shortness of breath for years and long-term therapy may be needed to aid recovery.

**Prevention**

Foodborne botulism has often been from home-canned foods with low acid content, such as asparagus, green beans, beets and corn. However, outbreaks of botulism from more unusual sources such as chopped garlic in oil, chile peppers, tomatoes, improperly handled baked potatoes wrapped in aluminum foil, and home-canned or fermented fish. Oils infused with garlic or herbs should be refrigerated. Potatoes which have been baked while wrapped in aluminum foil should be kept hot until served or refrigerated. Because the botulism toxin is destroyed by high temperatures, persons who eat home-canned foods should consider boiling the food for 10 minutes before eating it to ensure safety. Because honey can contain spores of *Clostridium botulinum* and this has been a source of infection for infants, children less than 12 months old should not be fed honey. Honey is safe for persons 1 year of age and older. Wound botulism can be prevented by promptly seeking medical care for infected wounds and by not using injectable street drugs.

**CHOLERA**

Cholera is an acute intestinal infection caused by ingestion of food or water contaminated with the bacterium *Vibrio cholerae*. It has a short incubation period, from less than one day to five days, and produces an enterotoxin that causes a copious, painless, watery diarrhea that can quickly lead to severe dehydration and death if treatment is not promptly given. Vomiting also occurs in most patients.

Cholera may be encountered worldwide but is most prevalent in Indonesia, most of Asia, Eastern Europe, and Africa.

Cholera is spread by eating or drinking contaminated food or water.

**Prevention:**

The available vaccine is only 50% effective and only lasts two to six months.

Avoid risky foods and drinks.

Buy it bottled or bring it to a rolling boil for 1 minute before drink it. Bottled carbonated water is safer than non-carbonated water.
Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles
and flavored ices that may have been made with contaminated water.

Eat foods that have been thoroughly cooked and that are still hot and steaming

Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily
contaminated and are very hard to wash well. When eating raw fruit or vegetables that can be
peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings.

Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the
street, and many travelers get sick from food bought from street vendors.

**TYPHOID FEVER (Not to be confused with Typhus discussed elsewhere in these FLDs)**

Typhoid fever is a life-threatening illness caused by the bacterium *Salmonella* Typhi. In the
United States about 400 cases occur each year, and 75% of these are acquired while traveling
internationally. Typhoid fever is common in most parts of the world except in industrialized
regions such as the United States, Canada, western Europe, Australia, and Japan. Therefore, if
you are traveling to the developing world, you should consider taking precautions. Over the past
10 years, travelers from the United States to Asia, Africa, and Latin America have been
especially at risk.

Typhoid fever can be prevented and can usually be treated with antibiotics. If you are planning to
travel outside the United States, you should know about typhoid fever and what steps you can
take to protect yourself

*Salmonella* Typhi lives only in humans. Persons with typhoid fever carry the bacteria in their
bloodstream and intestinal tract. In addition, a small number of persons, called carriers, recover
from typhoid fever but continue to carry the bacteria. Both ill persons and carriers shed *S.* Typhi
in their feces (stool).

Typhoid fever can be contracted from eating food or drinking beverages that have been handled
by a person who is shedding *S.* Typhi or if sewage contaminated with *S.* Typhi bacteria gets into
the water used for drinking or washing food. Therefore, typhoid fever is more common in areas
of the world where hand-washing is less frequent and water is likely to be contaminated with
sewage.

Once *S.* Typhi bacteria are eaten or drunk, they multiply and spread into the bloodstream. The
body reacts with fever and other signs and symptoms.

Persons with typhoid fever usually have a sustained fever as high as 103° to 104° F (39° to 40°
C). They may also feel weak, or have stomach pains, headache, or loss of appetite. In some
cases, patients have a rash of flat, rose-colored spots. The only way to know for sure if an illness
is typhoid fever is to have samples of stool or blood tested for the presence of *S.* Typhi.

**Prevention**
Two basic actions can protect against typhoid fever:

- Get vaccinated against typhoid fever.

If travel to a country where typhoid is common is anticipated, consider being vaccinated against typhoid. Contact Weston Global for assistance.

It is important to complete vaccination at least 1 week before travel so that the vaccine has time to take effect. Typhoid vaccines lose effectiveness after several years; check with a doctor to see if it is time for a booster vaccination. Taking antibiotics will not prevent typhoid fever; they only help treat it.

- Avoid risky foods and drinks.

Buy it bottled or bring it to a rolling boil for 1 minute before drink it. Bottled carbonated water is safer than non-carbonated water.

Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.

Eat foods that have been thoroughly cooked and that are still hot and steaming

Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well. When eating raw fruit or vegetables that can be peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings.

Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the street, and many travelers get sick from food bought from street vendors.

**SHIGELLA**

Shigella is a genus of Gram-negative, non-motile, non-spore forming rod-shaped bacteria closely related to Escherichia coli and Salmonella. The causative agent of human shigellosis, Shigella also cause disease in other primates, but not in other mammals.

Shigella infection is typically via ingestion of contaminated water or food. Depending on age and condition of the host as few as ten bacterial cells can be enough to cause an infection. Shigella cause dysentery that results in the destruction of the epithelial cells of the intestinal mucosa in the cecum and rectum. Some strains produce enterotoxin and Shiga toxin, similar to the verotoxin of *E. coli* O157:H7. Both Shiga toxin and verotoxin are associated with causing hemolytic uremic syndrome.

Shigella invade the host through epithelial cells of the large intestine. Using a Type III secretion system acting as a biological syringe, the bacterium injects *IpaD* protein into cell, triggering bacterial invasion and the subsequent lysis of vacuolar membranes using *IpaB* and *IpaC* proteins. It utilizes a mechanism for its motility by which its *IcsA* protein triggers actin polymerization in
the host cell (via N-WASP recruitment of Arp2/3 complexes) in a "rocket" propulsion fashion for cell-to-cell spread.

The most common symptoms are diarrhea, fever, nausea, vomiting, stomach cramps, and straining to have a bowel movement. The stool may contain blood, mucus, or pus (e.g. dysentery). In rare cases, young children may have seizures. Symptoms can take as long as a week to show up, but most often begin two to four days after ingestion. Symptoms usually last for several days, but can last for weeks. Shigella is implicated as one of the pathogenic causes of reactive arthritis worldwide.

**Prevention**

Simple precautions can be taken to prevent getting Shigellosis: wash hands before handling food and thoroughly cook all food before eating.

There is no vaccine to prevent shigellosis. However, the spread of *Shigella* from an infected person to other persons can be stopped by frequent and careful hand-washing with soap. Frequent and careful hand-washing is important among all age groups.

**CLOSTRIDIUM PERFRINGENS**

*Clostridium perfringens* (formerly known as *Clostridium welchii*) is a Gram-positive, rod-shaped, anaerobic, spore-forming bacterium of the genus *Clostridium*. *C. perfringens* is ubiquitous in nature and can be found as a normal component of decaying vegetation, marine sediment, the intestinal tract of humans and other vertebrates, insects, and soil. Virtually every soil sample ever examined, with the exception of the sands of the Sahara, has contained *C. perfringens*.

*C. perfringens* is commonly encountered in infections as a benign component of the normal flora. In this case, its role in disease is minor. Infections due to *C. perfringens* show evidence of tissue necrosis, bacteremia, emphysematous cholecystitis, and gas gangrene, which is also known as clostridial myonecrosis. The toxin involved in gas gangrene is known as α-toxin, which inserts into the plasma membrane of cells, producing gaps in the membrane which disrupt normal cellular function.

Some strains of *C. perfringens* produce toxins which cause food poisoning if ingested. In the United Kingdom and United States they are the third most common cause of food-borne illness, with poorly prepared meat and poultry the main culprits in harboring the bacterium. The clostridial enterotoxin mediating the disease is often heat-resistant and can be detected in contaminated food and feces.

Incubation time is between 8 and 16 hours after ingestion of contaminated food. Manifestations typically include abdominal cramping and diarrhea - vomiting and fever are unusual. The whole course usually resolves within 24 hours. Very rare, fatal cases of clostridial necrotizing enteritis have been known to involve "Type C" strains of the organism, which produce a potently ulcerative β-toxin.
It is likely that many cases of *C. perfringens* food poisoning remain sub clinical, as antibodies to the toxin are common amongst the population. This has led to the conclusion that most, if not all, of the population has experienced food poisoning due to *C. perfringens*.

**Prevention**
There is no vaccine available for humans

Prevention is provided by heating and cooling meat products and gravies properly.

Where contamination with the organism is suspected, wear appropriate PPE including respiratory protection. Prevent contact with open wounds. Decontaminate and manage waste including PPE by bagging and properly containerizing. Depending on the strain, heat may not be effective.

**CRYPTOSPORIDIUM**

Cryptosporidium is a protozoan pathogen of the Phylum Apicomplexa and causes a diarrheal illness called cryptosporidiosis. *Cryptosporidium* does not utilize an insect vector and is capable of completing its life cycle within a single host, resulting in cyst stages which are excreted in feces and are capable of transmission to a new host.

A number of species of *Cryptosporidium* infect mammals. In humans, the main causes of disease are *C. parvum* and *C. hominis* (previously *C. parvum* genotype 1). *C. canis*, *C. felis*, *C. meleagridis*, and *C. muris* can also cause disease in humans.

*Cryptosporidium* lives in the intestine of infected humans or animals. *Cryptosporidium* is found in soil, food, water, or surfaces that have been contaminated with infected human or animal feces in every region of the United States and throughout the world.

If a person swallows the parasite they become infected. You **cannot** become infected through contact with blood. The parasite can be spread by

Accidentally putting something into your mouth or swallowing something that has come into contact with contamination.

Swallowing recreational water contaminated with *Cryptosporidium* (Recreational water includes water in swimming pools, hot tubs, jacuzzis, fountains, lakes, rivers, springs, ponds, or streams that can be contaminated with sewage or feces from humans or animals.) **Note:** *Cryptosporidium* can survive for days in swimming pools with adequate chlorine levels.
Eating uncooked food contaminated with *Cryptosporidium*.

**Symptoms**

The most common symptom of cryptosporidiosis is watery diarrhea. Other symptoms include:
Dehydration
Weight loss
Stomach cramps or pain
Fever
Nausea
Vomiting

Some people will have no symptoms at all. While the small intestine is the site most commonly affected, *Cryptosporidium* infections could possibly affect other areas of the digestive or the respiratory tract.

Symptoms of cryptosporidiosis generally begin 2 to 10 days (average 7 days) after becoming infected with the parasite.

In persons with healthy immune systems, symptoms usually last about 1 to 2 weeks. The symptoms may go in cycles in which you may seem to get better for a few days, then feel worse again before the illness ends.

People who are most likely to become infected with *Cryptosporidium* include:

- Children who attend day care centers, including diaper-aged children
- Child care workers
- Parents of infected children
- International travelers
- Backpackers, hikers, and campers who drink unfiltered, untreated water
- People who drink from shallow, unprotected wells
- People who swallow water from contaminated sources

**Prevention**

**Practice good hygiene.**

Wash hands thoroughly with soap and water.
Wash hands after using the toilet and before handling or eating food (especially for persons with diarrhea).
Wash hands after every diaper change, especially if you work with diaper-aged children, even if you are wearing gloves.
Protect others by not swimming if you are experiencing diarrhea (essential for children in diapers).

**Avoid water that might be contaminated.**

Do not swallow recreational water
Do not drink untreated water from shallow wells, lakes, rivers, springs, ponds, and streams.
Do not drink untreated water during community-wide outbreaks of disease caused by contaminated drinking water.
Do not use untreated ice or drinking water when traveling in countries where the water supply might be unsafe. In the United States, nationally distributed brands of bottled or canned carbonated soft drinks are safe to drink. Commercially packaged non-carbonated soft drinks and fruit juices that do not require refrigeration until after they are opened (those that are stored un-refrigerated on grocery shelves) also are safe.

If you are unable to avoid using or drinking water that might be contaminated, then you can make the water safe to drink by doing one of the following:

Heat the water to a rolling boil for at least 1 minute, or
Use a filter that has an absolute pore size of 1 micron or smaller, or one that has been NSF rated for "cyst removal."

Do not rely on chemicals to disinfect water and kill Cryptosporidium. Because it has a thick outer shell, this particular parasite is highly resistant to disinfectants such as chlorine and iodine.

Avoid food that might be contaminated.

Wash and/or peel all raw vegetables and fruits before eating.
Use safe, uncontaminated water to wash all food that is to be eaten raw.
Avoid eating uncooked foods when traveling in countries with minimal water treatment and sanitation systems.

Take extra care when traveling.

If you travel to developing nations, you may be at a greater risk for Cryptosporidium infection because of poorer water treatment and food sanitation. Warnings about food, drinks, and swimming are even more important when visiting developing countries. Avoid foods and drinks, in particular raw fruits and vegetables, tap water, or ice made from tap water, unpasteurized milk or dairy products, and items purchased from street vendors. These items may be contaminated with Cryptosporidium. Steaming-hot foods, fruits you peel yourself, bottled and canned processed drinks, and hot coffee or hot tea are probably safe. Talk with your health care provider about other guidelines for travel abroad.
SCHISTOSOMIASIS

Schistosomiasis or bilharzia is a parasitic disease caused by several species of flatworm. The acute form of schistosomiasis is sometimes known as snail fever and cutaneous schistosomiasis is sometimes commonly called swimmer's itch.

There are five species of flatworms that cause schistosomiasis. Each causes a different clinical presentation of the disease. Schistosomiasis may localize in different parts of the body, and its localization determines its particular clinical profile.

Schistosoma Mansoni (ICD 10 B65.1 and Shistasoma intercalcatum (B 65.8) cause intestinal schistosomiasis. Shistosoma haematobium (B65.0) causes urinary schistosomiasis. Shistosoma japonicum (B65.2) and Shistosoma mekongi (B65.8) cause Asian intestinal schistosomiasis.

The disease is found in tropical countries in Africa, Caribbean, eastern South America, east Asia and in the Middle East. Schistosoma mansoni is found in parts of South America and the Caribbean, Africa, and the Middle East; S. haematobium in Africa and the Middle East; and S. japonicum in the Far East. S. mekongi and S. intercalatum are found focally in Southeast Asia and central West Africa, respectively.

Schistosomiasis is contracted by swimming or working in water in which the parasite is present. The parasitic flatworm eggs are shed by infected humans into water systems where they infest fresh water snails, in the snails the flatworms form sporocysts which reproduce and are shed by the snails back into the water as parasites, known as cercariae. The cercariae are attracted by the chemicals in humans skin attach and penetrate resulting in infection.

Although it has a low mortality rate, Schistosomiasis is a chronic disease which can be very debilitating. Pathology of S. mansoni and S. japonicum schistosomiasis includes: Katayama fever, hepatic perisinusoidal egg granulomas, Symmers’ pipe stem periportal fibrosis, portal hypertension, and occasional embolic egg granulomas in brain or spinal cord. Pathology of S. haematobium schistosomiasis includes: hematuria, scarring, calcification, squamous cell carcinoma, and occasional embolic egg granulomas in brain or spinal cord. Bladder Cancer diagnosis and mortality are generally elevated in affected areas.

Many infections are subclinically symptomatic, with mild anemia and malnutrition being common in endemic areas. Acute schistosomiasis (Katayama's fever) may occur weeks after the initial infection, especially by S. mansoni and S. japonicum.

Manifestations include:

Abdominal pain, Cough, Diarrhea, Eosinophilia - extremely high eosinophil granulocyte count, Fever, Fatigue, Hepatosplenomegaly - the enlargement of both the liver and the spleen.

Occasionally central nervous system lesions occur: cerebral granulomatous disease may be caused by ectopic S. japonicum eggs in the brain, and granulomatous lesions around ectopic eggs in the spinal cord from S. mansoni and S. haematobium infections may result in a transverse...
myelitis with flaccid paraplegia. Continuing infection may cause granulomatous reactions and fibrosis in the affected organs, which may result in manifestations that include:
Colonic polyposis with bloody diarrhea (*Schistosoma mansoni* mostly); Portal hypertension with hematemeses and splenomegaly (*S. mansoni*, *S. japonicum*); Cystitis and ureteritis (*S. haematobium*) with hematuria, which can progress to bladder cancer; Pulmonary hypertension (*S. mansoni*, *S. japonicum*, more rarely *S. haematobium*); Glomerulonephritis, and central nervous system lesions.

**Prevention**

Individuals can guard against schistosomiasis infection by avoiding bodies of water known or likely to harbor the carrier snails. When this is unavoidable, use of PPE and good hygiene practices are required.
MEDICAL WASTES

Medical wastes may be encountered on hazardous materials sites. Agents may be present in this waste that are still capable of causing infection. Generally, procedures for protection against chemical hazards are sufficient to protect workers. Full enclosure chemical protective clothing may be appropriate since these organisms may have the ability to penetrate the skin. One additional precaution is to use bleach or some other equivalent agent capable of destroying the biological organisms in the decontamination procedure.

It is important to remember that medical waste may also contain sharps (needles, catheters, broken glass, etc.) which can puncture PPE and inject organisms as well as chemicals into the body.

Medical Waste may also result in contact with Bloodborne pathogens.

Bloodborne Pathogens

In July of 1992, OSHA issued a final Standard for Protection of Workers Potentially Exposed to Bloodborne Pathogens (29 CFR 1910.1030). This standard primarily involves medical and research personnel and their exposure to blood or blood-containing fluids infected with Bloodborne Pathogens.

Weston personnel exposure to bloodborne pathogens may occur from Work in medical facilities, work with medical waste or providing first aid.

Bloodborne Pathogens as covered by this regulation include Hepatitis B, C and D and HIV

See FLD 44 and 45 for WESTON Bloodborne Pathogen Protection Programs
Person to Person Hazards

HEPATITIS

There are two forms of hepatitis which are not considered bloodborne pathogens which can also be dangerous to travelers or persons working where sewage is not properly treated.

The following table presents information on all forms of Hepatitis, but is included primarily for the information on the non-blood-borne aspects.

HEPATITIS

**Hepatitis A:** is a liver disease caused by the hepatitis A virus (HAV). Hepatitis A can affect anyone. In the United States, hepatitis A can occur in situations ranging from isolated cases of disease to widespread epidemics.

**Hepatitis B:** is a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death.

**Hepatitis C:** is a liver disease caused by the hepatitis C virus (HCV), which is found in the blood of persons who have the disease. HCV is spread by contact with the blood of an infected person.

**Hepatitis D:** is a liver disease caused by the hepatitis D virus (HDV), a defective virus that needs the hepatitis B virus to exist. Hepatitis D virus (HDV) is found in the blood of persons infected with the virus.

**Hepatitis E:** is a liver disease caused by the hepatitis E virus (HEV) transmitted in much the same way as hepatitis A virus. Hepatitis E, however, does not occur often in the United States.
<table>
<thead>
<tr>
<th></th>
<th>Hepatitis A (HAV)</th>
<th>Hepatitis B (HBV)</th>
<th>Hepatitis C (HCV)</th>
<th>Hepatitis D (HDV)</th>
<th>Hepatitis E (HEV)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is it?</strong></td>
<td>HAV is a virus that causes inflammation of the liver. It does not lead to chronic disease.</td>
<td>HBV is a virus that causes inflammation of the liver. It can cause liver cell damage, leading to cirrhosis and cancer.</td>
<td>HCV is a virus that causes inflammation of the liver. It can cause liver cell damage, leading to cirrhosis and cancer.</td>
<td>HDV is a virus that causes inflammation of the liver. It only infects those persons with HBV.</td>
<td>HEV is a virus that causes inflammation of the liver. It is rare in the U.S. There is no chronic state.</td>
</tr>
<tr>
<td><strong>Who is at Risk?</strong></td>
<td>Travelers to developing countries.</td>
<td>Emergency responders, first aid givers, healthcare workers, medical waste handlers</td>
<td>Same as HBV</td>
<td>Same as HBV</td>
<td>Travelers to developing countries,</td>
</tr>
<tr>
<td><strong>Incubation Period</strong></td>
<td>2 to 7 weeks. Average 4 weeks</td>
<td>6 to 23 weeks. Average 17 weeks</td>
<td>2 to 25 weeks. Average 7 to 9 weeks</td>
<td>2 to 8 weeks. Average 40 days</td>
<td>2 to 9 weeks. Average 40 days</td>
</tr>
<tr>
<td><strong>How is it Spread?</strong></td>
<td>Transmitted by close person to person contact or ingestion of contaminated food and water.</td>
<td>Contact with infected blood, seminal fluid, vaginal secretions, contaminated needles, Human bite.</td>
<td>Contact with infected blood, contaminated IV needles, razors,</td>
<td>Contact with infected blood, contaminated needles.</td>
<td>Outbreaks associated with contaminated water supply in other countries.</td>
</tr>
<tr>
<td><strong>Symptoms</strong></td>
<td>Adults usually have light stools, dark urine, fatigue, fever, nausea, vomiting, abdominal pain, and jaundice.</td>
<td>May have none. Some persons have mild flu like symptoms, dark urine, light stools, jaundice, fatigue and fever.</td>
<td>Same as HBV</td>
<td>Same as HBV</td>
<td>Same as HAV</td>
</tr>
<tr>
<td><strong>Vaccine</strong></td>
<td>Two doses of vaccine to anyone over 1 year of age.</td>
<td>Three doses may be given to persons of any age.</td>
<td>None</td>
<td>HBV vaccine prevents HDV infection.</td>
<td>None</td>
</tr>
</tbody>
</table>
Prevention

HAV - Vaccination. Immune Globulin within 2 weeks of exposure. Washing hands with soap and water after going to the toilet. Use household bleach (10 parts water to 1 part bleach) to clean contaminated surfaces.

HBV and HDV
HBV - Vaccination,. Immune Globulin within 1 week of exposure.
HBV, HCV and HDV - follow BBP FLD 44 and 45 protocols.
HAV and HDV - Avoid drinking or using potentially contaminated water.

DIPHTHERIA

Diphtheria is an acute infectious disease caused by the bacteria Corynebacterium diphtheriae.

Causes

Diphtheria spreads through respiratory droplets (such as those produced by a cough or sneeze) of an infected person or someone who carries the bacteria but has no symptoms. Diphtheria can also
be spread by contaminated objects or foods (such as contaminated milk). Symptoms usually occur 2 to 5 days after you have come in contact with the bacteria.

The bacteria most commonly infects the nose and throat. The throat infection causes a gray-to-black, tough, fiber-like covering, which can block the airways. In some cases, diphtheria may first infect the skin, producing skin lesions.

Once infected, dangerous substances produced by the bacteria can spread through your bloodstream to other organs, such as the heart, and cause significant damage. The most common complication is inflammation of the heart muscle (myocarditis). The nervous system is also frequently and severely affected, and may result in temporary paralysis.

Diphtheria may be mild or severe. Some people may not have symptoms. In others, the disease can slowly get worse.

Because of widespread and routine childhood DPT immunizations, diphtheria is now rare in many parts of the world. There are fewer than 5 cases of diphtheria a year in the United States. Diphtheria was once one of the most common causes of death in children. Since the introduction and widespread use of diphtheria vaccine, diphtheria has been rare in the United States. Between 1980 and 1995, 41 cases of diphtheria were reported to health authorities.

Diphtheria is still common in many other parts of the world, including the Caribbean and Latin America. During the last few years, large epidemics of diphtheria have occurred in the former Soviet republics. Outbreaks have also been reported in Algeria, China, and Ecuador. The majority of cases in many of these epidemics have been in adults and adolescents.

The increases have generally been the result of failed public health and immunization programs in areas weakened by economic and social turmoil.

In the United States, the diphtheria threat is shifting from children to adults and adolescents. Cases are occurring in persons who have not been immunized or in vaccinated persons who did not receive periodic booster doses to maintain their immunity. Routine vaccination of both children and adults is essential to prevent the re-emergence of diphtheria in the United States. Risk factors include crowded environments, poor hygiene, and lack of immunization.

Symptoms include:

Sore throat (may range from mild to severe), Painful swallowing, Hoarseness, Drooling (suggests airway blockage is about to occur), Fever, Chills, Bloody, watery drainage from nose, Croup-like (barking) cough, Stridor, difficulty breathing, or rapid breathing, No breathing, Bluish coloration of the skin, Skin lesions (usually seen in tropical areas)

Note: There may be no symptoms.

Exams and Tests
The health care provider will perform a physical exam and look inside the mouth. This may reveal a gray-to-black covering (pseudomembrane) in the throat, enlarged lymph glands, and swelling of the neck or larynx.

Tests used may include:
- Gram stain or throat culture to identify *Corynebacterium diphtheriae*
- Electrocardiogram (ECG)

The diphtheria toxin can damage the heart, nervous system, kidneys, or other organs. This may lead to:

- Myocarditis, which can lead to heart failure,
- Nerve problems such as peripheral neuritis, which can cause uncoordinated movements and paralysis.
- Kidney damage,
- Inflammation of the kidneys (nephritis)

**Prevention**

Prevention begins with initial vaccination and boosters every 10 years. Identify areas with increased incidence of diphtheria and avoid crowded places. Practice good hygiene.

**POLIOMYELITIS (POLIO)**

Records from antiquity mention crippling diseases compatible with poliomyelitis. Michael Underwood first described a debility of the lower extremities in children that was recognizable as poliomyelitis in England in 1789. The first outbreaks in Europe were reported in the early 19th century, and outbreaks were first reported in the United States in 1843. For the next hundred years, epidemics of polio were reported from developed countries in the Northern Hemisphere each summer and fall. These epidemics became increasingly severe, and the average age of persons affected rose. The increasingly older age of persons with primary infection increased both the disease severity and number of deaths from polio. Polio reached a peak in the United States in 1952, with more than 21,000 paralytic cases. However, following introduction of effective vaccines, polio incidence declined rapidly. The last case of wild-virus polio acquired in the United States was in 1979, and global polio eradication may be achieved within the next decade however this has not been achieved and travelers to areas where polio still exists are are at risk.

Poliovirus is a member of the enterovirus subgroup, family Picornaviridae. Enteroviruses are transient inhabitants of the gastrointestinal tract, and are stable at acid pH. Picornaviruses are small, ether-insensitive viruses with an RNA genome.

There are three poliovirus serotypes (P1, P2, and P3). There is minimal heterotypic immunity between the three serotypes. That is, immunity to one serotype does not produce significant immunity to the other serotypes. The poliovirus is rapidly inactivated by heat, formaldehyde, chlorine, and ultraviolet light.
The virus enters through the mouth, and primary multiplication of the virus occurs at the site of implantation in the pharynx and gastrointestinal tract. The virus is usually present in the throat and in the stool before the onset of illness. One week after onset there is less virus in the throat, but virus continues to be excreted in the stool for several weeks. The virus invades local lymphoid tissue, enters the bloodstream, and then may infect cells of the central nervous system. Replication of poliovirus in motor neurons of the anterior horn and brain stem results in cell destruction and causes the typical manifestations of poliomyelitis.

The incubation period for poliomyelitis is commonly 6 to 20 days with a range of 3 to 35 days. The response to poliovirus infection is highly variable and has been categorized on the basis of the severity of clinical presentation.

Up to 95% of all polio infections are inapparent or asymptomatic. Estimates of the ratio of inapparent to paralytic illness vary from 50:1 to 1,000:1 (usually 200:1). Infected persons without symptoms shed virus in the stool and are able to transmit the virus to others.

Four to 8% of polio infections consist of a minor, nonspecific illness without clinical or laboratory evidence of central nervous system invasion. This clinical presentation is known as abortive poliomyelitis, and is characterized by complete recovery in less than a week. Three syndromes observed with this form of poliovirus infection are upper respiratory tract infection (sore throat and fever), gastrointestinal disturbances (nausea, vomiting, abdominal pain, constipation or, rarely, diarrhea), and influenza-like illness. These syndromes are indistinguishable from other viral illnesses.

Nonparalytic aseptic meningitis (symptoms of stiffness of the neck, back, and/or legs), usually following several days after a symptoms similar to that of minor illness, occurs in 1%–2% of polio infections. Increased or abnormal sensations can also occur. Typically these symptoms will last from 2 to 10 days, followed by complete recovery.

Fewer than 1% of all polio infections result in flaccid paralysis. Paralytic symptoms generally begin 1 to 10 days after lesser symptoms appear and progress for 2 to 3 days. Generally, no further paralysis occurs after the temperature returns to normal. Many persons with paralytic poliomyelitis recover completely and, in most, muscle function returns to some degree.

Paralytic polio is classified into three types, depending on the level of involvement. Spinal polio is most common. It is characterized by asymmetric paralysis that most often involves the legs. Bulbar polio leads to weakness of muscles innervated by cranial nerves. Bulbospinal polio, is a combination of bulbar and spinal paralysis. The death-to-case ratio for paralytic polio is generally 2%–5% among children and up to 15%–30% for adults (depending on age). It increases to 25%–75% with bulbar involvement.

Poliovirus is highly infectious, with seroconversion rates among susceptible household contacts of children nearly 100%, and greater than 90% among susceptible household contacts of adults. Persons infected with poliovirus are most infectious from 7 to 10 days before and after the onset of symptoms, but poliovirus may be present in the stool from 3 to 6 weeks.
Prevention

Awareness, vaccination and good hygiene are the principle preventive measures against Polio.

Vaccination

Routine vaccination of adults (18 years of age and older) who reside in the United States is not necessary or recommended because most adults are already immune and have a very small risk of exposure to wild poliovirus in the United States.

Some adults, however, are at increased risk of infection with poliovirus. These include travelers to areas where poliomyelitis is endemic or epidemic (currently limited to South Asia, the eastern Mediterranean, and Africa), laboratory workers handling specimens that may contain polioviruses, and healthcare personnel in close contact with patients who may be excreting wild polioviruses.

For unvaccinated adults (including adults without a written record of prior polio vaccination) at increased risk of exposure to poliomyelitis, primary immunization with IPV is recommended. The recommended schedule is two doses separated by 1–2 months, and a third dose given 6–12 months after the second dose.

In some circumstances time will not allow completion of this schedule. If 8 weeks or more are available before protection is needed, three doses of IPV should be given at least 4 weeks apart.

If 4 to 8 weeks are available before protection is needed, two doses of IPV should be given at least 4 weeks apart. If less than 4 weeks are available before protection is needed, a single dose of IPV is recommended. In all instances, the remaining doses of vaccine should be given later, at the recommended intervals, if the person remains at increased risk.

Adults who have previously completed a primary series of 3 or more doses and who are at increased risk of exposure to poliomyelitis should be given one dose of IPV.

In addition, frequent washing of hands particularly prior to hand mouth contact is an important preventive measure.
Tuberculosis (abbreviated as TB for tubercle bacillus or Tuberculosis) is a common and deadly infectious disease caused by mycobacteria, mainly Mycobacterium tuberculosis. Tuberculosis most commonly attacks the lungs (as pulmonary TB) but can also affect the central nervous system, the lymphatic system, the circulatory system, the genitourinary system, bones, joints and even the skin. Other mycobacteria such as Mycobacterium bovis, Mycobacterium africanum, Mycobacterium canetti, and Mycobacterium microti can also cause tuberculosis, but these species do not usually infect healthy adults.[1]

Over one-third of the world's population has been exposed to the TB bacterium, and new infections occur at a rate of one per second.[2] Not everyone infected develops the full-blown disease; asymptomatic, latent TB infection is most common. However, one in ten latent infections will progress to active TB disease, which, if left untreated, kills more than half of its victims.

When the disease becomes active, 75% of the cases are pulmonary TB. Symptoms include chest pain, coughing up blood, and a productive, prolonged cough for more than three weeks. Systemic symptoms include fever, chills, night sweats, appetite loss, weight loss, pallor, and often a tendency to fatigue very easily.

In the other 25% of active cases, the infection moves from the lungs, causing other kinds of TB more common in immunosuppressed persons and young children. Extrapulmonary infection sites include the pleura, the central nervous system in meningitis, the lymphatic system in scrofula of the neck, the genitourinary system in urogenital tuberculosis, and bones and joints in Pott’s disease of the spine. An especially serious form is disseminated TB, more commonly known as miliary tuberculosis. Although extrapulmonary TB is not contagious, it may co-exist with pulmonary TB, which is contagious.

When people suffering from active pulmonary TB cough, sneeze, speak, kiss, or spit, they expel infectious aerosol droplets 0.5 to 5 µm in diameter. A single sneeze, for instance, can release up to 40,000 droplets. People with prolonged, frequent, or intense contact are at highest risk of becoming infected, with an estimated 22% infection rate. A person with active but untreated tuberculosis can infect 10–15 other people per year.

About 90% of those infected with Mycobacterium tuberculosis have asymptomatic, latent TB infection (sometimes called LTBI), with only a 10% lifetime chance that a latent infection will progress to TB disease. However, if untreated, the death rate for these active TB cases is more than 50%.

Prevention

Prevention includes: awareness of increased risk of exposure, minimizing exposure, using good hygiene, TB skin tests per and post potential exposure and prompt medical attention if symptoms indicate possible infection.
BIOLOGICAL WEAPONS

These etiological agents are naturally occurring and can be a hazard from natural sources. Information is provided below on diseases which are of primary concern as a weapon.

Types of Biological Agents

The Centers for Disease Control and Prevention (CDC) has defined and categorized bioterrorism agents according to priority as follows:

Category A Agents

These are biological agents which:

- pose the greatest possible threat for a bad effect on public health
- may spread across a large area or need public awareness
- need a great deal of planning to protect the public’s health

The Category A agents are anthrax, smallpox, plague, botulism, tularemia, and viral hemorrhagic fevers.

Anthrax, *See under Animal Borne Diseases

Anthrax spores can and have been used as a biological warfare weapon. In most cases, early treatment with antibiotics can cure cutaneous anthrax. Even if untreated, 80 percent of people who become infected with cutaneous anthrax do not die. Gastrointestinal anthrax is more serious because between one-fourth and more than half of cases lead to death. Inhalation anthrax is much more severe. In 2001, about half of the cases of inhalation anthrax ended in death.

Anthrax used as a weapon is produced in a very fine powder which ensures the organisms stay airborne longer than naturally occurring anthrax and when inhaled the spores or organisms settle out in the smaller air passages of the lungs.

Smallpox

Smallpox is a highly contagious virus. It transmits easily through the atmosphere and has a high mortality rate (20-40%). Smallpox was eliminated in the world in the 1970s, thanks to a worldwide vaccination program. However, some virus samples are still available in Russian and American laboratories. As a biological weapon smallpox is dangerous because of the highly contagious nature of both the infected and their pox. Smallpox occurs only in humans, and has no external hosts or vectors.

Smallpox (also known by the Latin names Variola or Variola vera) is a contagious disease unique to humans.[1] Smallpox is caused by either of two virus variants named Variola major and Variola minor. The deadlier form, V. major, has a mortality rate of 30–35%, while V. minor
causes a milder form of disease called alastrim and kills ~1% of its victims.[2][1] Long-term side-effects for survivors include the characteristic skin scars. Occasional side effects include blindness due to corneal ulcerations and infertility in male survivors.

Smallpox is highly contagious, although less so than other infectious diseases. Smallpox is not notably infectious in the prodromal period—viral shedding is usually delayed until the appearance of the rash. Smallpox is transmitted primarily through prolonged social contact or direct contact with infected body fluids or contaminated objects (fomites) such as bedding or clothes. Infection in the natural disease will be via the lungs. The fact that there has been no recurrence of wild smallpox since its elimination thirty years ago makes the assumptions made at the start of the elimination campaign - that human smallpox carriers do not exist, and that the virus does not exist outside humans - some of the most certain facts in medical science.

In the other form of Variola major smallpox, known as hemorrhagic smallpox, a mortality of 96 percent has been reported.[7] An entirely different set of symptoms starts to develop. The skin does not blister, but remains smooth. Instead, bleeding occurs under the skin, making the skin look charred and black (this is known as black pox). The eyes also hemorrhage, making the whites of the eyes turn deep red (and, if the victim lives long enough, black). At the same time, bleeding begins in the organs. Death may occur from bleeding (fatal loss of blood or by other causes such as brain hemorrhage), or from loss of fluid. The entry of other infectious organisms, since the skin and intestine are no longer a barrier, can also lead to multi-organ failure. This form of smallpox occurs in anywhere from 3–25% of fatal cases (depending on the virulence of the smallpox strain).

**Flat smallpox.** This form is also often fatal. The early signs and symptoms are similar to other forms of the disease, but the lesions are velvety and never become filled with pus. Eventually, the skin takes on a rubbery appearance. Bleeding in the skin and intestinal tract also may occur.

**Prevention**

Smallpox can be prevented through use of the smallpox vaccine. While not available for the general public, there are stockpiles for emergency response.

Where smallpox is suspected to have been released, the Procedures developed for START Bio-Watch Programs are to be used.

There is no proven treatment for smallpox, but research to evaluate new antiviral agents is ongoing. Patients with smallpox can benefit from supportive therapy (e.g., intravenous fluids, medicine to control fever or pain) and antibiotics for any secondary bacterial infections that may occur.
**Bubonic Plague**

Plague has a long history as a biological weapon. Aerosolized pneumonic plague remains the most significant threat. The plague can be easily treated with antibiotics, but a widespread epidemic is highly unlikely in developed countries.

Plague is a disease caused by the *Yersinia pestis* bacterium. Rodents are the normal host of plague, and the disease is transmitted to humans by flea bites and occasionally by aerosol in the form of pneumonic plague. The disease is considered a threat due to its ease of culture and ability to remain in circulation among local rodents for a long period of time.

**Botulinum toxin**

Botulinum toxin is one of the deadliest toxins known, and is produced by the bacterium Clostridium botulinum. Botulism causes death by respiratory failure and paralysis. It is also easy to obtain since it is found in the cosmetic products Botox and Dysport.

**Tularemia**

The Centers for Disease Control and Prevention regard *F. tularensis* as a viable bioweapons agent. The disease was used as a weapon by the Russians during World War II. Practical research into using Tularemia as a bioweapon took place at Camp Detrick in the 1950s. It was viewed as an attractive agent because:

- it is easy to aerosolize
- it is highly infective; fewer than 10 bacteria are required to infect
- it is non-persistent and easy to decontaminate (unlike anthrax)
- it is highly incapacitating to infected persons
- it has low-lethality, which is useful where enemy soldiers are in proximity to non-combatants, e.g. civilians

**Ebola**

Because Ebola is lethal and since no approved vaccine or treatment is available, Ebola is classified as a BSL 4 agent, as well as a Category A bioterrorism agent and a select agent by the CDC.

Ebola shows potential as a biological weapon because of its lethality but due to its relatively short incubation period it may be more difficult to spread since it may kill its victim before it has a chance to be transmitted.

Ebola is a viral hemorrhagic fever, with fatality rates ranging from 50-90%. No cure currently exists, although vaccines are in development.
Marburg Virus

Marburg is a viral hemorrhagic fever virus first discovered in Marburg, Germany. Fatality rates range from 25-100%, and although a vaccine is in development, no treatments currently exist aside from supportive care. As with ebola, basic barrier nursing significantly reduces the virulence of the virus.

Category B Agents

Category B agents are moderately easy to disseminate and have low mortality rates.

Brucellosis

Brucella species survive well in aerosols and resist drying. There is no vaccine available for humans. The CDC classifies Brucellosis as a class B bioterrorism agent. In the event of deliberate exposure to Brucella species, the respiratory route of exposure will be most likely, although food-borne exposure is possible.

Brucellosis (Brucella species) Brucellosis is an infectious disease caused by the bacteria of the genus Brucella. These bacteria are primarily passed among animals, and they cause disease in many different vertebrates. Various Brucella species affect sheep, goats, cattle, deer, elk, pigs, dogs, and several other animals. Humans become infected by coming in contact with animals or animal products that are contaminated with these bacteria. In humans brucellosis can cause a range of symptoms that are similar to the flu and may include fever, sweats, headaches, back pains, and physical weakness. Severe infections of the central nervous systems or lining of the heart may occur. Brucellosis can also cause long-lasting or chronic symptoms that include recurrent fevers, joint pain, and fatigue

Clostridium perfringens (C. perfringens),

Bioterrorism - Considered by CDC as a potential food safety threat

In addition the toxins formed by C. perfringens, may have potential as an aerosolized weapon.

Epsilon toxin is one of 12 protein toxins produced by Clostridium perfringens, a Gram positive, anaerobic spore–forming rod. There are five strains of C. perfringens, designated A through E. Each strain produces a unique spectrum of toxins. The epsilon toxin is made by types B and D. This toxin is a pore–forming protein; it causes potassium and fluid leakage from cells. In addition to the epsilon toxin, Clostridium perfringens type D strains produce alpha toxin and type B strains produce alpha and beta toxins. C. perfringens type B causes severe enteritis in young calves, foals, lambs and piglets. Type D causes enterotoxemia in sheep and goats and, on rare occasions, in cattle. All five strains can infect wounds in any species.

Other C. perfringens toxins are also potential biological weapons. Alpha toxin is a necrotizing toxin produced by all five strains. The purified toxin can cause serious acute pulmonary disease, as well as vascular leak, hemolysis, thrombocytopenia and liver damage. It is expected to be
lethal by aerosol. Beta toxin is a lethal necrotizing toxin found in types B and C. Theta toxin is an oxygen–labile cytolysin. This toxin can damage blood vessels, resulting in leukostasis, thrombosis, decreased perfusion and tissue hypoxia. Theta toxin also stimulates cytokine release and can cause shock. Two \textit{C. perfringens} toxins, enterotoxin and beta2 toxin, are not associated with specific strains. Enterotoxin is the major toxin responsible from human food poisoning.

The epsilon toxin could probably be transmitted in contaminated food, water or by aerosol.

\textbf{Salmonella}

Bioterrorism - Considered by CDC as a potential food safety threat. As such has been used as a bio-weapon.

\textit{E coli O157:H7}

Bioterrorism - Considered by CDC as a potential food safety threat.

\textbf{Shigella}

Bioterrorism - Considered by CDC as a potential food safety threat.

\textbf{Glanders}

Due to the high mortality rate in humans and the small number of organisms required to establish infection, \textit{Burkholderia mallei} is regarded as a potential biological warfare (BW) or bioterrorism agent, as is the closely related organism, \textit{Burkholderia pseudomallei}, the causative agent of melioidosis.

\textbf{Melioidosis}

There has been interest in melioidosis because it has the potential to be developed as a biological weapon. It is classed by the CDC as a Category B agent\textsuperscript{[45]} \textit{B. pseudomallei}, like its relative \textit{B. mallei} which causes glanders.

\textbf{Psittacosis (Chlamydia psittaci)}

\textit{C. psittaci} has previously been part of several country’s bioweapons research programs. Some characteristics that may make it a good potential bioweapon include its stability in the environment, ease for aerosolization and ease to obtain (worldwide occurrence).

\textbf{Q Fever}

Because of its route of infection it can be used as biological warfare agent. Q-fever is category "B" agent. It is highly contagious and very stable in aerosols in a wide range of temperatures. Just 1-2 particles are enough to infect an individual. Q-fever microorganisms may survive on
surfaces up to 60 days (like sporulating bacteria) and C. burnetii is known to reproduce and grow well in chicken egg embryos reaching very high concentrations.

Machupo

Due to its pathogenicity, Machupo virus requires BSL 4 conditions, the highest level.

There are no cures or immunizations for this disease, although those who have contracted it are immune. Treatment options are limited, mostly to supportive care, but are sometimes successful if started early.

Coccidioides Mycosis, (See Coccidioidomycosis)

*C. immitis* was investigated as a potential biological weapon for use as an incapacitant. As medical epidemiology later made clear, Coccidioidomycosis could have lethal effects on several segments of the population, so it was later considered a lethal agent. It was never standardized, and beyond a few field trials, it was never weaponized.

Shigella

*Shigella* bacterium is an attractive potential biological weapons agent due to its antibiotics resistance, its infectiousness, and the lack of a vaccine against the disease.

Ricin

Ricin toxin from *Ricinus communis (castor beans)* (see Hazardous Plants FLD 43 Ds

- Ricin is a poison that can be made from the waste left over from processing castor beans.
- It can be in the form of a powder, a mist, or a pellet, or it can be dissolved in water or weak acid.
- It is a stable substance. For example, it is not affected much by extreme conditions such as very hot or very cold temperatures.
- Castor beans are processed throughout the world to make castor oil. Ricin is part of the waste “mash” produced when castor oil is made.
- Ricin has some potential medical uses, such as bone marrow transplants and cancer treatment (to kill cancer cells).
- It would take a deliberate act to make ricin and use it to poison people. Accidental exposure to ricin is highly unlikely.
- People can breathe in ricin mist or powder and be poisoned.
- Ricin can also get into water or food and then be swallowed.
- Pellets of ricin, or ricin dissolved in a liquid, can be injected.
- Depending on the route of exposure (such as injection or inhalation), as little as 500 micrograms of ricin could be enough to kill an adult. A 500-microgram dose of ricin would be about the size of the head of a pin. A greater amount would likely be needed to
Ricin works by getting inside the cells of a person’s body and preventing the cells from making the proteins they need. Without the proteins, cells die. Eventually this is harmful to the whole body, and death may occur.

- Effects of ricin poisoning depend on whether ricin was inhaled, ingested, or injected.

Signs and symptoms of ricin exposure

The major symptoms of ricin poisoning depend on the route of exposure and the dose received, though many organs may be affected in severe cases.

Initial symptoms of ricin poisoning by inhalation may occur within 8 hours of exposure.
Following ingestion of ricin, initial symptoms typically occur in less than 6 hours.

- **Inhalation:** Within a few hours of inhaling significant amounts of ricin, the likely symptoms would be respiratory distress (difficulty breathing), fever, cough, nausea, and tightness in the chest. Heavy sweating may follow as well as fluid building up in the lungs (pulmonary edema). This would make breathing even more difficult, and the skin might turn blue. Excess fluid in the lungs would be diagnosed by x-ray or by listening to the chest with a stethoscope. Finally, low blood pressure and respiratory failure may occur, leading to death. In cases of known exposure to ricin, people having respiratory symptoms that started within 12 hours of inhaling ricin should seek medical care.

- **Ingestion:** If someone swallows a significant amount of ricin, he or she would develop vomiting and diarrhea that may become bloody. Severe dehydration may be the result, followed by low blood pressure. Other signs or symptoms may include hallucinations, seizures, and blood in the urine. Within several days, the person’s liver, spleen, and kidneys might stop working, and the person could die.

- **Skin and eye exposure:** Ricin in the powder or mist form can cause redness and pain of the skin and the eyes.

Death from ricin poisoning could take place within 36 to 72 hours of exposure, depending on the route of exposure (inhalation, ingestion, or injection) and the dose received. If death has not occurred in 3 to 5 days, the victim usually recovers.

Showing these signs and symptoms does not necessarily mean that a person has been exposed to ricin.

**Prevention**

Prevention of ricin poisoning involves awareness, knowledge of exposure routes and symptoms, use of appropriate PPE including respiratory protection, knowing what to do if exposed, and decontamination and effective waste control.

**Response to suspected release or exposure**

First, get fresh air by leaving the area where the ricin was released. Moving to an area with fresh air is a good way to reduce the possibility of death from exposure to ricin.
If the ricin release was outside, move away from the area where the ricin was released.

If the ricin release was indoors, get out of the building.

If you are near a release of ricin, emergency coordinators may tell you to either evacuate the area or to “shelter in place” inside a building to avoid being exposed to the chemical.

Suspected exposure

Remove clothing,

- Quickly take off clothing that may have ricin on it. Any clothing that has to be pulled over the head should be cut off the body instead of pulled over the head.

- Those helping other people remove their clothing, should wear PPE, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.

Washing

- Wash s quickly as possible, wash any ricin from skin with large amounts of soap and water. Washing with soap and water will help protect people from any chemicals on their bodies.

- If eyes are burning or vision is blurred, rinse eyes with plain water for 10 to 15 minutes. If contacts are worn, remove them and put them with the contaminated clothing. Do not put the contacts back in eyes (even if they are not disposable contacts). Eyeglasses can be worn if they are washed with soap and water.

Disposing of clothes:

After decontamination and washing, place clothing inside a plastic bag. Avoid touching contaminated areas of the clothing. If touching contaminated areas can not be avoided, or it is not clear where the contaminated areas are, wear rubber gloves, turn the bag inside out and use it to pick up the clothing, or put the clothing in the bag using tongs, tool handles, sticks, or similar objects. Anything that touches the contaminated clothing should also be placed in the bag.

Seal the bag, and then seal that bag inside another plastic bag.

When the local or state health department or emergency personnel arrive, tell them what you did with clothes. The health department or emergency personnel will arrange for further disposal.
SEB

Staphylococcal enterotoxin B (SEB) (Staphylococcus infections from natural occurring exposures are discussed above). SEB are toxins produced by staphylococcus bacteria which can cause intoxication from natural exposure, SEB has also been researched as a biological weapon and is rated by CDC as Category B Agent.

Staphylococcal toxins could be used as a biological agent either by contamination of food/water or by aerosolization and inhalation. Breathing in low doses of staphylococcal enterotoxin B may cause fever, cough, difficulty breathing, headache, and some vomiting and nausea. High doses of the toxin have a much more serious effect.

Typhus (Rickettsia prowazekii) See discussion on Typhus and other Rickettsial organisms in FLD B. Note Typhus is not the same as Typhoid Fever

Typhus fever was categorized by the CDC as a Category B biological weapons agent. Rickettsia prowazekii is highly infectious and could be fatal but cannot be passed from person to person.

Encephalitis Viral (alphaviruses), e.g.: Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis) There is more discussion on encephalitis and arboviruses in the FLD on Insect Borne Diseases). These organisms are listed here as they are on the CDC list of Select List agents and toxins that have the potential to pose a severe threat to public health and safety.

Encephalitis is an acute inflammation of the brain, commonly caused by a viral infection. It can be caused by a bacterial infection such as bacterial meningitis, or may be a complication of other infectious diseases like rabies (viral) or syphilis (bacterial). Certain parasitic or protozoal infestations, such as toxoplasmosis, malaria, or primary amoebic meningoencephalitis, can also cause encephalitis in people with compromised immune systems. Brain damage occurs as the inflamed brain pushes against the skull, and can lead to death.

Patients with encephalitis suffer from fever, headache and photophobia with weakness and seizures also common. Less commonly, stiffness of the neck can occur with rare cases of patients also suffering from stiffness of the limbs, slowness in movement and clumsiness depending on which specific part of the brain is involved. The symptoms of encephalitis are caused by the brain's defense mechanisms activating to get rid of the infection. Another symptom of Encephalitis is hallucination.

Causes and specific diseases

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the Togaviridae (genus alphavirus), Flaviviridae, and Bunyaviridae.
Water Supply Threats

**Cholera**, (Vibrio Choloae, Cholera )
Cholera is discussed elsewhere in this document.

The Centers for Disease Control and Prevention lists cholera as a possible bioterrorist agent; however, it has never been successfully used in this manner.

**Cryptosporidium parvum**

The CDC lists cholera as a possible bioterrorist agent.

**Other Diseases considered as potential Biological Agents include:**

Rocky Mountain Spotted Fever (Discussed in FLD 43 B Insects)

Yellow Fever, (Discussed in FLD 43 B Insects)

Japanese B Encephalitis, (Discussed in FLD 43 B Insects)

**Rift Valley Fever.** Discussed in FLD 43 A Animals

**Saxitoxin**

Saxitoxin (STX) is a neurotoxin found in marine (algae). It is a selective sodium channel blocker. The United States military isolated saxitoxin and assigned it the chemical weapon designation TZ. It is unique among toxins in that it acts in a matter of minutes. The median lethal dose (LC₅₀) of TZ is 5 mg·min/m³.

**Saxitoxin**

The medical importance of saxitoxin is in relation to red tide in shellfish and causes the paralytic shellfish poisoning (PSP) food poisoning from consumption of infected shellfish or inhalation of aerosols when red tide is present. The blocking of the sodium channel produces a flaccid paralysis that leaves its victim calm and conscious through the progression of symptoms. Death is from respiratory failure.

Exposure to saxitoxin might cause numbness of the oral mucosa within 30 minutes after ingestion. In severe poisoning, signs and symptoms typically progress rapidly, including parasthesias, a floating sensation, muscle weakness, vertigo, and cranial nerve dysfunction. Respiratory failure and death might occur from paralysis (1-5).

**Paralytic shellfish poisoning** (PSP) is one of the four recognized syndromes of shellfish poisoning (the others being neurologic shellfish poisoning, diarrheal shellfish poisoning and
amnesic shellfish poisoning). All four syndromes share some common features and are primarily associated with bivalve mollusks (such as mussels, clams, oysters and scallops). These shellfish are filter feeders and, therefore, accumulate toxins produced by microscopic algae in the form of dinoflagellates and diatoms.

PSP can be fatal in extreme cases (particularly those already immuno-suppressed). Children are more susceptible. PSP affects those who come into contact with the affected shellfish by ingestion. Ten to thirty minutes after ingestion, symptoms can include nausea, vomiting, diarrhea, abdominal pain, and tingling or burning lips, gums, tongue, face, neck, arms, legs, and toes. Shortness of breath, dry mouth, a choking feeling, confused or slurred speech, and lack of coordination are also possible.

Prevention

Routine surveillance of shellfish beds for known toxins should prevent most forms of shellfish poisoning.

Consumption of shellfish harvested outside of regulated areas or during times known to be associated with red tide is dangerous and should be avoided.

Mycotoxins. (See Molds and Fungus)

Category C agents

Category C agents are pathogens that might be engineered for mass dissemination because they are easy to produce and have potential for high morbidity or mortality (examples: nipah and hendra virus, hantavirus and multi-drug resistant Tuberculosis (MTB).

See FLD 43 A and 43 E for information on nipah and hendra viruses, Hantavirus and MTB

SELECT AGENTS AND TOXINS

The CDC regulates the possession, use, and transfer of select agents and toxins that have the potential to pose a severe threat to public health and safety. The CDC Select Agent Program oversees these activities and registers all laboratories and other entities in the United States of America that possess, use, or transfer a select agent or toxin.

This list which includes many of the etiological agents covered in FLDs 43 A, B, C and E. This list can be found at 7 CFR Part 331, 9 CFR Part 121, and 42 CFR Part 73. The primary focus of FLD E is on etiologic agents that occur naturally and could pose a threat to Weston field persons and international travelers.
INTRODUCTION

Bloodborne pathogens are pathogenic microorganisms which may be present in human blood and can cause disease in humans. These pathogens include, but are not limited to hepatitis B virus (HBV) and human immunodeficiency virus (HIV). The Occupational Safety and Health Administration (OSHA) requires compliance with 29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens Standard where, as a condition of employment, there is known or potential exposure to bloodborne pathogens. A source of occupational exposure may occur when an employee gives First Aid and CPR to an individual who has infectious blood and the potentially infectious materials come in contact with the employee’s eyes, mucous membranes, non-intact skin through cuts and abrasions.

Additional sources of exposure are contact with infectious waste found at hazardous waste sites; glassware, needles, and other sharp objects which have been involved in injuries to personnel resulting in contamination with blood or related bodily fluids; and laboratory personnel who may analyze samples containing infectious waste. FLD 45 provides a separate Bloodborne Pathogens Exposure Control Plan for Work with Infectious Waste.

In July 1992, OSHA issued a final Standard for Protection of Workers Potentially Exposed to Bloodborne Pathogens (29 CFR 1910.1030). This standard primarily involves medical and research personnel and their exposure to blood or blood-containing fluids infected with Bloodborne Pathogens. The HIV and HBV pathogens could potentially be present in viable states at emergency response sites and infectious or hazardous waste sites, with hepatitis virus being the more likely to survive in temperatures outside the body temperature ranges. Another potential for exposure would be from workers who could be infected. The OSHA Standard specifically includes first aid providers among workers covered by this standard.

WESTON's Corporate Environmental, Health, and Safety (CE&HS) Director is responsible for managing this Exposure Control Plan (ECP). WESTON's Division Environmental, Health, and Safety Managers (DESHSMs) will provide technical guidance and assistance in review and implementation.

This ECP is available on the WESTON EHS Portal site.

SCOPE

WESTON personnel do not provide medical assistance as a primary job duty, however, this Bloodborne Pathogen ECP is applicable to designated first aid providers. Weston workers expected to administer first aid must have a basic understanding of bloodborne pathogens in order to protect themselves effectively from any hazards. At a minimum, this Bloodborne Pathogen ECP for First Aid Providers will be on site and implemented for each project.

WESTON personnel may deliver First Aid and CPR in a nonclinical setting. First Aid and CPR duties are often performed in uncontrolled environments, which, due to a lack of time and other factors, do not allow for application of a complex decision-making process to the emergency at hand.
This ECP is intended to assist personnel in making decisions concerning the use of personal protective equipment (PPE) and resuscitation equipment, as well as for decontamination, labeling, containerizing and disposal procedures.

**Information Program**

Completion of health and safety plans (HASP) requires identification and assessment of risk from exposure to biological hazards. This ECP deals with forms of infection that are of concern to workers who can come in contact with bodily fluids associated with blood.

WESTON training programs will provide information on bloodborne pathogens and the Occupational Exposure to Bloodborne Pathogens Standard to all field personnel with special emphasis on those employees who may be certified and called upon to perform First Aid.

**Exposure Control**

This ECP is designed to eliminate or minimize employee exposure to bloodborne pathogens through information and training, use of PPE, safe handling procedures, decontamination, and proper disposal methods.

**Exposure Determination**

Employees certified in First Aid and CPR may be at risk from bloodborne pathogens when these services are rendered. Attachment 1 identifies tasks in which occupational exposure may occur, potential contact, and required protective measures for First Aid providers.

**METHODS OF COMPLIANCE**

**Universal Precautions**

When treating a victim for an injury, conducting CPR, or handling potentially infectious waste, the use of universal precautions is the recommended approach to infection control. Universal precautions assume all human blood and certain human body fluids are infectious for HIV, HBV and other bloodborne pathogens. Other body substances, including feces, urine, or vomit are not included, unless they contain visible blood. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

**Work Practice Controls**

Work practice controls reduce the likelihood of exposure by formalizing the manner in which a task is performed.

- All first aid procedures involving blood or other potentially infectious materials shall be performed in a manner that minimizes splashing, spraying, spattering, and generation of droplets of these substances.
- Mouth suctioning of blood or other infectious materials is prohibited.
- When handling sharps such as needles used for bee stings or diabetes, do not recap, purposely bend, break by hand, remove from disposable syringes, or otherwise manipulate by hand.
- As soon as possible after use, contaminated sharps are to be placed in puncture proof/leak proof containers until they can be disposed.
• Broken glassware which may be contaminated shall not be picked up directly with the hands unless gloves are used to protect the hands against cuts. It is best to use mechanical means, such as a brush and dust pan then place contaminated broken glass in a puncture proof/leak proof container.

• When handling red bag waste, hold the top end of the bag rather than the bottom.

• Containers of potentially infectious waste should be labeled with a biohazard label.

• All PPE should be inspected prior to use. PPE should not be worn if the PPE barrier is compromised.

• Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood, other body fluids to which universal precautions apply, or their potentially contaminated articles. Hands should always be washed after gloves are removed even if the gloves appear intact.

• Where hand washing facilities are not readily accessible, an antiseptic hand cleaner along with clean cloth/paper towels or antiseptic towelettes should be used. When antiseptic hand cleaners or towelettes are used hands shall be washed with soap and running water as soon as feasible.

Engineering Controls

Engineering controls isolate or remove the bloodborne pathogen hazard from the workplace.

• Proper containerizing, labeling and disposal of contaminated items are required for all potentially infectious waste.

• Minimizing needle sticks by placing them in a puncture proof container.

• Limiting access or close off areas which contain potentially infectious materials.

Administrative Controls

Administrative controls reduce or eliminate bloodborne pathogen hazards from the workplace by program development (i.e., ECP), auditing to ensure these programs are in place and implemented, and providing information and training.

Personal Protective Equipment (PPE)

PPE is specialized clothing or equipment worn by an employee for protection against a hazard. Attachment 1 provides examples of recommendations for PPE in the nonclinical setting; the list is not intended to be all-inclusive.

First-aid kits will be supplemented with bloodborne pathogen kits or supplies and will be readily accessible at all times. The CEH&S Department maintains a list of the minimum content of bloodborne pathogen PPE kits or supplies. The list is accessible on the EHS Portal Site.

If the chance of being exposed to blood is high, the caregiver should put on protective attire before beginning CPR or First Aid. Protective barriers should be used in accordance with the level of exposure encountered.

Under rare or extraordinary circumstances, a responding employee may decide, based on his or her judgment, that use of PPE would prevent delivery of care or pose an increased hazard to safety of the
employee or co-worker. When this judgment has been made, an investigation of the event will be initiated and documented in order to determine what changes in procedures or protective equipment is needed.

**Resuscitation Equipment**

No transmission of HBV or HIV infection during mouth to mouth resuscitation has been documented. However, because of the risk of salivary transmission of other infectious diseases and the theoretical risk of HIV and HBV transmission during artificial ventilation of trauma victims, disposable mouth to mouth resuscitation masks (one-way valve type only) should be used. These devices are designed to isolate emergency response personnel from contact with victim's blood and blood-contaminated saliva, respiratory secretions, and vomit. Disposable resuscitation equipment and devices should be disposed of once they have been used.

**Decontamination and Disposal**

All PPE will be removed prior to leaving a contaminated area and secured properly for decontamination or proper disposal.

Decontamination uses physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal. All spills of blood and blood-contaminated fluids should be promptly cleaned up. The area should be decontaminated with a commercial disinfectant solution or a 1:100 solution of household bleach. Soiled cleaning equipment should be cleaned and decontaminated with the disinfectant solution.

If a victim's clothes become soiled with blood during First Aid or CPR, the soiled material (i.e., clothes, resuscitation equipment or disposable towels) should be placed in a red or orange plastic bag. If possible this bag should accompany the victim to the hospital or ambulance. Where on-site emergency care is given and additional medical treatment is not likely, soiled material should be placed in a red or orange plastic bag and then pick-up should be arranged by a local medical waste disposal company. Containers must be identified prior to transport or pick-up.

Any questions regarding the disposal or management of soiled garments or materials should be directed to CE&HS or the applicable DEHSM.

**Containerizing**

The potentially contaminated materials and sharps container generated from giving First Aid and CPR will be placed in a red or orange container/bag. When PPE is removed it shall be placed in an appropriate designated area for containerization. If the outside contamination of the primary container occurs, the primary container shall be placed within a second container which prevents leakage during handling processing storage, transport or shipping and is labeled or color coded.

Sharps such as needles used for bee stings or diabetes should be placed in a puncture proof/leak proof color coded or labeled container. If other contents could puncture the primary container, the primary container shall be placed within a secondary container which is puncture resistant. The liquid generated from the decontamination process should be contained in a leak proof container until a local medical waste disposal company can provide information on proper disposal based on local, state and federal regulations.
Labeling and Hazard Communication

Biohazard warning labels required by the Standard [29 CFR 1910.1030(g)(1)(ii)(B)] must be attached to containers of regulated wastes or other containers of potentially infectious materials during storage, transport or shipment. Red or orange bags may be substituted for labeling requirements, otherwise, a biohazard label with lettering or symbols should be affixed to the outside of each bag or container generated. Consequently, any container so labeled or any red or orange bagged waste or materials shall be considered to contain either blood or other infectious material.

Incident Reporting

When an employee gives First Aid or CPR, or is potentially exposed to a bloodborne pathogen, a Notification of Incident (NOI) Report must be completed. The report must indicate "Potential Exposure to Bloodborne Pathogens". Additionally, the employee will acknowledge potential exposure to bloodborne pathogen on the Monthly Employee Health and Safety Report.

Vaccination and Post-Exposure Evaluation and Follow-up

The pre-work Hepatitis B Vaccination for First Aid providers is not required, it will therefore, be offered post-exposure.

Hepatitis B vaccines are effective in preventing hepatitis B following a documented exposure when given within 1 week after HBV exposure. The vaccine may be more effective when combined with HBIG, a preparation of immune globulin with high levels of antibody to HBV (anti-HBs). The U.S. Public Health Service and Center for Disease Control guidelines should be accessed for current information.

Upon suspicion or verification of exposure to blood or infectious materials, Hepatitis vaccine will be made available to the exposed individual(s) at no cost to the employee. The employee will immediately be referred to WESTON's Occupational Medical Consultant (OMC) for counseling and management.

In the event the employee declines the Hepatitis B vaccine the Hepatitis B Vaccine Declination form (Attachment 2) must be completed and filed with CE&HS and the OMC.

Upon learning of exposure to a source or source individual found to be positive for HBV or HIV, WESTON's OMC will provide direction on case management. The OMC, after discussion of the exposure situation with the medical clinic or hospital where the victim was evaluated and treated for injury, will determine whether the exposed employee should be tested for HBV or HIV prior to the status of the source being known (or in the case where the source is unknown).

HBV and HIV testing of the source individual should be done at the local offices' medical clinic or at the hospital where the victim was treated for injury. Local laws may apply for testing source individuals in situations where consent cannot be obtained because the source refuses testing or cannot be identified (i.e., an unconscious patient). If the job location does not allow access to the local offices' medical clinic then a new WESTON OMC will be consulted for guidance. The alternate clinic/hospital must offer pretest counseling, post test counseling and referral for treatment.

Consult with WESTON's OMC to determine if the exposed employee should be given the HBV post-exposure vaccination.

Collection and testing of blood for HBV and HIV serological status shall be performed as soon as feasible on the exposed employee’s blood (after consent) where the source is found to be positive for HIV or
HBV. Results of the source individual’s testing shall be made available to the exposed employee, and the employee shall be informed by CEHS and/or the OMC of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual. When the source individual is already known to be infected with HBV or HIV testing of the source individual known HBV or HIV status need not be repeated (Center for Disease Control, 1985).

If the source of the exposure is a needle stick or bloodstained material (i.e., blood stained material contacted an open wound on a field team member) the source should be placed in an appropriate container (i.e., sharps container for needles and red bag for blood tainted material). The container should be given to the WESTON medical clinic for analysis. If the source is found to be HBV or HIV positive, the incident report must be updated to change the status from suspected to confirmed exposure. At this point the NOI Report will be placed in a limited control access portion of incident filing system to maintain confidentiality.

**Human Immunodeficiency Virus Post Exposure Management**

For any exposure to a source or source individual who has AIDS, who is found to be positive for HIV infection or who refuses testing, the worker should be counseled regarding the risk of infection and evaluated clinically and serologically for evidence for the HIV infection as soon as possible after the exposure. WESTON's OMC will provide direction on the case management.

If the source individual was tested and found to be seronegative, follow-up will be determined by WESTON's OMC.

If the source or source individual cannot be identified, decisions regarding appropriate follow-up should be individualized. Serological testing will be made available to all workers who may be concerned they have been infected with HIV through an occupational exposure. WESTON’s OMC will provide direction on the case management.

**Communication of Hazards to Employees**

**Training Schedule**

WESTON ensures that employees, who are certified to provide First Aid and CPR, are trained in all components of the bloodborne pathogen standard upon assignment and at the annual refresher training. All First Aid providers must be aware of task modifications or procedure changes which might affect occupational exposure.

**Training Contents**

A training sign-up sheet will be completed to include course title, date, attendees’ names, signatures, job classifications, instructor’s name, and duration of the class. Training content will include the following information:

- Where an accessible copy of the regulatory text and the WESTON's ECP can be found.
- An explanation of WESTON's ECP and the means by which employees can obtain a copy of the written plan.
- A general explanation of the epidemiology and symptoms of bloodborne diseases.
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials.
• An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and PPE.

• Information on the types, proper use, location, removal, handling, decontamination and disposal of PPE.

• An explanation of the basis for selection of PPE.

• Information on the Hepatitis B vaccine (or any new vaccines), including information on its efficacy, safety, method of administration, the benefits of being vaccinated.

• An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.

• Information on the post-exposure evaluation and follow-up that WESTON is required to provide for the employee following an exposure incident.

• An explanation of the signs and labels and/or color coding for disposal of infectious materials.

• An opportunity for interactive questions and answers with the person conducting the training session.

Recordkeeping

When an employee gives First Aid or CPR and in doing so becomes subject to this ECP, he/she will verbally report the incident according to WESTON's Operating Practices and then as soon as possible complete a WESTON NOI Report. As part of a medical record, the circumstances of exposure will be kept confidential. Relevant information includes the activities in which the worker was engaged at the time of exposure, the extent to which appropriate work practices and PPE were used, and a description of the source of exposure (USHHS and NIOSH, 1989). When the source is tested for HIV or HBV, the incident report is updated and placed in a confidential file.

Dates

This Exposure Control Plan was revised effective March 2008.
## CPR AND FIRST AID

<table>
<thead>
<tr>
<th>EMERGENCY SITUATION</th>
<th>SERVICE</th>
<th>POTENTIAL CONTACT</th>
<th>PPE SUGGESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victim is lying on the ground</td>
<td>Primary survey of victim and opening victims airway</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Victims breathing has ceased</td>
<td>Rescue breathing</td>
<td>Skin to skin contact</td>
<td>Gloves, Resuscitation mouthpiece</td>
</tr>
<tr>
<td>No pulse</td>
<td>CPR</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Victim is lying on the ground</td>
<td>Secondary survey of victim</td>
<td>Skin to skin contact</td>
<td>Gloves, Resuscitation mouthpiece</td>
</tr>
<tr>
<td>Choking without stoppage of breathing</td>
<td>Heimlich maneuver</td>
<td>Skin to skin contact</td>
<td>None required if skin is intact Non-intact skin requires gloves</td>
</tr>
<tr>
<td>Heart Attack</td>
<td>Comfort victim</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Bleeding with spurting blood</td>
<td>External control</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Minimal bleeding</td>
<td>External control</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Compound fractures</td>
<td>External control</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Burns</td>
<td>External control</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Poisoning</td>
<td>If induced vomiting is needed</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Diabetic shock</td>
<td>Giving an injection</td>
<td>Sharps from needle could cause direct injection</td>
<td>Gloves, Sharps container</td>
</tr>
<tr>
<td>Bites and stings</td>
<td>Giving an injection</td>
<td>Sharps from needle could cause direct injection</td>
<td>Gloves, Sharps container</td>
</tr>
<tr>
<td>Seizures</td>
<td>External control</td>
<td>Eyes and skin contact</td>
<td>Gloves</td>
</tr>
</tbody>
</table>

*FLD44-8  April 2008*
<table>
<thead>
<tr>
<th>EMERGENCY SITUATION</th>
<th>SERVICE</th>
<th>POTENTIAL CONTACT</th>
<th>PPE SUGGESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>Provide comfort</td>
<td>None</td>
<td>Gloves</td>
</tr>
<tr>
<td>Heat Stress/Cold Stress</td>
<td>External control</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Victim has fainted</td>
<td>Raise legs for shock</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Victim falls down in hazardous atmosphere</td>
<td>Rescue victim from area</td>
<td>Skin to skin contact</td>
<td>Gloves</td>
</tr>
<tr>
<td>Soiled clothes handling</td>
<td>Place soiled clothing and materials in red/orange bag</td>
<td>Skin contact with bloodborne pathogens in clothing fabrics</td>
<td>Gloves Gown or apron (as needed)</td>
</tr>
<tr>
<td>Decontamination</td>
<td>Scrub with disinfectant</td>
<td>Skin contact with bloodborne pathogens in clothing fabrics</td>
<td>Gloves Gown or apron (as needed)</td>
</tr>
<tr>
<td>Containerization</td>
<td>Place contaminated clothing into bags</td>
<td>Potential skin contact with residual bloodborne pathogen on bags</td>
<td>Gloves Gown or apron (as needed)</td>
</tr>
</tbody>
</table>
ATTACHMENT 2
DECLINATION OF VACCINATION
(29 CFR 1910.1030, APPENDIX A)

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

________________________________________  ________________
Employee Signature                      Date

________________________________________
Employee Name (Print)

________________________________________
Employee Number

________________________________________  ________________
Safety Officer Signature                Date

A copy of this form will be maintained in the employees medical file, a copy given to the employee, and the original forwarded to the OMC.
FLD 47  CLEARING, GRUBBING AND LOGGING OPERATIONS

RELATED FLDs AND PROGRAMS

FLD 22 – Heavy Equipment Operation  
FLD 31 – Fire Prevention and Protection Planning  
FLD 32 – Fire Extinguishers Required and Requirements  
FLD 38 – Hand and Power Hand Tools  
Occupational Noise and Hearing Conservation Program

Safety procedures must be evaluated and utilized for all types of clearing, grubbing, and logging activities. The primary purpose of this FLD is to evaluate safe practices by WESTON personnel who occasionally must use chain saws and other equipment to perform limited tasks. Performance of logging activities by WESTON personnel is limited to trained personnel performing small-scale ancillary tasks within the criteria outlined in this FLD. Basic subcontractor compliance requirements are also provided in this FLD.

Logging tasks on WESTON projects are rare and typically performed by a subcontractor. WESTON may perform mechanical clearing, grubbing, and logging using heavy equipment, or manually using hand and power tools.

TRAINING

Project Managers are responsible for verifying that personnel are appropriately trained and prepared to perform tasks necessary.

Any employee or subcontractor performing logging tasks or work with chain saws must provide documentation of training to the Project and/or Site Manager prior to performance of task activities. Subcontractors may document compliance with requirements of 29 CFR 1910.266 by means of individual certificates or by a letter that certifies compliance by all subcontract employees. Training for WESTON personnel consists of formal, documented overview of this FLD and OSHA’s Logging Regulation (29 CFR 1910.266), and viewing the Chain Saw Safety Video (LC02) available on the WESTON EHS Portal Site.

On-the-job training for chain saw and chipper operations will be provided by experienced personnel and consist of review of the chain saw operations manual, review of equipment and protective equipment requirements, and observation for competency during task operations.

HAZARD EVALUATION

Operations must meet requirements of 29 CFR 1910.266. Activity hazards analyses must be performed and site-specific health and safety plan (HASP) prepared in accordance with the Corporate Environmental Health and Safety Program prior to beginning the task. For logging activities, hazard evaluation must include, but is not limited to terrain, weather, tree size and lean, tree configuration and condition (e.g., visible dead wood, rotting, fungal growth, lack of new growth), potential for throwback during felling, and proximity to other workers, utilities and equipment. It is recommended that the on-line Logging eTool (available on www.osha.gov) be used as a tool for hazards analyses and HASP development.
LIMITATIONS TO WESTON-PERFORMED ACTIVITIES

Because WESTON personnel do not typically perform clearing or logging activities, the following WESTON limitations on tree felling are established. For those hazards or tasks that exceed the limitations indicated, work must be performed by a subcontractor.

Manual Felling

Manual felling is limited to trained employees with personal protection equipment (PPE) and other equipment appropriate to the task. Limitations include:

- Tree size limited to less than 12 inches diameter.
- Chain saw bar maximum size limited to 16 inches.
- No climbing or elevated platform cuts unless limited to non-powered hand tools for nuisance limb clearing.
- Felling cuts limited to the Open Face Cut.
- No felling of “Danger Trees” (i.e., standing trees that present employee hazard due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem or limbs, inappropriate direction or lean of the tree, prominent fork in trunk or double trees, creating potential felling hazard, hung or entangled trees and snags that create unreasonable risk to the feller during manual cuts). Danger trees are to be removed by mechanical aid or subcontractor.
- No felling of “Spring poles” created during felling unless employee specifically qualified to release created tension, otherwise these must be mechanically removed.
- No felling of trees located within 2 tree length distance to hazards such as active roadways, elevated utility lines, buildings, etc.
- No felling on sloping terrain such that safe felling and retreat is compromised.

Mechanical Felling

Mechanical felling is limited to trained and experienced equipment operators with equipment appropriate to the task.

Tree size is limited to less than 12 inches diameter.

Trees cannot be located within 2 tree length distance to hazards such as active roadways, elevated utility lines, buildings, etc.

ENVIRONMENTAL CONDITIONS

Work performed by WESTON or a subcontractor must be stopped and employees moved to safe areas when environmental conditions are imminent such as, but not limited to, electrical storms, high winds, heavy rain, fog, or snow, extreme cold, or darkness.

SAFETY PRECAUTIONS

All hand tools, power tools, required safety equipment, and supplies must be inspected before use on each shift in accordance with the Corporate EHS Program and FLD 38, “Hand and Power Hand Tools.” Damaged or missing items must be repaired or replaced before work startup.
WESTON corporate EHS Program first aid and fire protection (FLD 31 and FLD 32) requirements must be met. Signaling equipment (i.e., hand or audible - discernable above background noise) must be available. An air horn is suggested. Operation and maintenance manuals must be available on-site for tools such as chain-saws and chippers. Checklists should be developed to ensure compliance with 29 CFR 1910.266.

PERSONAL PROTECTIVE EQUIPMENT:

Required PPE is determined during activity hazards analyses. The following should be considered for clearing, grubbing, and logging operations.

- **Hand Protection:** Must be adequate for protection from puncture wounds, cuts, lacerations.
- **Leg Protection:** Chain saw operators must wear cut-resistant (e.g., ballistic nylon or equivalent) leg protection which covers full length from thigh to the top of the boot for each leg (for subcontracted operations see exceptions in 29 CFR 1910.266(d) if necessary).
- **Foot Protection:** Water-proof or water repellent foot protection which covers and supports the ankle. If operating a chain saw, material must be cut-resistant (e.g., multiple layers of material such as ballistic nylon, kevlar). Cut-resistant material can be intrinsic to the boot construction or as an approved supplemental attachment.
- **Head Protection:** Hard hats required.
- **Hearing Protection:** Hearing protection capable of reducing the noise level to less than 85 dBA required.
- **Eye Protection:** Safety glasses required.
- **Face Protection:** ANSI approved safety glasses and face shield required when operating chipper. Face shield (e.g. mesh screen or ANSI clear) required when operating chain saw, unless determined that use of face shield creates greater hazard.
This FLD provides guidance on Federal, State, or local regulatory agency inspections conducted at Weston Solutions, Inc. (WESTON) project sites and office locations.

Occupational Safety and Health Administration (OSHA), Federal Aviation Administration (FAA), U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA) and other regulatory agency inspections occur from time to time. A typical sequence of events is as follows:

- The regulatory agency inspector arrives at the site or office and introduces himself/herself to the manager in charge of the operation.
- The inspector may conduct a pre-inspection conference with the manager and other individuals as determined by the manager or inspector. At that time the scope of the inspection should clearly be described by the inspector.
- The inspector will perform the inspection, which may include a walk-through inspection of the work-site or a targeted file/records review. This inspection may be limited to specific areas of the site or certain records, especially if it was initiated in response to a complaint or a focused compliance inspection program. The inspector may make notes or take pictures to document site conditions.
- The site or office inspection typically ends with a close-out conference during which the inspector may provide tentative findings. In some cases the inspector may forego the close-out conference and issue a written citation after leaving the site. On occasion, inspections may require more than one day.
- Most regulatory agency inspectors seldom issue citations during the inspection, however, if an OSHA or EPA inspector observes an imminent hazard he/she can order a work stoppage. A citation is not considered to have been issued until it is in writing and received by mail or by another appropriate method.

It is WESTON’s practice to cooperate with investigations. Information that is requested should be provided.

Requests for copies of documents, health and safety plans, training records, etc. should not be provided without first obtaining approval from WESTON’s Law Department. Under no circumstances should any attempt be made to mislead the inspector. If the inspection is on a client site, WESTON will refer to the client’s written procedures for handling regulatory agency inspections.

If the client’s procedures differ significantly from WESTON’s procedures, the Site Manager in consultation and agreement with the Division Environmental Health and Safety Manager (DEHSM) and Corporate Counsel will document site-specific procedures and ensure that site personnel and client contacts are aware of these modifications.

Procedure

Coordination of any regulatory agency inspection is the responsibility of the Site or Office Manager with assistance from the Field Safety Officer (FSO) or Office Safety Officer (OSO). At least one of these individuals will accompany the inspector during all stages of the inspection. The following guidelines will apply:
• Treat the inspector as a professional and with courtesy.

• Ask for the inspector’s credentials to verify that he/she is representing a recognized regulatory agency. Personnel who cannot demonstrate their affiliation with a recognized regulatory agency should not be allowed access to the project site or office.

• Ensure that any pre-inspection conference is attended by the site and/or office manager and an EHS representative, at a minimum. If not stated during the pre-inspection conference, ask the nature of the inspection.

• **Contact the client and, in order of priority, one of the following:** the DEHSM or Corporate Environmental Health and Safety (CEH&S), prior to taking the inspector on-site or into the office. The DEHSM, FSO, OSO, or CEH&S will notify the appropriate WESTON personnel including the following:
  - General Counsel
  - CEH&S Director
  - Vice President, Human Resources
  - Vice President, Corporate Quality Leadership
  - Division Manager(s) and other DEHSMs responsible for the project
  - Project Manager and Client Services Manager responsible for the project
  - President and CEO
  - Chief Operating Officer

• If there are any questions during the conference, contact the WESTON CEH&S Department for guidance.

• Note where and what observations are made and write down any comments. If the inspector makes photographs or videotapes, take photographs or video footage that will document the conditions being recorded. If cameras or video recorders are not available at the site, at least document what shots were taken and what conditions existed, such as weather, work activities, etc. Record the names of any individuals to whom the inspector speaks.

• At the end of the inspection, ensure that there is a closing conference. Take full notes of all proceedings. Contact and debrief the DEHSM immediately following the closeout.

• Remember that a subcontractor’s conformance with OSHA, EPA, FAA, DOT and other regulations may be considered the general contractor’s responsibility. Do not rely on indemnification to protect WESTON. Act at all times in conformance with all regulatory requirements.

• **At the end of the day, complete a WESTON Notice of Incident (NOI) Form - available on the Risk Management Portal Site.** This reporting process must be used to ensure that Senior Management is fully aware of the visit and can make available whatever resources are needed to support the local manager.

• Upon receipt of final reports or Notice of Violation from the inspector, contact and provide copies to the following WESTON personnel:
  - DEHSM
  - CEH&S Director
  - Corporate Counsel
• The inspector is required to follow the same health and safety procedures and OSHA regulations and requirements as any employee or other person (such as hazardous waste operations, confined space, personal protective equipment, etc.).

• All employees are to be reminded that the law and WESTON policy prohibit any retaliation against any person reporting health and safety concerns.

**Inspection Follow-Up**

• The Project Manager will be responsible for assembling an inspection review and response team consisting of the PM, the appropriate DEHSMs, FSOs, OSOs, the CEH&S Director and other Environmental Health and Safety resources as needed.

• A chronology of events report will be started and any corrective actions deemed appropriate by the team will be taken and documented.

• Some regulatory agencies have up to 6 months to issue a written Notice of Violation. However, most agencies typically will be able to complete a written Notice of Violation within 90 days. The Notice of Violation is not official until it is received. At this point, WESTON may have 15 working days to decide whether to contest any OSHA violations and request an informal conference.

• Other federal or state regulatory agencies may have differing time limits that will be provided along with a copy of any Notice of Violation or citation.

• An abatement plan may be required by OSHA or other regulatory agency. The local project or office team will be responsible for preparing this plan along with any rebuttal of the citation with support from Corporate and Division EHS resources, as well assistance from WESTON’s Legal Department.

**Inspection Closure**

• The chronology report will conclude when any abatement plan has been accepted and/or the regulatory agency indicates, preferably in writing, that any violations have either been vacated or abated.
FLD 57 – MOTOR VEHICLE SAFETY

RELATED OP AND FLD

OP 11-01-017 – Motor Vehicle Safety
FLD 11 – Rough Terrain

This FLD applies to vehicles other than passenger vehicles that are operated when performing WESTON activities/operations. WESTON personnel safe driving requirements must be included in site-specific health and safety plans and accident prevention plans.

SAFE VEHICLE OPERATION

The vehicle operator is responsible for the vehicle, and for ensuring that the vehicle is in good working condition before use. WESTON employees must not operate a vehicle with any mechanical defect which endangers the safety of the driver, passengers, or the public. Before use, the vehicle operator must ensure that the vehicle is safe to operate and free from apparent damage that could result in failure while in use. The vehicle operator documents the inspection of the Equipment/Trucking Inspection Checklist available on the Weston EHS Portal.

Vehicle operators are responsible for observing the procedure established in OP 11-01-017 Motor Vehicle Safety and the following requirements:

- comply with all state and local traffic laws
- drive defensively
- comply with client requirements regarding motor vehicle operation
- use seat belts at all times when the vehicle is in motion
- ensure that all passengers are using seat belts at all times when the vehicle is in motion
- use caution when driving through congested areas, or near where personnel and equipment are working
- use a spotter for backing vehicles, if possible.

Vehicle operators must observe the following prohibited actions:

- DO NOT operate a motor vehicle under the influence of alcohol or drugs.
- DO NOT leave keys in an unattended vehicle.
- DO NOT leave the driver’s seat of a vehicle while the motor is running.
- DO NOT operate a motor vehicle when abnormally tired.
- DO NOT drive beyond any barricades or into any area posted with designations, such as “NO TRESPASSING,” “RESTRICTED AREA,” or “DO NOT ENTER.”
- DO NOT allow riders on the outside of a vehicle while it is in motion.
SAFETY DURING TRAVEL

- Know the traveling height (overhead clearance), width, length, and weight of the vehicle and know highway and bridge load, width and overhead limits, making sure these limits are not exceeded with an adequate margin.
- Never move a vehicle unless the vehicle brakes are in sound working order.
- Allow for any overhang when cornering or approaching other vehicles or structures.
- Be aware that the canopies of service stations and motels may be too low for a high-profile vehicle.
- Watch for low hanging electrical lines, particularly at the entrances to work sites, restaurants, motels, or other commercial sites.
- Remove all ignition keys when a drill rig is left unattended.
- For off-road travel, refer to FLD 11.

LOADING AND UNLOADING

The following guidelines should be followed, as applicable, when loading and unloading vehicles.

Tractors and/or trailers must be chocked during loading and unloading. Deck plates and positive anchor systems must be used for delivery to elevated platforms at trailer floor level if unloaded by fork lifts. Trailers detached from tractors must have additional support if fork lifts will enter or if instability of load presents a hazard of front wheels collapsing.

When loading or unloading a vehicle (such as a drill rig) or other “large” equipment on a trailer or a truck:

- Use ramps of adequate design that are solid and substantial enough to bear the weight of the vehicle or equipment with carrier - including tooling.
- Load and unload on level ground.
- Use the assistance of someone on the ground as a guide.
- Check the brakes on the vehicle or carrier before approaching loading ramps.
- Distribute the weight of the vehicle or carrier, and tools on the trailer so that the center of weight is approximately on the centerline of the trailer and so that some of the trailer load is transferred to the hitch of the pulling vehicle. Refer to the trailer manufacturer’s weight distribution recommendations.

Secure the vehicle/equipment and tools to the hauling vehicle with ties, chains, and/or load binders of adequate capacity.

INSPECTION AND PRECAUTIONS

Tires

Vehicle tires must be checked daily for safety and during extended travel for loss of air, and maintained and/or repaired in a safe manner. If tires are deflated to reduce ground pressure for movement on soft ground, the tires must be reinflated to normal pressures before movement on firm or hilly ground or on streets, roads, and highways. Under-inflated tires are not as stable on firm ground as properly inflated
tires. Air pressures should be maintained for travel on streets, roads, and highways according to the manufacturer's recommendations. During tire checks, inspect for:

- Missing or loose wheel lugs.
- Objects wedged between duals or embedded in the tire casing.
- Damage to or poorly fitting rims or rim flanges.
- Abnormal or uneven wear and cuts, breaks, or tears in the casing.

The repair of truck and off-highway tires should only be made with required special tools and following the recommendations of a tire manufacturer's repair manual.

**Batteries**

Batteries contain strong acid. Use extreme caution when inspecting or charging batteries.

- Service batteries in a ventilated area while wearing safety glasses.
- When charging a battery with a battery charger, turn off the power source to the battery before either connecting or disconnecting charger loads to the battery posts. Cell caps should be loosened prior to charging to permit the escape of gas.
- Spilled battery acid can burn your skin and damage your eyes. Immediately flush spilled battery acid off of your skin with lots of water. Should battery acid get into someone's eyes, flush immediately with large amounts of water and see a medical physician at once.
- To avoid battery explosions, keep the cells filled with electrolyte, use a flashlight (not an open flame) to check electrolyte levels, and avoid creating sparks around the battery by shorting across a battery terminal. Keep lighted smoking materials and flames away from batteries.
- When a battery is removed from a vehicle or service unit, disconnect the battery ground clamp first.
- Secure batteries when transporting to prevent tip over.
- When installing a battery, connect the battery ground clamp last.

**Fuel**

Special precautions must be taken for handling fuel and refueling vehicles. Vehicles should not be fueled from open cans or by other makeshift methods, as there is great danger of flash fire from hot engines.

- Engines should be shut off while fueling.
- Only use the type and quality of fuel recommended by the engine manufacturer.
- Refuel in a well-ventilated area.
- Do not fill fuel tanks while the engine is running. Turn off all electrical switches.
- Do not spill fuel on hot surfaces. Clean any spillage before starting an engine.
- Wipe up spilled fuel with cotton rags or cloths - do not use wool or metallic cloth.
- Keep open lights, lighted smoking materials, and flames or sparking equipment well away from the fueling area.
- Turn off heaters in carrier cabs when refueling the carrier.
• Do not fill portable fuel containers completely full to allow expansion of the fuel during temperature changes.
• Keep the fuel nozzle in contact with the tank being filled to prevent static sparks from igniting the fuel.
• Do not transport portable fuel containers in the vehicle or carrier cab with personnel.
• Keep fuel containers and hoses in contact with a metal surface during travel to prevent the buildup of static charge.
For project assignments lasting longer than two weeks, WESTON employees should not work in excess of 84 hours per week (12 hours/day – 7 days/week) unless approved by the Project Manager. The Division and Corporate EHS communities, as well as the local Operations/Resource Manager are available to support the Project Manager’s decision process. Certain Federal Contracts, Regulatory Agencies, and Country-specific (non-CONUS) regulations may require more stringent limitations on work hours which are addressed in Weston’s Staffing and Work Plans.

Project Health and Safety Plans (HASPs) address specific employee requirements as they relate to working long hours. On project assignments requiring extended periods of working long hours, Site Supervisors and/or Field Safety Officers (FSOs) will monitor employees for outward signs of fatigue (see Appendix B for signs and symptoms). Employee rotations may need to be adjusted to allow for individual differences in how fatigue-related stress is handled and for their specific role on the Project.

While working extended hours, employee travel time to and from work will be minimized to allow for sufficient rest and should be taken into account in determining hours per day and per week limits. Group transportation to and from the work location and lodging may be used to address this situation. The Project HASP will address project-related commuting and employee fatigue. Consideration should be given to “awake” time and not just the hours logged on a time sheet. For example, if an employee is awake at 6:00 AM, works a 10 hour shift on-site (7:00 AM until 6:00 PM with an hour for lunch), returns to the hotel for clean-up and dinner and begins a 5 hour commute home at 8:00 PM – this employee will be awake for 18 hours when he/she is one hour from home in the middle of the night. Studies demonstrate that being awake and driving at the 18 hour mark is equivalent of driving under the influence (DUI) and exposes the employee and others to a higher probability of an accident caused by falling asleep at the wheel or fatigue-induced errors in judgment.

There may be extreme circumstances that require employees to work longer rotations based on given Project circumstances. If a Project requires a WESTON employee to work greater than 84 hours per week for more than two weeks, this should be addressed in the HASP and approved by the Project Manager. If the Project circumstances are projected to run long than a month, then the work/rest cycle will be addressed in a HASP amendment prior to end of that month time frame for the Project. The HASP will address recognition of fatigue, actions to take when fatigue is noted and appropriate and relevant elements of a Fatigue Management Plan to ensure risk mitigation. Anyone having concerns about safety issues relating to long hours should discuss these with the Project Manager, FSO, Office Safety Manager, or Division EHS Manager.

Appendix A is a Risk of Injury Table that presents data from studies where risk of injury was quantified and/or modeled. Appendix B is a reprint of an article that describes symptoms of fatigue. Additional information on fatigue, fatigue factors, and mitigation will also be posted on the Corporate EHS Portal Site.
APPENDIX A  RISK OF INJURY TABLE

Association Between Working Extended Work Shifts/Work Weeks and Workplace Injury: Summary of Reviewed Literature

This table highlights studies that evaluated the association between hours worked and occupational injury. It presents data from several recent studies where the risk of injury has been quantified and/or modeled. None of the studies highlighted here evaluate how the implementation of a well-designed and well-managed fatigue management program would impact the risk of injury. However, it is clear from the studies that when aspects of such a program (e.g., including breaks throughout a work shift) are implemented, fatigue is reduced and performance is enhanced; the risk of injury may be similarly reduced. These data should be used collectively when designing a work schedule for an incident-specific fatigue management plan. It is “necessary to consider the various features of the schedule in combination with one another, rather than in isolation from one another” (Johnson & Lipscomb, 2006).

<table>
<thead>
<tr>
<th>Reference</th>
<th>10-hr work shift</th>
<th>12-hour work shift</th>
<th>afternoon work shift</th>
<th>night work shift</th>
<th>successive shifts</th>
<th>&gt; 40-hr work week</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. Vegso, et al, 2007</td>
<td>↑ by 13%</td>
<td>↑ by 27.5%</td>
<td>↑ by 15.2%</td>
<td>↑ by 27.9%</td>
<td>Night Shifts:</td>
<td>↑ by 88% for those who worked more than 64 hr during the previous week</td>
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<tr>
<td>Folkhard &amp; Lombardi, 2006 (model using results from numerous studies)</td>
<td>↑ by 37%</td>
<td>↑ by 27%</td>
<td>↑ by 15%</td>
<td>↑ by 27.9%</td>
<td>Night Shifts:</td>
<td>↑ by 6% for 2nd night worked</td>
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<td>↑ by 17% for 3rd night worked</td>
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<td>↑ by 36% for 4th night worked</td>
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<td></td>
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<td></td>
<td></td>
<td>Varies based on length of shift and time of day. For any given work week duration, a long span of short shifts is likely to be safer than a short span of long shifts.</td>
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<td>60 hour week – as 6 10-hr days: ↑ by 16% (day)</td>
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<td></td>
<td></td>
<td>↑ by 54% (night)</td>
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<td></td>
<td></td>
<td>62% (night)</td>
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</table>

Dembe, et al, 2005 | ↑ by 37% | | | | | ↑ by 23% |

(60 hrs/week)
### Risk of Injury
(as compared with working 8-hr work day, working during the day shift, and working a 40 hr work week)

<table>
<thead>
<tr>
<th>Reference</th>
<th>10-hr work shift</th>
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<th>night work shift</th>
<th>successive shifts</th>
<th>&gt; 40-hr work week</th>
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</thead>
<tbody>
<tr>
<td>Dong, 2005</td>
<td>↑ by 57% (&gt; 8 hrs; construction workers)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>↑ by 98% (&gt; 50 hrs; all occupations)</td>
</tr>
<tr>
<td>Folkhard &amp; Lombard, 2004</td>
<td>↑ by 13%</td>
<td>↑ by 27.5%</td>
<td>↑ by 18.3%</td>
<td>↑ by 30.4%</td>
<td>Night Shifts:</td>
<td>Night Shifts:</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>↑ by 6% for 2nd night worked</td>
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<td>Day Shifts:</td>
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<td>↑ by 2% for 2nd day worked</td>
<td>↑ by 2% for 2nd day worked</td>
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<td>↑ by 7% for 3rd day worked</td>
<td>↑ by 7% for 3rd day worked</td>
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<td></td>
<td></td>
<td>↑ by 17% for 4th day worked</td>
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</tr>
<tr>
<td>Folkhard &amp; Tucker 2003,</td>
<td></td>
<td></td>
<td></td>
<td>↑ by 18.3%</td>
<td>↑ by 30.4%</td>
<td>Night Shifts:</td>
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<td>↑ by 17% for 4th day worked</td>
<td>↑ by 17% for 4th day worked</td>
</tr>
<tr>
<td>Baker, 2003*</td>
<td>no significant ↑; accidents peaked – 10th hour (day shift) and 12th hour (night shift)</td>
<td></td>
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</tr>
</tbody>
</table>
## Risk of Injury
(as compared with working 8-hr work day, working during the day shift, and working a 40 hr work week)

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<th>Reference</th>
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<th>night work shift</th>
<th>successive shifts</th>
<th>&gt; 40-hr work week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnson &amp; Sharit, 2001*</td>
<td>no significant ↑ (switched from 8- to 12-hr work shift)</td>
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</tr>
</tbody>
</table>

* “Research comparing 8- and 12-hour shift schedules has not consistently reported increases in health and safety risks with longer shift durations. Some of the 12-hr shift schedules offset longer shifts with fewer consecutive work days (a “compressed” work week) and more rest days so that total hours approximate a 40-hr week. Fewer commutes may be another offsetting advantage. Thus, future research needs to consider potential interactions of shift length with length of work week, opportunity for rest, and commuting requirements.” (Caruso et al., 2006)

Considerations for evaluating data included in this table:

- This table highlights studies that evaluate the relationship between hours worked and risk of injury. It presents data from several recent studies where this relationship has been quantified or modeled. There are numerous studies that evaluate the relationship between hours worked and other health effects, which are of equal importance in understanding the full range of effects that workers may experience when working extended work shifts, work weeks, and work rotations. Many of these studies are highlighted in the literature review presented in this Appendix.
- None of the studies evaluated recovery workers during disaster operation.
- Most of the studies included individuals working in a broad range of occupations, or focused on a single manufacturing or market sector. The study lead by Dong focused on construction workers, an occupation that is frequently involved in recovery operation, but did not focus on construction operations during disaster recovery.
- All of the studies have design and data limitations – it is important to understand these when evaluating the data presented in the study and in this table.
- The type and severity of injury is not well defined in the studies reviewed. Folkard and Lombardi (2006) note that “in the vast majority of cases the incidents on which these trends are based were not severe, but it is likely that they represent a relatively direct measure of the occurrence of mistakes and omissions.” Injury severity likely varies among the individuals within each study and between the studies evaluated.
YOU MIGHT BE FATIGUED IF....
by Frederick V. Malmstrom, Ph.D., CPE from Flying Safety, February 1997, pg 14-15 (Reprinted by permission.)

The National Transportation Safety Board (NTSB) doesn’t consider fatigue a “cause” of aviation mishaps. Rather, as a “contributing factor.” Personally, I think this kind of reasoning is more an exercise in semantics than reality. But, whatever the causes, the results of fatigue can be deadly.

So, what on earth is fatigue? It is, as psychologists are fond of saying, a theoretical construct. Nobody can measure it, weight it, time it, smell it, or place any physical units on it—yet everyone agrees it exists. It’s been said that for every two Frenchmen who meet in a coffee house, a new political party is formed. It’s also said that for every psychologist who writes an article on fatigue, a new definition of fatigue is created.

Fatigue is typified by symptoms of inattention, degraded judgment, poor motor skills, exhaustion, confusion, and a whole long list of other effects. (See table 1.)

I have experienced the near-fatal side effects of fatigue. This was an instance when we’d been up flying combat all night and coasted in sleepily for a dawn landing. The brakes somehow had collected water and froze. During the half-second of fatigue-induced inattention after touchdown, our EB-66C’s brakes locked up, and we spun into the infield grass. Happily, all six of us walked (well, ran) away from that one.

THE FOUR CAUSES OF FATIGUE
AS RESEARCHERS RICHARD ADAMS OF

Advanced Aviation Concepts and Dr. Alan Stokes of the Florida Institute of Technology (1995) warn, fatigue is much more than just sleep deprivation. There are at least four known causes:

1. Inadequate rest.
2. Desynchronized physiological circadian rhythms.
3. Weariness following physical activity.
4. Impaired judgment following prolonged mental activity.

And any or all of the above-mentioned causes are enough to induce fatigue.

FATIGUE-INDUCED ERRORS

Even though the NTSB says fatigue doesn’t “cause” mishaps, research shows it sure causes errors. As students of the theory of signal detection know, there are only two categories of flying errors: (1) errors of commission, and (2) errors of omission.

Unfortunately, fatigue causes both categories of error, although the error of omission is by far the most common.

Adams and Stokes cited a classic 1948 U.K. study in which fatigued subjects flying a simulator made numerous errors of omission followed by several “catch-up” errors of commission. Talk about making a bad situation badder!
What are the most common fatigue-induced flight errors? Well, for instance, in 1995, Dr. J. C. Wilson of Leicester University and Capt A. Elsey and Mr. P. Hunton of British Airline Pilots’ Association (BAPA) surveyed over 1,000 U.K. commercial pilots and flight engineers. Although no single type of fatigue-related error is overwhelming the “miscommunication”* error seems to come up more frequently. Their study found a shotgun spread of fatigue-related errors—probably because fatigue is a global thing. When you fly long hours, you fatigue your entire person—not just your eyes, not just your mind, and not even just your backside. The nasty thing about fatigue is that it seems to lower your all-around ability to integrate the parts of the puzzle.

Fatigued individuals have limited attention—they see the trees but not the forest. For instance, older (like me) people are especially vulnerable to fatigue. That’s probably in no small part due to our reduced brain, skeletal, and muscle mass. There is simply physically less of us to cope with the global problems of the world.

HOW DO YOU RECOGNIZE FATIGUE?

Unfortunately, fatigue, like hypoxia, tends to sneak up on the victim gradually and isn’t always easy to recognize. Having worked with mental patients for years, I’ve noted that the truly psychotic persons are themselves the last to know that they’re crazy. Hence, they must rely on outside observers to point this out to them, and even then, these disturbed persons often won’t accept the fact. Likewise, fatigued persons tend to be in denial and wouldn’t always recognize fatigue if it bit them.

Dr. Richard F. Haines and C. Flatau, in their book Night Flying (1992), have taken the time to table some observable effects of fatigue. I’ve condensed some of their findings into Table 1. Note that some of the effects can be seen only by you (intrinsic symptoms). Extrinsic symptoms are easily seen only by others. Please take the time to note the extrinsic symptoms. They’re the kind of behaviors which the individual typically ignores but the outsider should be able to spot rather easily.

If you aren’t able to recognize your own fatigue symptoms, the least you can do is recognize these fatigue symptoms in others. And, if you do, you can say, “You might be fatigued if...you have these symptoms.” I’d have been grateful if someone had brought that to my attention on that morning 30 years ago while I was landing in the EB-66C.

*Miscommunication is a hot topic in aviation research. CRM-crew resource management (aka cockpit resource management)—analyzes things like crew workload, social interactions, and (mis)communications. For further reading, see Maj. Eric Offil’s article, “Cockpit Resource Management,” in the September 1996 Flying Safety.

Table 1. You might be fatigued if...you have these observable effects of fatigue (from Haines & Flatau, 1992)

**What you see:**

**INTRINSIC SYMPTOMS**

**A. PHYSICAL**

1. Frequent, unexplainable headaches
2. Muscular aches and pains
3. Breathing difficulties
4. Blurred/double vision
5. Burning urination

**B. MENTAL**
1. Attentional focusing
2. Easily distracted
3. Reduced flying standards
4. Feeling of depression
5. Impaired judgment
6. Poor visual perception

**What others see:**

**EXTRINSIC SYMPTOMS**

**A. PHYSICAL**
1. Degraded motor skills
2. Tenseness and tremors
3. Intolerant/irritable
4. Increased reaction time
5. Social withdrawal

**B. MENTAL**
1. Absentmindedness
2. Poor short-term memory
3. Lack of interest and drive
4. Confused and fearful
5. Slow startle response
6. Worried and anxious
ATTACHMENT D

ENVIRONMENTAL HEALTH AND SAFETY INSPECTION CHECKLIST
ENVIRONMENTAL HEALTH AND SAFETY INSPECTION CHECKLIST

Project Name: ________________________________

Inspector: ________________________________

Submit to: ________________________________

Date: ________________________________
### THE WESTON SITE APPEARANCE

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td></td>
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<td><strong>Is the site secured to prevent inadvertent, unnecessary, or unauthorized access?</strong> Are gates closed and locked at any time that the access point is not occupied or visible to site workers?</td>
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<td><strong>Are access points posted with signs to indicate client and end-user client name, WESTON’s name and logo, names of other contractors and sub-contractors, project name and location, and appropriate safety messages?</strong></td>
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<td><strong>Are required postings in place (e.g., Labor Poster, Emergency Phone Numbers, Site Map, etc.)?</strong></td>
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<td><strong>Are site trailers tied down per local code and provided with stairs that have a landing platform with guard and stair railings?</strong></td>
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<td><strong>Is a Site Safety file system established in the office to maintain records required by applicable safety regulations?</strong></td>
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<td><strong>Is the Health and Safety Plan (HASP) or Accident Prevention Plan (APP) amended as scope of work changes, hazards are discovered or eliminated or if risk change?</strong></td>
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<td><strong>Is the Site Safety Plan and the Safety Officers Field Manual on site?</strong></td>
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<td><strong>Is new employee indoctrination provided?</strong></td>
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<td><strong>Have site Rules been provided, discussed and signed off on by all employees</strong></td>
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<td><strong>Incident Reporting procedure explained to all?</strong></td>
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<td><strong>Is site management trained in the WESTON (and client as applicable) Incident Reporting system?</strong></td>
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<td><strong>Are NOI and Supplemental Report forms and OSHA 300 Log available on site?</strong></td>
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<td><strong>Is Site Management aware of the Case Management and Incident Investigation Procedures?</strong></td>
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<td><strong>Is there a list of preferred provider medical facilities available?</strong></td>
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<td><strong>Has the “Inspection By A Regulatory Agency” procedure been reviewed by all site management?</strong></td>
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<td><strong>Will Competent Persons be required because of activities to be performed, equipment to be used or hazards to be encountered?</strong></td>
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</table>
## POLICIES

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Each individual employee is aware that he or she responsible for complying with applicable safety requirements, wearing prescribed safety equipment and preventing avoidable accidents.

Do employees understand that they will wear clothing suitable for existing weather and work conditions and the minimum work uniform will include long pants, sleeved work shirts, protective footwear, hard hat, and safety glasses unless otherwise specified via the HASP.

Are employees provided safety and health training to enable them to perform their work safely? Is all training documented to indicate the date of the session, topics covered, and names of participants?

Safety meetings are conducted daily. The purpose of the meetings are to review past activities, review pertinent tailgate safety topics and establish safe working procedures for anticipated hazards encountered during the day.

Training has been provided to all personnel regarding handling of emergency situations that may arise from the activity or use of equipment on the project.

Employees/contractors are informed and understand that they may not be under the influence of alcohol, narcotics, intoxicants or similar mind-altering substances at any time. Employees found under the influence of or consuming such substances will be immediately removed from the job site.

Site workers and operators of any equipment or vehicles are able to read and understand the signs, signals and operating instructions of their use.

Have contractors performing work provided copies of relevant documentation (such as medical fit-for-duty, training certificates, fit-tests, etc.) prior to initiation of the project?
## SANITATION
29 CFR 1926 Subparts C, D. EM 385-1-1, Section 2

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<th>YES</th>
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<td><strong>Is an adequate supply of drinking water provided. Is potable/drinking water labeled as such? Are there sufficient drinking cups provided?</strong></td>
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<td><strong>Is there a sufficient number of toilets?</strong></td>
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<td><strong>Are washing facilities readily available and appropriate for the cleaning needs?</strong></td>
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<td><strong>Are washing facilities kept sanitary with adequate cleansing and drying materials?</strong></td>
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<td><strong>Waste is secured so as not to attract rodents, insects or other vermin?</strong></td>
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<td><strong>Is an effective housekeeping program established and implemented?</strong></td>
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## ACCIDENT PREVENTION SIGNS, TAGS, LABELS, SIGNALS, AND PIPING
SYSTEM IDENTIFICATION
29 CFR 1926 Subpart G. EM 385-1-1, Section 8

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<td><strong>Are signs, tags, and labels provided to give adequate warning and caution of hazards and instruction/directions to workers and the public?</strong></td>
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<td><strong>Are all employees informed as to the meaning of the various signs, tags and labels used in the workplace and what special precautions are required?</strong></td>
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<td><strong>Are construction areas posted with legible traffic signs at points of hazard?</strong></td>
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<td><strong>Are signs required to be seen at night lighted or reflectorized?</strong></td>
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<td><strong>Tags contain a signal word (“danger” or “caution”) and a major message to indicate the specific hazardous condition or the instruction to be communicated to the employee. Tags follow requirements as outlined in 29 CFR 1926.200.</strong></td>
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## MEDICAL SERVICES AND FIRST AID
### 29 CFR 1926 Subparts C, D. EM 385-1-1, Section 3

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<td><strong>Is a local medical emergency facility (LMEF) identified in the HASP or APP?</strong></td>
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<td><strong>Has the LMEF been visited to verify the directions and establish contacts?</strong></td>
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<td><strong>Has site management reviewed WESTON’s incident management procedures?</strong></td>
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<td><strong>Have clinics and specialists that will help WESTON manage injuries and illnesses been identified?</strong></td>
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<td><strong>Is there at least two (2) people certified in First Aid and CPR?</strong></td>
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<td><strong>Are first aid kits available at the command post and appropriate remote locations?</strong></td>
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<td><strong>Are first Aid Kits and Eyewash/Safety Showers inspected weekly?</strong></td>
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<td><strong>Are 15 minute eyewash/safety showers in place if required.</strong></td>
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<td><strong>Is an Emergency Response and Contingency Plan in place?</strong></td>
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</table>
## FIRE PREVENTION AND PROTECTION

29 CFR 1926 Subpart F. EM 385-1-1, Section 9

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<th>YES</th>
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<td></td>
<td>Are emergency phone numbers posted?</td>
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<td>Are fire extinguishers selected and provided based on the types of materials and potential fire classes in each area.</td>
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<td></td>
<td>Are fire extinguishers provided in each administrative and storage trailer, within 50 ft but no closer than 25 ft of any fuel or flammable liquids storage, on welding and cutting equipment, on mechanical equipment?</td>
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<td></td>
<td>Are fire extinguishers checked daily and inspected monthly?</td>
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<td>Do site personnel know the location of fire extinguishers and how to use them?</td>
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<td>Are flammable and combustible liquids stored in approved containers?</td>
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<td></td>
<td>Safety cans are used for dispensing flammable or combustible liquids in 5 gallon or less volumes.</td>
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<td>Are flammable and combustible liquids stored in flammable storage cabinets or appropriate storage areas?</td>
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<td>Are flammable materials separated from oxidizers by at least 20 feet (or 5 foot tall, ½ -hour rated fire wall) when in storage?</td>
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<td>Are fuel storage tanks double walled or placed in a lined berm?</td>
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<td></td>
<td>Spills are cleaned up immediately and wastes are disposed of properly.</td>
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<td>Combustible scrap, debris and waste material (oily rags) are stored in closed metal containers and disposed of promptly.</td>
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<td>Vehicle fueling tanks are grounded and bonding between the tank and vehicle being fueled is provided?</td>
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<td></td>
<td>LPG is stored, handled and used according to OSHA regulations 29 CFR 1926.</td>
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<td>LPG cylinders are not stored indoors.</td>
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<td>Is a hot work permit program in place? See WESTON FLD-36</td>
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<td></td>
<td>Is smoking limited to specific areas, prohibited in flammable storage areas and are signs posted to this effect?</td>
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<td>YES</td>
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<td>COMMENT</td>
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<td>Are operations, materials and equipment evaluated to determine the presence of hazardous contaminants or if hazardous agents could be released in the work environment?</td>
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<td>Are MSDS for substances made available at the work-site when any hazardous substance is procured, used, or stored?</td>
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<tr>
<td>Are all containers and piping containing hazardous substances labeled appropriately?</td>
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<td>Is there an inventory of hazardous substances?</td>
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<tr>
<td>Is there a site Specific Hazard Communication Program?</td>
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<tr>
<td>Spill kits appropriate for the hazardous materials present are on site and their location is known to spill responders.</td>
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<tr>
<td>Is disposal of excess hazardous chemicals performed according to WESTON’s guidelines and RCRA regulations.</td>
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<tr>
<td>Before initiation of activities where there is an identified asbestos or lead hazard, is there a written plan detailing compliance with OSHA and EPA asbestos or lead abatement requirements? Does the plan comply with state and local authority, and USACE requirements, as applicable?</td>
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<tr>
<td>Are personnel trained and provided with protection against hazards from animals, poisonous plants and insects?</td>
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### PERSONAL PROTECTIVE AND SAFETY EQUIPMENT, RESPIRATORY AND FALL PROTECTION

29 CFR 1926 Subparts D, E, M. EM 385-1-1, Section 5

<table>
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<tr>
<th>YES</th>
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<td></td>
<td></td>
<td><strong>Do employees understand that the minimum PPE is hard hat, safety glasses with side shields and safety shoes or boots and that long pants and a sleeved shirt are required?</strong></td>
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<td><strong>Has the SSHC reviewed the PPE requirements in the HASP against actual site conditions and certified that the PPE is appropriate? (see Field Manual, PPE Program)</strong></td>
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<td><strong>PPE is inspected, tested and maintained in serviceable and sanitary condition as recommended by the manufacturer. Is defective or damaged equipment taken out of service and repaired or replaced?</strong></td>
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<td><strong>Are employees trained in the use of the PPE required?</strong></td>
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<td><strong>Are personnel exposed to vehicular or equipment traffic, including signal persons, spotters or inspectors required to wear vests or apparel marked with a reflective or high visibility material?</strong></td>
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<td><strong>Is there a noise hazard? If yes, hearing protection will be required.</strong></td>
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<td><strong>Is there a splash or splatter hazard? Face shields or goggles will be required.</strong></td>
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<td><strong>Will personnel be working in or over water? Personnel Floatation devices will be required.</strong></td>
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<td><strong>Is there a welding hazard? Welding helmet and leathers will be required. Is there a cutting torch hazard? Goggles and protective clothing will be required.</strong></td>
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<td><strong>Is each person on a walking/working surface with an unprotected side or edge that is 6 feet (1.8 m) or more above a lower level protected from falling by the use of guardrail systems, safety net systems or personal fall arrest systems? See WESTON FLD 25 (Note General Industry standard is four feet).</strong></td>
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<td><strong>Guardrail systems are used as primary protection whenever feasible. Guardrail construction meets criteria in 29 CFR 1926.502(b).</strong></td>
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<td><strong>Personal fall arrest systems (PFAS) are inspected and appropriate for use.</strong></td>
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<td><strong>Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses are from synthetic fibers.</strong></td>
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<td><strong>Safety nets and safety net installations are constructed, tested and used according to 29 CFR 1926.502.c</strong></td>
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<td><strong>Is respirator use required? See WESTON Respiratory Protection Program</strong></td>
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<td>YES</td>
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<td>Persons using respiratory protection have been successfully medically cleared, trained and fit tested.</td>
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<td>Respirators are used according to the manufacturer’s instructions, regulatory requirements, selection criteria and health and safety plan provisions.</td>
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<td>For Level C operations with organic vapor contamination, is the cartridge change-out schedule documented?</td>
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<td>Is breathing certified as Grade D, or better, and certification available on-site?</td>
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**MACHINERY AND MECHANIZED EQUIPMENT**

29 CFR 1926 Subparts N, O. EM 385-1-1, Sections 16, 17, 18

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<td>Are inspections of machinery by a competent person established?</td>
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<td>Is equipment inspected daily before its next use?</td>
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<td>Equipment inspection reports are reviewed, followed-up on negative findings and records of inspections are maintained?</td>
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<td>Machinery or equipment found to be unsafe is taken out of service until the unsafe condition has been corrected.</td>
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<td>Is there a preventive maintenance program established?</td>
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<td>Are operators of equipment qualified and authorized to operate?</td>
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<td>Is all self-propelled construction and industrial equipment equipped with a reverse signal alarm?</td>
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<td>Are seats or equal protection provided for each person required to ride on equipment. Are seatbelts installed and worn on motor vehicles, as appropriate.</td>
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<td>All equipment with windshields is equipped with powered wipers. If fogging or frosting is possible, operable defogging or defrosting devices are required.</td>
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<td>Internal combustion engines are not operated in enclosed areas unless adequate ventilation are made. Air monitoring is conducted to assure safe working conditions.</td>
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<td>Is each bulldozer, scraper, dragline, crane, motor grader, front-end loader, mechanical shovel, backhoe, or similar equipment equipped with at least one dry chemical or carbon dioxide fire extinguisher with a minimum rating of 5-B:C?</td>
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<td>Will cranes or other lifting devices be used? If so, are the following documents available on site: 1) a copy of the operating manual, 2) load rating chart, 3) log book, 4) a copy of the last annual inspection and 5) the initial on-site inspection?</td>
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<td>YES</td>
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<td>COMMENT</td>
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<td>Do operators have certificates of training to operate the type of crane(s) to be used?</td>
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<td>Is a signal person provided when the point of operation is not in full view of the vehicle, machine or equipment operator? When manual (hand) signals are used, is only one person designated to give signals to the operator?</td>
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<td>Signal persons back one vehicle at a time. While under the control of a signal person, drivers do not back or maneuver until directed. Drivers stop if contact with the signal person is lost.</td>
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<td>Is a critical lift plan prepared by a competent person whenever:</td>
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<td>- a lift is not routine, or a lift exceeds 75% of a crane’s capacity,</td>
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<td>- a lift results in the load being out of the operator’s line of sight, or a lift involves more than one crane,</td>
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<td>- a man basket is used, or the operator believes there is a need for a critical lift plan.</td>
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<td>Fork Lifts (Powered Industrial Trucks) - Will forklifts be used on site?</td>
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<td>All forklifts meet the requirements of design, construction, stability, inspection, testing, maintenance and operation as indicated in ANSI/ASME B56.1 Safety Standards for Low Lift and High Lift Trucks.</td>
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<td>Do forklift operators have certificates of training?</td>
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<td>Are pile driving operations conducted according to EM 385-1-1, Section 16.L?</td>
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<td>Is drilling equipment operated, inspected, and maintained as specified in the manufacturer’s operating manual? Is a copy of the manual available at the work-site? See also the Drilling Safety Guide in the Safety Officers Field Manual.</td>
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<td>Are flag persons provided when operations or equipment on or near a highway expose workers to traffic hazards? Do flag persons and persons working in proximity to a road wear high visibility vests? Are persons exposed to highway vehicle traffic protected by signs in all directions warning of the presence of the flag persons and the work? Do signs and distances from the work zone conform to federal and local regulations?</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
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<td></td>
<td>Motor vehicle operators have a valid permit, license, or certification of ability for the equipment being operated.</td>
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<td></td>
<td>Inspection, maintenance and repair is according to manufacturer’s requirements by qualified persons.</td>
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<td></td>
<td>Vehicles are inspected on a scheduled maintenance program.</td>
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<td></td>
<td>Vehicles not in safe operating condition are removed from service until defects are corrected.</td>
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<td></td>
<td>Glass in windshields, windows, and doors is safety glass. Any cracked or broken glass is replaced.</td>
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<td></td>
<td>Seatbelts are installed and worn.</td>
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<td></td>
<td>The number of passengers in passenger-type vehicles does not exceed the number which can be seated.</td>
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<td></td>
<td>Trucks used to transport personnel have securely anchored seating, a rear endgate, and a guardrail.</td>
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<tr>
<td></td>
<td>No person is permitted to ride with arms or legs outside of a vehicle body; in a standing position on the body; on running boards; seated on side fenders, cabs, cab shields, rear of the truck or on the load.</td>
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</tr>
<tr>
<td></td>
<td>ATV operators possess valid state drivers license, have completed an ATV training course prior to operation of the vehicle, and wear appropriate protective equipment such as helmets, boots, and gloves.</td>
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</tbody>
</table>
## EXCAVATING AND TRENCHING
29 CFR 1926 Subpart P. EM 385-1-1, Section 25

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td></td>
<td>Has the known or estimated location of utility installations such as sewer, telephone, fuel, electric, water lines, or any other underground installations that may be expected to be encountered during excavation been determined before excavation? Have utility locations been verified by designated state services according to state regulations? Has the client provided clearance where state jurisdiction doesn’t apply?</td>
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</tr>
<tr>
<td></td>
<td>Have overhead utilities in excavation areas been identified and either de-energized, shielded or barricaded so excavating equipment will not come within 10 feet?</td>
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<tr>
<td></td>
<td>Are inspections of the excavation, the adjacent areas, and protective systems made daily and as necessary by a competent person?</td>
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<tr>
<td></td>
<td>Are Protective systems in place as prescribed by the competent person?</td>
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<td></td>
<td>Is material removed from excavations managed so it will not overwhelm the protective systems?</td>
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<td></td>
<td>Are barriers provided between excavations and walkways?</td>
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<td></td>
<td>Are excavations by roadways barricaded to warn vehicles of presence or to prevent them from falling in?</td>
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<td></td>
<td>Is there a means of exit from the excavation every 25 feet?</td>
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<td></td>
<td>Is air monitoring required? If yes, Is it performed?</td>
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</tbody>
</table>

## CONFINED SPACES
29 CFR 1910 Subpart J. EM 385-1-1, Section 6

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td></td>
<td>Is there a Confined Space Entry Program in place?</td>
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<tr>
<td></td>
<td>Are the confined Spaces identified and labeled?</td>
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<tr>
<td></td>
<td>Will the Confined Spaces be entered?</td>
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<tr>
<td></td>
<td>Is appropriate entry documentation used and on-file?</td>
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</tbody>
</table>
### ELECTRICAL
29 CFR 1926 Subpart K. EM 385-1-1, Section 11

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Are electrical installations made according to the National Electrical Code and applicable local codes?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Qualified electricians make all connections and perform all work within 10 feet of live electric equipment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Location of underground, overhead, under floor, behind wall electrical lines is known and communicated. Lines are documented by qualified person as de-energized where necessary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workers understand they must not work near live parts of electric circuits, unless they are qualified as required by OSHA or are protected by de-energizing and guarding the parts, guarding the parts by insulation, or other effective means.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Employees who regularly work on or around energized electrical equipment or lines are instructed in the cardiopulmonary resuscitation (CPR) methods.</td>
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<tr>
<td></td>
<td></td>
<td>Workers are prohibited from working alone on energized lines or equipment over 600 volts.</td>
</tr>
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<td></td>
<td></td>
<td>Are ground-fault circuit interrupters (GFCIs) or is ground-fault circuit protection provided to protect employees from ground-fault hazards for all 115 – 120 Volt, 15 and 20 amp receptacle outlets which are not a part of the permanent wiring of a building or structure at construction sites?</td>
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<tr>
<td></td>
<td></td>
<td>Circuit breakers are labeled.</td>
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<td></td>
<td>Circuit breaker and all cabinets with exposed electric conductors are kept tightly closed.</td>
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<td>Unused openings (including conduit knockouts) in electrical enclosures and fittings are closed with appropriate covers, plugs or plates.</td>
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<td>Sufficient access and working space is provided and maintained about all electrical equipment to permit ready and safe operations and maintenance.</td>
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<td></td>
<td></td>
<td>Motors are located within sight of their controllers or controller disconnecting means are capable of being locked in the pen position or is a separate disconnecting means installed in the circuit within sight of the motor.</td>
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<td></td>
<td></td>
<td>Are visual inspections of extension cords and cord-and-plug-connected equipment conducted daily? Is equipment found damaged or defective tagged and removed from service, and not used until repaired?</td>
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<tr>
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<td></td>
<td>Wet Areas - Is portable lighting used in wet or conductive locations, such as tanks or boilers operated at no more than 12 volts and protected by GFCIs.</td>
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<tr>
<td>YES</td>
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<td>COMMENT</td>
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<tr>
<td>Are electrical installations in hazardous areas to NEC?</td>
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<tr>
<td>Metal ladders and tools including tape measures or fabric with metal thread are prohibited where contact with energized electrically parts is possible.</td>
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<tr>
<td>All extension cords are the three-wire type, designed and rated for hard or extra hard usage?</td>
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</tr>
<tr>
<td>Worn or frayed electrical cords or cables are taken out of service. Fastening with staples, hanging from nails or suspending extension cords by wire is prohibited.</td>
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</tr>
<tr>
<td>Electric wire/flexible cord passing through work areas is protected from damage such as foot traffic, vehicles, sharp corners, projections and pinching? Flexible cords and cables passing through holes are protected by bushings or fittings?</td>
<td></td>
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</tr>
<tr>
<td>Before an employee or contractor performs any service or maintenance on a system where the unexpected energizing, start up, or release of kinetic or stored energy could occur and cause injury or damage, the system is to be isolated. Only authorized persons may apply and remove lockouts and tags.</td>
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<tr>
<td>Contractors planning to use hazardous energy control procedures submit their hazardous energy control plan to the WESTON site safety officer or designee before implementing lockout/tagout procedures.</td>
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<tr>
<td>There is a site specific hazardous energy control plan that clearly and specifically outlines the scope, purpose, authorization, rules and techniques to be used for the control of hazardous energy.</td>
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<tr>
<td>Workers possess the knowledge and skills required for the safe application, usage and removal of energy controls.</td>
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### WELDING AND CUTTING
29 CFR 1926 Subpart J. EM 385-1-1, Section 10

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<tr>
<th>YES</th>
<th>NO</th>
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<tr>
<td></td>
<td></td>
<td>Prior to performing welding, cutting or any other heat or spark producing activity, an assessment of the area is made by a competent person to identify combustible materials and potential sources of flammable atmospheres.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Welders, cutters and their supervisors are trained in the safe operation of their equipment, safe welding and cutting practices, hot work permit requirements, and fire protection.</td>
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<tr>
<td></td>
<td></td>
<td>Welding and cutting equipment is inspected daily before use. Unsafe equipment is taken out of use, replaced or repaired.</td>
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<tr>
<td></td>
<td></td>
<td>Workers and the public is shielded from welding rays, flashes, sparks, molten metal and slag.</td>
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<td>Employees performing welding, cutting or heating are protected by PPE appropriate for the hazards (e.g., respiratory, vision and skin protection).</td>
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<td></td>
<td>Compatible fire extinguishing equipment is provided in the immediate vicinity of welding or cutting operations.</td>
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<td></td>
<td>Drums, tanks, or other containers and equipment which have contained hazardous materials shall be thoroughly cleaned before welding or cutting. Cleaning shall be performed in accordance with NFPA 327, Cleaning or Safeguarding Small Tanks and Containers, ANSI/AWS F4.1, Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, and applicable health and safety plan requirements.</td>
</tr>
</tbody>
</table>
### HAND AND POWER TOOL SAFETY
#### 29 CFR 1926 Subpart I. EM 385-1-1, Section 13

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
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<tr>
<td></td>
<td></td>
<td>Power tools are from a manufacturer listed by a nationally recognized testing laboratory for the specific application for which they are to be used.</td>
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<tr>
<td></td>
<td></td>
<td>Hand and power tools are inspected, maintained, tested and determined to be in safe operating condition before use.</td>
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<td></td>
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<td>Tools found to be unsafe are not used, tagged and repaired or destroyed.</td>
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<td></td>
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<td>Users of tools are trained in safe use.</td>
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<td></td>
<td></td>
<td>Electrical tools have cords and plug connections in good repair.</td>
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<td></td>
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<td>Electrical tools are effectively grounded or approved double insulated.</td>
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<td></td>
<td>Reciprocating, rotating, and moving parts of equipment are guarded if they may be accessed by employees or they otherwise create a hazard.</td>
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<td>Safety clips/retainers are installed and maintained on pneumatic impact tool connections.</td>
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<td></td>
<td>Chain saws have an automatic chain brake or anti-kickback device.</td>
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<td>Pneumatic and hydraulic hoses and fittings are inspected regularly.</td>
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<td></td>
<td>Employees who operate powder actuated tools are trained and carry valid operators cards.</td>
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<td>Powder activated tools are stored in individual locked containers, when not in use and are not loaded until ready to use.</td>
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<td>Powder actuated tools are inspected for obstructions or defects daily before use.</td>
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<td>Powder actuated tool operators have appropriate PPE.</td>
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MATERIAL HANDLING, STORAGE, AND DISPOSAL  
29 CFR 1926 Subpart H. EM 385-1-1, Section 14

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tr>
<td></td>
<td></td>
<td>Employees are trained in and use safe lifting techniques.</td>
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<td>Materials are not moved or suspended over workers unless positive precautions have been taken to protect workers.</td>
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<td></td>
<td>Conveyors are constructed, inspected, and maintained by qualified persons according to manufacturer’s recommendations.</td>
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<td></td>
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<td>All conveyors are to be equipped with emergency stopping devices.</td>
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<td></td>
<td>Hazardous exposed moving machine parts are guarded mechanically, electrically or by location.</td>
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<td>Controls are clearly marked and/or labeled to indicate the function controlled.</td>
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<td>Taglines are used for suspended loads where the movement may be hazardous to persons.</td>
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<td>Material in storage is protected from falling or collapse by effective stacking, blocking, cribbing, etc.</td>
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<td></td>
<td></td>
<td>Walkways and aisles are to be kept clear.</td>
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<td>Materials are not stored on scaffolds or runways in excess of normal placement or in excess of safe load limits.</td>
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<td></td>
<td></td>
<td>Work areas and means of access are maintained safe and orderly.</td>
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<td></td>
<td></td>
<td>Tools, materials, extension cords, hoses or debris do not cause tripping or other hazards.</td>
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<td></td>
<td></td>
<td>Storage and construction sites are kept free from the accumulation of combustible materials.</td>
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<td>Waste materials and rubbish are placed in containers or, if appropriate, in piles. Waste materials are disposed of in accord with applicable local, state, or federal requirements.</td>
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## RIGGING
29 CFR 1926 Subpart H. EM 385-1-1, Section 15

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<tr>
<th>YES</th>
<th>NO</th>
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<td></td>
<td>Rigging equipment is inspected as specified by the manufacturer, by a qualified person, before use on each shift and as necessary to assure that it is safe.</td>
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<td>Defective equipment is removed from service.</td>
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<td>Rigging not in use is removed from the work area, properly stored, and maintained in good condition.</td>
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<td>Wire rope removed from service for defects is cut up or plainly marked as unfit for use as rigging.</td>
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<td></td>
<td>The number of saddle clips used to form eyes in wire rope conforms with Table H-20, are spaced evenly and the saddles are on the live side.</td>
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<td>Chain rigging has a tag clearly indicating load limits, is inspected before initial use, then weekly, and is of alloyed metal.</td>
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<td>Fiber rope rigging is not used if it is frozen or has been subject to acids or excessive heat.</td>
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<td></td>
<td>Sling and their fittings and fastenings are inspected before use on each shift and as needed during use.</td>
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<td>Drums, sheaves, and pulleys on rigging hardware are smooth and free of surface defects that can damage rigging.</td>
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</table>

## FLOATING PLANT AND MARINE ACTIVITIES
29 CFR 1926 Subpart O. EM 385-1-1 Section 19

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<tr>
<th>YES</th>
<th>NO</th>
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<tr>
<td></td>
<td></td>
<td>Floating plants that are regulated by the USCG have current inspections and certificates.</td>
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<td></td>
<td></td>
<td>Before any floating plant is brought to the job site and placed in service it is inspected and determined to be in safe operating condition</td>
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<tr>
<td></td>
<td></td>
<td>Periodic inspections are made such that safe operating conditions are maintained. Strict compliance with EM 385-1-1, Section 19 is expected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plans are in place for removing or securing the plant and evacuation of personnel endangered by severe weather and other marine emergencies such as; fire, flooding, man overboard, hazardous materials incidents, etc.</td>
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<td></td>
<td></td>
<td>Means of access are properly secured, guarded, and maintained free of slipping and tripping hazards.</td>
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<td></td>
<td>Dredging operations follow guidelines as established in EM 385-1-1, Section 19.D.</td>
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</tbody>
</table>
## PRESSURIZED EQUIPMENT AND SYSTEMS
29 CFR 1926 Subparts I, F. EM 385-1-1, Section 20

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<tr>
<th>YES</th>
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<td>Pressurized equipment and systems are inspected before being placed into service.</td>
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<td>Pressurized equipment or systems found to be unsafe are tagged “Out of Service-Do Not Use”.</td>
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<td>Systems and equipment are operated, inspected and maintained by qualified, designated personnel.</td>
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<td>Safe clearance, lockout/tagout procedures are followed as appropriate during maintenance or repair.</td>
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<td></td>
<td>Air hose, pipes, fittings are pressure-rated for the activity. Defective hoses are removed from service.</td>
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<tr>
<td></td>
<td></td>
<td>Hoses aren’t laid over ladders, steps, scaffolds, or walkways in a manner that creates a tripping hazard.</td>
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<td></td>
<td>The use of compressed air for personal cleaning is prohibited. The use of compressed air for other cleaning is restricted to less than 30 psig.</td>
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<td></td>
<td>Compressed gas cylinders are stored in well-ventilated locations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cylinders in storage are separated from flammable or combustible liquids and from easily ignitable materials by at least 40 feet or by a minimum five feet tall, ½-hour fire resistive partition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stored cylinders containing oxidizing gases are separated from fuel gas cylinders by at least 20 feet or by a minimum five feet tall, ½-hour fire resistive partition.</td>
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<td>Cylinder valve caps are in place when cylinders are in storage, in transit, or a regulator is not in place.</td>
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<td></td>
<td>Compressed gas cylinders in service are secured in substantial fixed or portable racks or hand trucks.</td>
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<td></td>
<td></td>
<td>Oxygen cylinders and fittings are kept away from, and free from oil and grease.</td>
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<td></td>
<td>Cylinder Storage areas are posted with the names of the gases in storage and with signs indicating &quot;No Smoking or Open Flame&quot;.</td>
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<tr>
<td></td>
<td></td>
<td>Cylinders are to be stored such that mechanical and corrosion damage is avoided. Cylinders are not to be stored in areas required as an egress path.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cylinders may be stored in the open outdoors, however, they must be protected from the ground to prevent corrosion and must be protected from temperatures that may exceed 125 degrees F.</td>
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<tr>
<td>Work platforms are erected, used, inspected, tested, maintained and repaired according to manufacturer’s requirements.</td>
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<tr>
<td>Construction, inspection, and disassembly of scaffolds is under the direction of a competent person.</td>
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<tr>
<td>Workers on scaffolding have been trained by a qualified person.</td>
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<tr>
<td>Scaffolds are erected on a firm and level surface and are square and plumb.</td>
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<tr>
<td>Scaffolds are not loaded in excess of rated capacity.</td>
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<tr>
<td>Working levels of work platforms are fully planked or decked.</td>
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<tr>
<td>Planks are in good condition and free from obvious defects.</td>
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<tr>
<td>Fabricated frame scaffolding four times higher than the base width is secured to building/structure according to manufacturer’s instruction and/or OSHA requirements.</td>
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<tr>
<td>Working platforms of scaffolding over ten feet in height have guard rails meeting OSHA specifications. Fall protection is suggested at four feet or greater.</td>
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</tr>
<tr>
<td>Scaffolding/work platforms are accessed by means of a properly secured ladder or equivalent. Built on ladders conform to scaffold ladder requirements. Climbing of braces is not allowed.</td>
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<tr>
<td>Crane supported work platforms are designed and used in accordance with OSHA standards.</td>
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<tr>
<td>Elevating work platforms are operated, inspected and maintained according to the equipment operations manual.</td>
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<tr>
<td>Employees working in aerial lifts remain firmly on the floor of the basket. Employees use fall protection while in an aerial lift basket.</td>
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## WALKING AND WORKING SURFACES AND STAIRS

29 CFR 1926 Subparts L, M, X. EM 385-1-1, Sections 21, 22, 24

<table>
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<tr>
<th>YES</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Work areas are clean, sanitary, and orderly</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Work surfaces are kept dry or appropriate means are taken to assure the surfaces are slip-resistant</strong></td>
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<td></td>
<td><strong>Accumulations of combustible dust are routinely removed.</strong></td>
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<td></td>
<td><strong>Aisles and passageways are kept clear and marked as appropriate.</strong></td>
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<td></td>
<td></td>
<td><strong>There is safe clearance for walking in aisles where motorized or mechanical handling equipment is operating.</strong></td>
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<td><strong>Materials or equipment is stored in such a way that sharp projections will not interfere with the walkway.</strong></td>
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<td></td>
<td><strong>Changes of direction or elevation are readily identifiable.</strong></td>
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<td></td>
<td><strong>Aisles or walkways that pass near moving or operating machinery, welding operations or similar operations are arranged so employees will not be subjected to potential hazards.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Standard guardrails are provided wherever aisle or walkway surfaces are elevated more than 30 inches above any adjacent floor or the ground and bridges provided where workers must cross over conveyors and similar hazards.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>There are standard stair rails or handrails on all stairways having four or more risers or with an elevation of 30 or more inches.</strong></td>
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<td></td>
<td><strong>Stairways are at least 22 inches wide. (General Industry Standard)</strong></td>
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<td></td>
<td><strong>Stairs angle no more than 50 and no less than 30 degrees, risers are uniform from top to bottom (plus or minus 1/4 inch) and are provided with a surface that renders them slip resistant.</strong></td>
</tr>
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<td></td>
<td></td>
<td><strong>Stairway handrails are not less than 36 inches above the leading edge of stair treads and have at least 3 inches of clearance between the handrails and the wall or surface they are mounted on.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Where doors or gates open directly on a stairway, there is a platform provided so the swing of the door does not reduce the width of the platform to less than 20 inches.</strong></td>
</tr>
<tr>
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<td></td>
<td><strong>Where stairs or stairways exit directly into any area where vehicles may be operated, there are adequate barriers and warnings provided to prevent employees stepping into the path of traffic.</strong></td>
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<td></td>
<td><strong>Signs are posted showing the load capacity of elevated storage areas.</strong></td>
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<tr>
<td>YES</td>
<td>NO</td>
<td>COMMENT</td>
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<td></td>
<td>An appropriate means of access and egress is provided for surfaces with 19 or more inches of elevation change.</td>
</tr>
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<td></td>
<td>Material on elevated surfaces is minimized, with that necessary for immediate work requirements piled, stacked or racked in a manner to prevent it from tipping, falling, collapsing, rolling or spreading.</td>
</tr>
</tbody>
</table>

**FLOOR AND WALL HOLES AND OPENINGS**

29 CFR 1926 Subpart M. EM 385-1-1, Section 24

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Floor and roof openings that persons can walk into or fall through are guarded by a physical barrier or covered.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Holes (defined as equal to or greater than 2 inches in least dimension) where person could trip must be covered/protected.</td>
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<td></td>
<td></td>
<td>Unprotected sides and edges on a walking/working surface six feet or more (note four feet in General Industry) are protected by guardrail system, safety net or Personal Fall Arrest System (PFAS).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unused portions of service pits and pits not actually in use are either covered or protected by guardrails or equivalent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coverings for holes or other openings must be constructed of sufficient strength to support any anticipated load, must be secured in place to prevent accidental removal or displacement and must be marked indicating purpose (e.g., stenciled &quot;Hole&quot; or painted contrasting color to surroundings).</td>
</tr>
</tbody>
</table>
## LADDERS
29 CFR 1926 Subpart X. EM 385-1-1, Section 21

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Portable ladders are used for their designed purpose only.</td>
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<td></td>
<td>Portable ladders are examined for defects prior to, and after use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ladders found to be defective are clearly tagged to indicate &quot;DO NOT USE&quot; if repairable, or destroyed immediately if no repair is possible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workers are trained in hazards associated with ladder use and how to inspect ladders.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ladders have secure footing provided by a combination of safety feet, top of ladder tie-offs and mud sills or a person holding the ladder to prevent slipping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The handrails of a straight ladder used to get from one level to another extend at least 36 inches above the landing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ladders conform to construction criteria of ANSI Standards A-14.1 and A-14.2.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wooden ladders are not painted with an opaque covering such that signs of flaws, cracks or drying are obscured.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fixed ladders are constructed and used according to OSHA Standards, 29 CFR 1910.27 and ANSI A-14.3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rungs, cleats or steps, and side rails that may be used for handholds when climbing, offer adequate gripping surface and are free of splinters, slivers or burrs, and substances that could cause slipping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fixed ladders of greater than 24 feet have cages or other approved fall protection devices. (note: General Industry is 20 feet).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Where fall protection is provided by ladder safety systems (body belts or harnesses, lanyards and braking devices with safety lines or rails), systems meet the requirements of and are used in accordance with WESTON Fall Protection Standard Practices and are compatible with construction of the ladder system.</td>
</tr>
</tbody>
</table>
### DEMOLITION

**29 CFR 1926 Subpart T. EM 385-1-1, Section 23**

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Prior to initiating demolition activities an engineering survey (by a competent person) and a demolition plan (by a competent person) is completed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All employees engaged in demolition activities are instructed in the demolition plan.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>It has been determined through the engineering survey and outlined in the plan, if any hazardous materials, or conditions (e.g., asbestos, lead, utility connections) exist. Such hazards are controlled or eliminated before demolition is started.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continued inspections, by a competent person, are conducted to ensure safe employee working conditions.</td>
</tr>
</tbody>
</table>

### TREE MAINTENANCE AND REMOVAL

**29 CFR 1910 Subpart R. EM 385-1-1, Section 31**

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tree maintenance or removal is done is under the direction of a qualified person.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tree work, in the vicinity of charged electric lines, is by trained persons qualified to work with electricity and tree work. Appropriate distances are maintained for all workers who are not qualified.</td>
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<tr>
<td></td>
<td></td>
<td>Equipment is inspected, maintained, repaired and used in accordance with the manufacture’s directions.</td>
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<tr>
<td></td>
<td></td>
<td>Prior to felling actions are planned to include clearing of the area to permit safe working conditions and escape.</td>
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<tr>
<td></td>
<td></td>
<td>Employees must be trained in the safe operation of all equipment.</td>
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<tr>
<td></td>
<td></td>
<td>All equipment and machinery is inspected and determined safe prior to use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Work is performed under requirements of FLD 43.</td>
</tr>
</tbody>
</table>
### BLASTING
29 CFR 1926 Subpart U.  EM 385-1-1, Section 29

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A blasting safety plan is developed prior to bringing explosives on-site.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The transportation, handling, storage, and use of explosives, blasting agents, and blasting equipment must be directed and supervised by a person with proven experience and ability in blasting operations. Licensing of person is verified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blasting operations in or adjacent to cofferdams, piers, underwater structures, buildings, structures, or other facilities must be carefully planned with full consideration to potential vibration and damage.</td>
</tr>
</tbody>
</table>

### HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE AND UNDERGROUND STORAGE TANK (UST) ACTIVITIES
29 CFR 1926 Subpart D.  EM 385-1-1, Section 28

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All construction activities performed with known or potential exposure to hazardous waste are conducted in accordance with Hazardous Waste Operations and Emergency Response requirements.</td>
</tr>
</tbody>
</table>
## CONCRETE and MASONRY CONSTRUCTION
### 29 CFR 1926 Subpart Q. EM 385-1-1, Section 27

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Construction loads are not placed on a concrete or masonry structure or portion of a concrete or masonry structure unless the employer determines, based on information from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the loads.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employees are not permitted to work above or in positions exposed to protruding reinforcing steel or other impalement hazards unless provisions have been made to control the hazard.</td>
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</tr>
<tr>
<td></td>
<td>Sections of concrete conveyances and airlines under pressure are secured with wire rope (or equivalent material) in addition to the regular couplings or connections.</td>
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</tr>
<tr>
<td></td>
<td>Structural and reinforcing steel for walls, piers, columns, and similar vertical structures is supported and/or guyed to prevent overturning or collapse.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All form-work, shoring, and bracing is designed, fabricated, erected, supported, braced, and maintained so it will safely support all vertical and lateral loads that may be applied until the loads can be supported by the structure.</td>
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<tr>
<td></td>
<td>Shoring equipment is inspected prior to erection to determine that it is specified in the shoring design. Any equipment found to be damaged is not used.</td>
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</tr>
<tr>
<td></td>
<td>Erected shoring equipment is inspected immediately prior to, during, and immediately after the placement of concrete. Any shoring equipment that is found to be damaged, displaced, or weakened is immediately reinforced or re-shored.</td>
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</tr>
<tr>
<td></td>
<td>Shoring, vertical slip forms and jacks conform with requirements of Section 27.B.08-13 of USACE EM 385-1-1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forms and shores (except those on slab or grade and slip forms) are not removed until the individual responsible for forming and/or shoring determines that the concrete has gained sufficient strength to support its weight and all superimposed loads.</td>
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<tr>
<td></td>
<td>Precast concrete members are adequately supported to prevent overturning or collapse until permanent connections are complete.</td>
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<tr>
<td></td>
<td>No one is permitted under pre-cast concrete members being lifted or tilted into position except employees required for the erection of those members.</td>
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<tr>
<td>YES</td>
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<td>COMMENT</td>
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<tr>
<td></td>
<td>Lift slab operations are planned and designed by a registered engineer or architect.</td>
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<tr>
<td></td>
<td>Hydraulic jacks used in lift slab construction have a safety device that causes the jacks to support the load in any position if the jack malfunctions</td>
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<tr>
<td></td>
<td>No one is permitted under the slab during jacking operations.</td>
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<tr>
<td></td>
<td>A limited access zone is established whenever a masonry wall is being constructed.</td>
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<tr>
<td></td>
<td>Fall protection is provided to masonry workers exposed to falls of 6 feet or more.</td>
<td></td>
</tr>
</tbody>
</table>

**STEEL ERECTION**

29 CFR 1926 Subpart R. EM 385-1-1, Section 27

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td></td>
<td>Impact wrenches have a locking device for retaining the socket. Containers shall be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Structural and reinforcing steel for walls, piers, columns, and similar vertical structures shall be guyed and supported to prevent collapse</td>
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<tr>
<td></td>
<td>No loading is placed upon steel joists until all bridging is completely and permanently installed.</td>
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</tr>
<tr>
<td></td>
<td>Workers are provided fall protection whenever they are exposed to falls of 1.8 m (6 ft) or more (EM 385-1-1).</td>
<td></td>
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<tr>
<td></td>
<td>Temporary flooring in skeleton steel erection conforms with Section 27.F of USACE 385-1-1</td>
<td></td>
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</tbody>
</table>
## ROOFING

29 CFR 1926 Subpart M. EM 385-1-1, Sections 21, 22, 24, 27

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td></td>
<td>In the construction, maintenance, repair, and demolition, of roofs, fall protection systems is provided that will prevent personnel from slipping and failing from the roof and prevent personnel on lower levels from being struck by falling objects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>On all roofs greater than 4.8 m (16 ft) in height, a hoisting device, stairways, or progressive platforms are furnished for supplying materials and equipment.</td>
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<tr>
<td></td>
<td>Roofing materials and accessories that could be moved by the wind, including metal roofing panels, that are on the roof and unattached are secured when wind speeds are greater than, or are anticipated to exceed, 10 mph.</td>
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<tr>
<td></td>
<td>Level, guarded platforms are provided at the landing area on the roof.</td>
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<td></td>
<td>When their use is permitted, warning line systems comply with USACE Section 27.07 of EM 385-1-1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workers involved in roof-edge materials handling or working in a storage area located on a roof with a slope $\leq$ to four vertical to twelve horizontal and with edges 6 ft or more above lower levels are protected by the use of a guardrail, safety net, or personal fall arrest system along all unprotected roof sides and edges of the area.</td>
<td></td>
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</table>
### ENVIRONMENTAL COMPLIANCE

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Waste Determination Made.</td>
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<tr>
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<td></td>
<td>Manifest and/or Shipping Papers prepared and filed.</td>
</tr>
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<td></td>
<td>Manifest Exception Reports Prepared, as necessary. Procedures to track manifests in place.</td>
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<td>State Annual and EPA Biennial Reporting Information Available.</td>
</tr>
<tr>
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<td></td>
<td>RCRA Personnel Training Records on file.</td>
</tr>
<tr>
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<td>CAA Permits on file.</td>
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<tr>
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<td>CWA Permits on file.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RCRA Permits on file.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>State and/or Local Permits on file.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RCRA Inspections conducted and Documentation on file.</td>
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<tr>
<td></td>
<td></td>
<td>Transporter and TSD compliance information on file.</td>
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<tr>
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<td></td>
<td>Waste Accumulation Areas Managed Properly.</td>
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<tr>
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<td>Wetlands Areas Identified and Protected.</td>
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<td></td>
<td>Endangered, Threatened or Special Concern Species or Areas Identified and Protective Methods Determined.</td>
</tr>
<tr>
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<td>Runon and Runoff Concerns Identified and Managed.</td>
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<tr>
<td></td>
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<td>Adjacent Land Areas Protected as Necessary.</td>
</tr>
<tr>
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<td>Non-Hazardous Solid Wastes Managed Properly.</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS REGULATORY and POLICY COMPLIANCE

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Noise Control Issues Addressed and Managed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site Security Issues Identified and Managed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Known Historical, Archeological, and Cultural Resources Identified and Managed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WESTON EHS Analysis Checklist In Use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safety Observation and Recognition Program in place.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weekly EHS Report Card System in place.</td>
</tr>
<tr>
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<td></td>
<td>Federal, State and Local Required Postings in place.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site specific Lockout/Tagout Program is in place.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site-specific Confined Space Program is in place.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site Safety Officer filing system is in place and up to date.</td>
</tr>
</tbody>
</table>
ATTACHMENT E

ENVIRONMENTAL PROTECTION AND SUSTAINABILITY PROGRAM
IMPACT PLAN AND CHECKLIST
ENVIRONMENTAL PROTECTION AND SUSTAINABILITY PROGRAM
IMPACT CHECKLIST
PRE-PROPOSAL AND EHS COMPLIANCE PLANNING

1. BACKGROUND
   a. Client name, address, phone number, and Point of Contact: National Guard Bureau and PA
      Army National Guard at Fort Indiantown Gap Annville, PA - TBD
   b. Name/Identifier of proposal, if applicable: Fort Indiantown Gap GSA -PBA - RI/FS -
      Ricochet Area
   c. Prepared by: C. Hikel
   d. Project Manager (PM) Signature: John Gerhard

2. DESCRIPTION
   a. Description, justification for, and location of Scope of Work in the proposal (i.e. training,
      activity, construction, regulation, license; include site location map):
      Scope of Field work: Remedial Investigation of MEC/MC within 8,000 acres SGL 211 in
      Annville, PA
   b. Environmental setting and present land use of the proposed site:
      State Game Lands adjacent to FIG

3. KNOWN OR POTENTIAL EHS IMPACTS
   Note that this checklist cannot completely anticipate all regulatory requirements, and that use of this
   checklist outlines only certain Federal criteria of specific interest (it is by no means a complete listing).
   State and local requirements must be evaluated also.

   ▪ The Project Manager and Project Team are responsible for evaluating project-specific
     environmental, health and safety needs that may be beyond those outlined in this checklist.

   ▪ Assistance is available through the Division Environmental, Health, and Safety (EHS)
     Managers and Corporate EHS Department. Early engagement of EHS support is a key to
     success.

   ▪ “NA” response indicates all answers for the section are not based on specific knowledge

   ▪ “Yes” responses will require a plan to address a specific issue. “No” responses must be based
     upon specific knowledge. “Unknown” responses require appropriate follow-up for
     confirmation.

3.1 CLEAN AIR ACT (CAA) □ NA
   The basic purpose of the CAA is to control air pollution by instituting point source controls (fixed and/or
   mobile) and establishing maximum pollutant levels for the ambient air. Permits to construct and/or
   operate are required for sources that meet regulatory requirements. These sources include, but may not be
   limited to: major stationary sources, hazardous air pollution sources, and sources subject to new source
   performance standards.
<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th><strong>Criteria for Evaluation</strong></th>
<th><strong>Comments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td><strong>General and Miscellaneous</strong></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>☐</td>
<td>Will the project release contaminants to the air from a new or existing source of air contaminants?</td>
<td>If MD require destroy in place there is a potential for air pollutants.</td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Does the project have the potential for deterioration of air quality?</td>
<td>Levels would be minimal.</td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will there be the introduction of smoke, suspended particles, or noxious gases/vapors (e.g., open burning, open detonation, etc.)?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will there be real or potential for particulate/dust migration beyond facility/site boundaries?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will WESTON own or operate a source of air emissions (e.g., air stripper, incinerator, thermal desorption system, soil vapor extraction system, fuel tanks or dispensers, electric generators, turbines) or disturb land?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will WESTON own or operate an air pollution control device (e.g., scrubber, vapor-phase activated carbon system)?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Is fugitive emissions and/or perimeter air monitoring specified in the scope of work?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Has client specified air monitoring methods or real-time monitoring?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Prevention of Significant Deterioration (PSD) Permits (40 CFR 52)</strong></td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Is site within an attainment area? (See 40 CFR 81.301-356).</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will the project involve construction or operation of a new major source with the potential to emit more than 100 tons/year for those specific listed emissions sources or 250 tons/year for all other emission sources types or a major modification of an existing major source with pollutant emission increases exceeding Prevention of Significant Deterioration (PSD) rates? (see 40 CFR 52.21(b) and/or CAA Section 169).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Non-Attainment Permits (40 CFR 52)</strong></td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Is site within a non-attainment area? (See 40 CFR 81.301-356). If known, indicate which criteria pollutant(s) are not met.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>New Source Performance Standards (40 CFR 60)</strong></td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will the project involve the release of contaminants to the air from a new or modified non-exempt source?</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Unknown</td>
<td>Criteria for Evaluation</td>
<td>Comments</td>
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</tr>
<tr>
<td>NESHAPS Standards for Air Toxics (40 CFR 61, 63) See also TSCA and OSHA</td>
<td></td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will the project involve the demolition or renovation of any structure containing asbestos?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will the project involve a stationary source or group of stationary sources with the potential to emit 10 or more tons per year (tpy) of a single HAP, or 25 tpy or more of multiple HAPs?</td>
<td></td>
</tr>
<tr>
<td>Accidental Release and Risk Management Planning (40 CFR 68)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will the project involve storage and/or use of any chemical listed under 40 CFR 68.115 at or greater than its Threshold Planning Quantity (TPQ)?</td>
<td></td>
</tr>
<tr>
<td>Operating Permits (40 CFR 70, 71)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>Will the project involve obtaining any permit as required under the CAA? Need to meet requirements for possible open detonation.</td>
<td></td>
</tr>
<tr>
<td>Reduction in Use of Ozone Depleting Substances (40 CFR 82)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will site tasks involve repair, maintenance or decommissioning of objects containing ozone depleting substances (e.g., air conditioning/heat pump/refrigeration systems)?</td>
<td></td>
</tr>
</tbody>
</table>

**State-Specific Requirements**

As with many environmental regulations, States may have specific and/or additional regulations and laws associated with air and air quality. Remember to evaluate State and/or Local requirements.

### 3.2 CLEAN WATER ACT  NA

The stated objective of the Act is to restore and maintain the chemical, physical, and biological integrity of the Nation’s water by regulating discharges of pollutants into water bodies. Major requirements to plan for include; point source discharges, stormwater discharges, pretreatment prior to sewer system discharge, spill prevention and response, and wetland modification and/or dredge and fill activities.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Criteria for Evaluation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Will the project location involve fresh water, marine environment, ground water impact or other? A local stream runs along the MRA border.</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will the project involve impact to water movement (e.g., construction of dam)?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will the project involve any change in the quantity and/or quality of ground water?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Is there any potential for spills of hazardous materials/substances/wastes that could subsequently impact water quality (surface or ground)?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will the project involve any impact to wetlands or floodplains?</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Unknown</td>
<td>Criteria for Evaluation</td>
<td>Comments</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Is the project in a well head protection area?</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td>Will there be any injection of waste materials into the ground?</td>
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<td></td>
<td></td>
<td></td>
<td>Will unimproved roads or new haul roads be required?</td>
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<td></td>
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<td></td>
<td>Will the project involve a change in topography at the site?</td>
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<tr>
<td></td>
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<td></td>
<td>Will the project create an increase in wind or water erosion of soils (either on or off-site)?</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td><strong>NPDES Point Source Discharge Permit (40 CFR 122)</strong></td>
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<td></td>
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<td></td>
<td>Will the project involve a point source discharge into surface water?</td>
<td></td>
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<td></td>
<td><strong>Stormwater Discharge Permit (40 CFR 122.26)</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Will the project involve an industrial facility with potential for stormwater discharges to surface water or to a storm sewer system?</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Will the project involve the disturbance of one or more acres of land?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Pretreatment Requirements (40 CFR 403)</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Will there be a discharge (e.g., process water, groundwater, cooling water) to a sewer authority or public sewer system? (Do not include proper connections from domestic-type sources such as toilets or kitchens).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Discharge of Oil and SPCC Plans (40 CFR 110, 112)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Will oil or petroleum products be stored at the site/operation?</td>
<td>Possible fuel for generator, and equipment Volume stored will be below SPCC requirements.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Will the storage capacity of oil or petroleum products exceed 1320 gallons in above ground storage (include only containers equal to or larger than 55 gallons), or 42000 gallons underground?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Wetlands Modification and/or Dredge and Fill Requirements (40 CFR 230-233)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Will the project involve excavation in or the discharge or dredge or fill material into water or wetlands?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Will the project involve site clearing, or dredging or filling on/near water or wetlands?</td>
<td></td>
</tr>
</tbody>
</table>

**State Requirements**

As with many environmental regulations, States have specific regulations and laws associated with water protection and quality. Remember to evaluate State and/or Local requirements.
### 3.3 SAFE DRINKING WATER ACT (SDWA)

The SDWA regulates the quality of drinking water. Requirements typically relate to providing public drinking water, waste disposal in underground injection wells and establishing criteria for CERCLA remediation.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Criteria for Evaluation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td></td>
<td>Will WESTON be providing a drinking water supply to the public?</td>
<td></td>
</tr>
</tbody>
</table>

**Sole-Source Aquifer Protection (40 CFR 149)**

- Will the project involve operating a public water supply system that has 15 or more services or serves more than 25 people per day for more than 60 days per year?

**Underground Well Injection (40 CFR 144-148)**

- Will the project involve the placing of fluids into a bored, drilled, driven, or dug well?

---

**State Requirements**

In addition to compliance (and/or more restrictive) with above Federal criteria, States are responsible for implementing and enforcing well-head protection standards.

### 3.4 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

RCRA provides the classic “cradle-to-grave” concept for waste materials, i.e., management of the waste material from generation to final disposal. RCRA requirements apply to those who generate, transport, store and dispose of wastes. Permits and identification numbers may be required for all categories with limited exceptions.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Criteria for Evaluation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td></td>
<td>Will WESTON or the site generate any non-hazardous solid wastes?</td>
<td></td>
</tr>
</tbody>
</table>

**Universal Wastes (40 CFR 273)**

- Will WESTON or the site generate any universal wastes?

- All waste material will be carried out after sitewalk.

**Hazardous Wastes Generation and Management (40 CFR 260-262)**

- Will WESTON generate any hazardous wastes?

- Will WESTON be responsible for managing hazardous wastes generated by the client?

- Will site activities result in quantities that result in Conditionally Exempt Small Quantity Generator (CESQG), Small Quantity Generator (SQG), or Large Quantity Generator (LQG)?
### Criteria for Evaluation

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>Has on-site accumulation of waste stream (areas, containers or other device) been evaluated?</td>
</tr>
</tbody>
</table>

**Hazardous Waste Treatment and Disposal Permit (40 CFR 264-270)**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>Will on-site treatment of waste(s) be conducted?</td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>If off-site disposal has TSDF been evaluated and accepted?</td>
</tr>
<tr>
<td>☒</td>
<td>☐</td>
<td>☑</td>
<td>Will the project involve clean-up of hazardous waste or hazardous waste constituents from a RCRA-regulated facility?</td>
</tr>
</tbody>
</table>

**Hazardous Waste Transportation (40 CFR 263)**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>Will WESTON be responsible for preparing hazardous wastes for transportation?</td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>If transporting wastes, has transporter been evaluated and accepted?</td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>Will WESTON sign manifest? If yes, as Generator or as “Agent” for client?</td>
</tr>
</tbody>
</table>

**Underground Storage Tanks (USTs) (40 CFR 280)**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
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<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>Will WESTON activities involve the installation, use, maintenance, spill or release clean-up, or decommissioning of a UST storing petroleum or CERCLA-listed hazardous substance?</td>
</tr>
</tbody>
</table>

**Used Oil (40 CFR 279)**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
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<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>Will site activities involve the generation, storage or transportation of used/waste oil?</td>
</tr>
</tbody>
</table>

**Land Disposal Restrictions (40 CFR 268)**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
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<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>Will the project involve the generation of wastes meeting Land Disposal Restriction (LDR) criteria?</td>
</tr>
</tbody>
</table>

### State Requirements

Most States have primacy for both hazardous and non-hazardous solid waste; ensure knowledge of specific state requirements for such waste streams.

### 3.5 COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA)  NA

CERCLA provides a mechanism to clean up uncontrolled or abandoned contaminated sites and hold potentially responsible parties accountable for clean-up costs.
### Criteria for Evaluation

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
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<tbody>
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**Remediation Efforts (40 CFR 300)**

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<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
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<tbody>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>RI being led by NGB with stakeholder input from PADEP, PGC and PAARNG</td>
</tr>
</tbody>
</table>

**State Requirements**

Many states have enacted Superfund-type programs. Although many are similar to the Federal program, others may have significant differences to include broader ranges of hazardous substances.

### 3.6 EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW (EPCRA) ☒ NA

EPCRA established a process for developing state and local emergency planning and information programs on hazardous chemicals located at and/or emitted from facilities. Planning requirements apply to any facility that produces, uses or stores threshold quantities or more of any substance on the EPA list of extremely hazardous substances. There are also requirements for facilities that are required to maintain Material Safety Data Sheets (MSDSs) to notify the local fire department of those materials.

### General

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<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
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<tbody>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Fuels gas and diesel.</td>
</tr>
</tbody>
</table>

### Emergency Planning Notifications (40 CFR 355)

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
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<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
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**Emergency Release Notifications (40 CFR 370)**

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<th>Yes</th>
<th>No</th>
<th>Unknown</th>
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</table>

**Community Right to Know/Hazardous Chemical Inventory Reporting (40 CFR 370)**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Comments</th>
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</tbody>
</table>
State Requirements

There are specific reporting and documentation requirements under EPCRA for state and local entities.

3.7 FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA) □ NA

The purpose of FIFRA is to protect public health and the environment from the misuse of pesticides by regulating the labeling and registration of pesticides. In addition to data necessary for the registration of pesticides sold there are requirements for the certification of applicators of those pesticides listed as restricted use.

<table>
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<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Criteria for Evaluation</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Labeling and Packaging Requirements (40 CFR 156, 157)</td>
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<td></td>
<td>☐</td>
<td>☐</td>
<td>Does the project involve the use or application of pesticides?</td>
<td></td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Certification of Applicators (40 CFR 171)</td>
<td></td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Is the use of a licensed pesticide applicator required (use of restricted use pesticides)?</td>
<td></td>
</tr>
</tbody>
</table>

3.8 TOXIC SUBSTANCES CONTROL ACT (TSCA) SEE ALSO OSHA REQUIREMENTS □ NA

Much of TSCA deals with the manufacture, use and distribution of chemicals in commerce with limited impact to WESTON. There are, however, management requirements (to include remediation and disposal efforts) for specific chemicals (most importantly lead-based paint, PCBs, and asbestos).

Note: A “Yes” will require an appropriate technical approach to address the toxic material and must be included within the project-specific HASP. A “No” will require appropriate documentation from the Client or their designee describing how this determination was reached. An “Unknown” will require follow-up and receipt of documentation prior to proceeding.

WESTON may conduct its own survey and analysis to resolve “No” and “Unknown” responses if necessary.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Criteria for Evaluation</th>
<th>Comments</th>
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<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Lead-Based Paint (40 CFR 745)</td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Has the site been evaluated for the presence of lead or lead-containing materials?</td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Will the project involve the removal of lead-contaminated materials?</td>
<td></td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Polychlorinated Biphenyls (PCBs) (40 CFR 761)</td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Has the site been evaluated for the presence of PCBs or PCB-contamination?</td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Will the project involve the removal or handling of PCBs?</td>
<td></td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Asbestos (40 CFR 762)</td>
<td></td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Does the site or structures contain asbestos containing material (ACM)?</td>
<td></td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>Will the project involve the disruption or removal of ACM?</td>
<td></td>
</tr>
</tbody>
</table>
### 3.9 NATURAL RESOURCES AND THE ENDANGERED SPECIES ACT  NA

The Endangered Species Act (ESA) was passed to designate and protect fish, wildlife and plant species that are endangered or threatened as well as designate critical habitat for those species. Compliance with the ESA is required within the context of this checklist for not only necessary permits (e.g., Stormwater), but, as a means of understanding the potential environmental impact of our work efforts.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Criteria for Evaluation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Is the project site in an area identified as habitat for endangered, threatened or special interest species?</td>
<td>See CSM</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Will the project result in a change in the diversity or numbers of any species of plants or animals?</td>
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<td></td>
<td>Will the project result in the reduction of numbers or habitat damage to any unique, rare, threatened or endangered species of plants or animals?</td>
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<td></td>
<td>Will the project result in the introduction of new species of plant or animal (including microbes, etc.)?</td>
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<td>Will the project result in any barrier(s) to the migration or movement of animals?</td>
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<td>Will the project result in any significant alteration, deterioration, or destruction of habitat?</td>
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<td>Will the project result in the alteration, destruction, or significant impact to any environmentally sensitive areas (e.g., wetlands, floodplains, critical habitat, prime farm land, coastal zones, etc.)?</td>
<td></td>
</tr>
</tbody>
</table>

Note that a location-specific understanding of the ESA is necessary for completion of applications relating to air quality permitting, stormwater permitting and potentially others.

### 3.10 NATIONAL ENVIRONMENTAL POLICY ACT  NA

The purpose of the National Environmental Policy Act (NEPA) is to encourage harmony between man and the environment, promote efforts to prevent or eliminate damage and stimulate the health and welfare of man, and to enrich the understanding of the ecological systems and natural resources that are important to the Nation. In context, NEPA requires federal agencies to prepare an environmental impact statement covering proposed actions that could significantly affect the quality of the human environment.

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<thead>
<tr>
<th>Yes</th>
<th>No</th>
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<th>Comments</th>
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<tbody>
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<td></td>
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<td></td>
<td>Is the project a major Federal action, or project, or a project requiring a federal permit, receiving federal funds, or located on federal land? (NEPA)</td>
<td>Federal project but NEPA not required for RI work.</td>
</tr>
</tbody>
</table>

### 3.11 NOISE  (SEE ALSO OSHA REQUIREMENTS)  NA

The Noise Control Act promotes the policy that the environment is to be free of noise that jeopardizes health or welfare. While there are limited Federal/EPA regulations, there are State and Local regulations/ordinances that are applicable to work tasks.
<table>
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<tr>
<th>Yes</th>
<th>No</th>
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<td>General</td>
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<td>Will the project cause an increase in noise levels?</td>
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<td>Is the project site near sensitive receptor populations (e.g., residences, hospitals, schools, etc.)?</td>
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<td>Will site activities extend beyond typical daylight hours?</td>
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<td>Are there local noise ordinances in effect?</td>
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<td>Does the contract (or specifications) identify noise monitoring or other criteria?</td>
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### 3.12 OCCUPATIONAL SAFETY AND HEALTH *(SPECIFICALLY 29 CFR 1910 AND 1926)*

The overall goal of the Occupational Safety and Health Act (OSH Act) is to assure that employees are not adversely affected to hazards that they may be exposed to in the course of employment. All work activities conducted by WESTON must comply with applicable components of the General Industry Standards, the Construction Standards, or the applicable requirements of Client-specific criteria (e.g., the Corps of Engineers).

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<thead>
<tr>
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<th>No</th>
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<td></td>
<td>General</td>
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<td></td>
<td>Will project activities be conducted under OSHA Construction Standards?</td>
<td></td>
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<td></td>
<td>Will project activities be conducted under OSHA General Industry Standards?</td>
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<td></td>
<td>Will project activities be conducted under the requirements of EM 385-1-1 (USACE)?</td>
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<td></td>
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<td></td>
<td>Does the client have any specific occupational/safety requirements for the site work?</td>
<td>FIG and NGB specific work requirements along with PGC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Will project activities be conducted under other standards?</td>
<td>Weston FLDs.</td>
</tr>
</tbody>
</table>

Based upon site activities, location and tasks follow all applicable criteria outline in WESTON’s Safety and Health requirements guidelines.

### 3.13 TRANSPORTATION *(SPECIFICALLY 49 CFR PARTS 171-179, 383, 390-399)*

Transportation in the context of this checklist typically relates to the transportation of hazardous chemicals. The Department of Transportation (DOT) has specific regulatory requirements that must be met if WESTON either conducts or oversees the preparation for transport or actual transportation of hazardous chemicals/materials designated by DOT.

**Note:** Security Plans are required for transporting hazardous materials in an amount that must be placarded, hazardous materials in a bulk packaging having a capacity equal to or greater than 3,500 gallons for liquids or gases or more than 468 cubic feet for solids, or a select agent or toxin regulated by the Centers for Disease Control and Prevention under 42 CFR Part 73. Contact your local Dangerous Goods Advisor for assistance.
<table>
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<th>No</th>
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<td>General</td>
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<td></td>
<td>Will site activities involve the transportation (or storage incidental to transportation) of hazardous materials?</td>
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<td></td>
<td>Will WESTON personnel be transporting hazardous materials (in any amount)?</td>
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<td>Will WESTON personnel be operating vehicles meeting the definition of a commercial vehicle?</td>
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<td></td>
<td></td>
<td></td>
<td>Will WESTON personnel be operating vehicles transporting a hazardous material in a placarded amount?</td>
<td></td>
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</tbody>
</table>

### 3.14 RADIATION

- **NA**

Various regulations under the auspices of the Nuclear Regulatory Agency (10 CFR) require specific procedures for the handling, training, storage and maintenance of nuclear materials.

<table>
<thead>
<tr>
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<td></td>
<td>General</td>
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<td></td>
<td>Will Radiation sources be used or present?</td>
<td></td>
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<td></td>
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<td></td>
<td>Will the project involve the transportation of radioactive material?</td>
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<td>Will the project involve the storage of radioactive material?</td>
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<td>Will the project involve the disposal of radioactive material?</td>
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<td></td>
<td>Will the project involve the use or storage of a radioactive source (e.g., troxler gauge, XRF)?</td>
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<td></td>
<td>Have users been properly trained and certified?</td>
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<td></td>
<td>Are users operating under a radiation monitoring program?</td>
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<td></td>
<td></td>
<td></td>
<td>Have rad licenses been transferred and/or the client notified of the presence of rad sources?</td>
<td></td>
</tr>
</tbody>
</table>

Based upon site activities, location and tasks follow all applicable criteria outlined in WESTON’s EHS Program.

### 3.15 HISTORIC/ARCHAEOLOGICAL

- **NA**

There are numerous Federal, State, Local and Tribal requirements outlining procedures to protect historic and cultural properties. These include those that exist as well as those that are discovered during work activities.
### General

<table>
<thead>
<tr>
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<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td></td>
<td>☐</td>
<td>Is the site or project in an area that is of historic or archeological interest?</td>
<td>See CSM</td>
</tr>
<tr>
<td>☐</td>
<td>✗</td>
<td>☐</td>
<td>Will the project result in alteration or destruction of an archeological or historical site, structure, object or building that is on or eligible for inclusion in the National Register of Historic Places?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>✗</td>
<td>☐</td>
<td>Will the project involve the excavation, altering, defacing, or removal of archaeological objects or resources or Native Indian graves, cairns, or glyptic records?</td>
<td></td>
</tr>
</tbody>
</table>

Note that a location-specific understanding of historic and archaeological issues is necessary for completion of applications relating to air quality permitting, stormwater permitting and potentially others.

#### 3.16 MISCELLANEOUS

<table>
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<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td></td>
<td>☐</td>
<td>Have subcontractors been screened by Procurement and an EHS Manager or Safety Officer?</td>
<td></td>
</tr>
<tr>
<td>✗</td>
<td></td>
<td>☐</td>
<td>Has a Client Services Manager (CSM), Project Manager (PM), or WESTON Officer engaged WESTON’s Subcontractors using the Subcontractor Talking points?</td>
<td></td>
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<tr>
<td>✗</td>
<td></td>
<td>☐</td>
<td>Has a project Kick-off meeting been planned?</td>
<td></td>
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<tr>
<td>✗</td>
<td></td>
<td>☐</td>
<td>Will a Safety Officer or an EHS Manager be involved in the kick-off meeting?</td>
<td></td>
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<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will the average work day including driving to and from the site exceed 12 hours?</td>
<td></td>
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<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>If yes, there must be a plan for addressing driving safety and fatigue.</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will project personnel be driving vehicles they are not familiar with?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>If yes, there must be a plan for addressing driving safety.</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will there be work at elevation (greater than 4 foot difference in elevations between working levels, work from ladders, work from scaffolding, use of aerial lifts, floor openings, wall openings)?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>Will there be potential for struck by hazards (moving equipment, thrown or falling objects or material)?</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Unknown</td>
<td>Criteria for Evaluation</td>
<td>Comments</td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will there be potential for being caught in (conveyors, power-take-off, screens, etc.) or between moving machinery?</td>
<td></td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will there be work with or within 10 feet of exposed electrical conductors?</td>
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<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Are there overhead utilities?</td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Are there underground utilities?</td>
<td></td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will the project add additional traffic volume or types (material or equipment haul trucks) that may require community approval or plans?</td>
<td></td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will there be a traffic control plan for off-site and on-site vehicles?</td>
<td></td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Is the facility a military facility?</td>
<td></td>
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<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Has the potential for UXO/MEC encounter been objectively evaluated? UXO Technician on-site</td>
<td></td>
</tr>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Will there be slip, trip and fall hazards Walking canes will be used for stability.</td>
<td></td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will there be repetitive and or heavy lifting?</td>
<td></td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>If demolition work has the demolition plan, engineering survey and required components been addressed?</td>
<td></td>
</tr>
<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Are there OSHA Specific Standards applicable (asbestos, lead, cadmium, arsenic, hexavalent chromium, benzene, vinyl chloride, methylene chloride, butadiene, formaldehyde, dibromochloropropane)?</td>
<td></td>
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<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Will work be performed over or near water or boats? Water depth is less than 1 foot.</td>
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<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will boats be used?</td>
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<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Will Lifting Equipment and rigging be used?</td>
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<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Is there a communication Plan for letting neighbors know of WESTON activities that may impact them? CRP</td>
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</tbody>
</table>

### 3.17 REAL ESTATE AND TENANT ISSUES ☐ NA

WESTON as an owner or operator assumes liability for actions or activities conducted by ourselves or by others (tenants). We must ensure compliance with Federal, State and Local requirements. The following outline major issues, however, as indicated previously for the EHS Checklist, it is not meant to be comprehensive. Remember, if we have tenants occupying portions of facilities that are under our control, we have an obligation to understand and assure compliance. For the following issues compliance may be by WESTON, by various tenants or a combination, ensure that each tenant is evaluated. Note that various components of the previous EHS Checklist sections may be appropriate.
<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
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<th>Comments</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Air</strong></td>
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<td>Are boilers or other pressure vessels (e.g., chillers, air receivers) located within our work space or at tenant locations?</td>
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<td>Have they been certified and inspected?</td>
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<td>Do emission sources (e.g., boilers, chillers, bulk oil storage, etc.) have proper registration (federal, state or local)?</td>
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<td>Are tenants responsible for compliance with inspections and permits?</td>
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<td></td>
<td></td>
<td></td>
<td>Is WESTON responsible for inspections and permits?</td>
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<td><strong>Occupancy and Other Permits</strong></td>
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<td></td>
<td>Do Business Permits/Certificate of Occupancy Requirements: State, County, City/Municipality need to be addressed?</td>
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<td>If yes, is WESTON responsible? and/or are tenants responsible?</td>
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<td>Are Fire Code Inspections (e.g., materials storage, electrical, suppression systems) due? Are Corrective Actions due from past inspections?</td>
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<td></td>
<td>If yes, is WESTON responsible? and/or are tenants responsible?</td>
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<td>Are local permits and/or registrations for USTs or ASTs available or needed?</td>
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<td><strong>RCRA</strong></td>
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<td>Is the facility a Hazardous Waste Generator? If yes, what size?</td>
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<td>Is WESTON responsible? What is the waste stream?</td>
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<td>Do tenants generate Hazardous Wastes? If yes, what quantity? What is the waste stream?</td>
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<td>Are appropriate permits available for waste generation?</td>
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<td></td>
<td>Is facility and/or are tenants under litigation or regulatory action for non-compliance with RCRA?</td>
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<td>Are USTs or ASTs on site? If yes, what are type, size, contents?</td>
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<td>Have USTs been upgraded for overflow and spill control protection?</td>
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</table>
### Water and Stormwater

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<tr>
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<th>No</th>
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<th>Comments</th>
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<tr>
<td></td>
<td>☐</td>
<td>☒</td>
<td>Is a stormwater permit and plan necessary for the site?</td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Is a NPDES and/or local discharge permit necessary for the site?</td>
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### EPCRA

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<tbody>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Do any of the chemicals used or stored on site meet the definition of a hazardous substance and meet or exceed the threshold planning quantity (TPQ) for that chemical or 500 pounds, whichever is lower? (See 40 CFR Part 355 Appendix A and B). If inventory meets criteria (material and quantity) then reports to LEPC, local Fire Department and SERC required. (See 40 CFR 370.21).</td>
<td></td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Is WESTON responsible for compliance?</td>
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<tr>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Are Tenants responsible for compliance?</td>
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### SPCC and Oil

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<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Will oil or petroleum products be stored at the site/operation?</td>
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<td>☐</td>
<td>☐</td>
<td>Will the storage capacity of oil or petroleum products exceed 1320 gallons in above ground storage (include only containers equal to or larger than 55 gallons), or 42000 gallons underground?</td>
<td></td>
</tr>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Is WESTON responsible for compliance?</td>
<td>Yes if it is our fuel.</td>
</tr>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Are Tenants responsible for compliance?</td>
<td></td>
</tr>
</tbody>
</table>

### Compliance

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Criteria for Evaluation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Is the site under enforcement action for regulatory non-compliance?</td>
<td></td>
</tr>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Is any Tenant under enforcement action for regulatory non-compliance?</td>
<td></td>
</tr>
</tbody>
</table>

### 3.18 EXPLOSIVES   ☐ NA

Various regulations under the auspices of the Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE), 27 CFR Part 55 – Commerce in Explosives and 27 CFR Part 55 the Safe Explosives Act, require specific procedures for the purchase, use, storage, handling and sale of explosives or explosive containing items. Attention to these questions will help to manage our risk when developing projects that may involve explosives or munitions.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Criteria for Evaluation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Will the project involve the handling or use of explosives or munitions that are either new or recovered (e.g. dynamite, military munitions, UXO, detonating cord, TNT, etc.)?</td>
<td>All munitions encountered will be managed in accordance with USACE plans..</td>
</tr>
</tbody>
</table>

X:\FIG\GSA - PBA - RICOCHET AREA RI AND FS\APP SSHP\DRAFTAPP\ATTACHMENTS\5_EPSP IMPACT CHECKLIST FIG SITE VISIT-UNPROTECTED.DOC

Created 11 May 2009
<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>Criteria for Evaluation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒</td>
<td></td>
<td></td>
<td>Will the project involve the storage of explosives?</td>
<td>Magazines may be used to store donor explosive or munitions that are removed.</td>
</tr>
<tr>
<td>☒</td>
<td></td>
<td></td>
<td>Will the project involve the transportation of explosives?</td>
<td></td>
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<tr>
<td>☒</td>
<td></td>
<td></td>
<td>Have project personnel been cleared by BATFE as either a Possessor or Responsible Party to handle explosives?</td>
<td></td>
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<tr>
<td>☒</td>
<td></td>
<td></td>
<td>Will the project require a State Licensed Blaster?</td>
<td>WESTON has these on staff.</td>
</tr>
<tr>
<td>☒</td>
<td></td>
<td></td>
<td>Will WESTON’s Explosives Users Permit be required to execute the project? If yes, has the UXO Service Line Manager been notified?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### 3.19 SUSTAINABILITY

No

There are a wide range of options for integrating sustainability into the execution of projects, far beyond what can be incorporated into this checklist. The following are a few broad questions which are designed to stimulate thinking about how sustainable approaches could be utilized throughout project execution. A checklist of credits used in evaluating projects for LEED (Leadership in Energy and Environmental Design) could be used here in addition to the checklist below. Inclusion of an employee who is LEED AP Certified in the development of the work plan could help add other considerations, such as sustainable sites and efficient materials and resources. See the WESTON Sustainability Portal for further details. [http://westonportal/sites/sustainability/default.aspx](http://westonportal/sites/sustainability/default.aspx)

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>☒</td>
<td></td>
<td></td>
<td>Are there opportunities to reduce travel-related energy and environmental impacts associated with the project through such techniques as carpooling, use of videoconferencing, telecommuting or utilization of local personnel?</td>
<td>Local lodging for site workers.</td>
</tr>
<tr>
<td>☒</td>
<td></td>
<td></td>
<td>Has consideration been given to the potential for beneficial reuse or recycling of materials that will be excavated, removed or discarded during project execution?</td>
<td></td>
</tr>
<tr>
<td>☒</td>
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<td></td>
<td>Are there opportunities to utilize alternative or renewable energy on the project, through applications such as photovoltaics (solar) or wind power for remote sensing and/or trailer power, or alternative fuel (e.g. biodiesel) for fleet vehicles or equipment?</td>
<td></td>
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<tr>
<td>☒</td>
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<td></td>
<td>Have “green” considerations been integrated into the procurement process for materials and or equipment (e.g. recycled content, energy efficiency, recyclability, minimal packaging)?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>☒</td>
<td></td>
<td>Are there opportunities to increase energy or water efficiency in the execution of the project through selection of appropriate equipment or technical approaches?</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Unknown</td>
<td>Criteria for Evaluation</td>
<td>Comments</td>
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<td>☐</td>
<td>Are there opportunities to offset some of the environmental impacts of the project through purchase of carbon credits, renewable energy credits or wetlands banking?</td>
<td></td>
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<tr>
<td>☑</td>
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<td>☐</td>
<td>Could a Community Partnering/Make-a-Difference event be coordinated or integrated with this project?</td>
<td></td>
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</tbody>
</table>
SITE-SPECIFIC HAZARD COMMUNICATION PROGRAM

Location-Specific Hazard Communication Program/Checklist

To ensure an understanding of and compliance with the Hazard Communication Standard, WESTON will use this checklist/document (or similar document) in conjunction with the WESTON Written Hazard Communication Program as a means of meeting site- or location-specific requirements.

While responsibility for activities within this document references the WESTON Safety Officer (SSHO), it is the responsibility of all personnel to effect compliance. Responsibilities under various conditions can be found within the WESTON Written Hazard Communication Program.

To ensure that information about the dangers of all hazardous chemicals used by WESTON is known by all affected employees, the following Hazard Communication Program has been established. All affected personnel will participate in the Hazard Communication Program. This written program, as well as WESTON’s Corporate Hazard Communication Program, will be available for review by any employee, employee representative, representative of OSHA, NIOSH, or any affected employer/employee on a multi-employer site.

☐ Site or other location name/address: ____________________________________________

☐ Site/Project/Location Manager: ________________________________________________

☐ Site/Location Safety Officer: __________________________________________________

☐ List of chemicals compiled, format: ☐ ☐ HASP Other: ____________________________

☐ Location of MSDS files: _______________________________________________________

☐ Training conducted by: Name: ___________________________________________________

Date: ___________________________
Indicate format of training documentation:

Field Log: Other: 

Client briefing conducted regarding hazard communication:

If multi-employer site (client, subcontractor, agency, etc.), indicate name of affected companies:

(Client, Subs, Agencies, etc.)

Other employer(s) notified of chemicals, labeling, and MSDS information:

Has WESTON been notified of other employer’s or client’s hazard communication program(s), as necessary? Yes No

**List of Hazardous Chemicals**

A list of known hazardous chemicals used by WESTON personnel must be prepared and attached to this document or placed in a centrally identified location with the MSDSs. Further information on each chemical may be obtained by reviewing the appropriate MSDS. The list will be arranged to enable cross-reference with the MSDS file and the label on the container. The SO or Location Manager is responsible for ensuring the chemical listing remains up-to-date.

**Container Labeling**

The WESTON SO will verify that all containers received from the chemical manufacturer, importer, or distributor for use on-site are clearly labeled.

The SO is responsible for ensuring that labels are placed where required and for comparing MSDSs and other information with label information to ensure correctness.

**Material Safety Data Sheets (MSDSs)**

The SO is responsible for establishing and monitoring WESTON’s MSDS program for the location. The SO will ensure that procedures are developed to obtain the necessary MSDSs and will review incoming MSDSs for new or significant health and safety information. He/she will
see that any new information is passed on to the affected employees. If an MSDS is not received at the time of initial shipment, the SO will call the manufacturer and have an MSDS delivered for that product in accordance with the requirements of WESTON’s Written Hazard Communication Program.

A log for, and copies of, MSDSs for all hazardous chemicals in use will be kept in the MSDS folder at a location known to all site workers. MSDSs will be readily available to all employees during each work shift. If an MSDS is not available, immediately contact the WESTON SO or the designated alternate. When a revised MSDS is received, the SO will immediately replace the old MSDS.

**Employee Training and Information**

The SO is responsible for the WESTON site-specific personnel training program. The SO will ensure that all program elements specified below are supplied to all affected employees.

At the time of initial assignment for employees to the work site, or whenever a new hazard is introduced into the work area, employees will attend a health and safety meeting or briefing that includes the information indicated below.

- Hazardous chemicals present at the work site.
- Physical and health risks of the hazardous chemicals.
- The signs and symptoms of overexposure.
- Procedures to follow if employees are overexposed to hazardous chemicals.
- Location of the MSDS file and Written Hazard Communication Program.
- How to determine the presence or release of hazardous chemicals in the employee’s work area.
- How to read labels and review MSDSs to obtain hazard information.
- Steps WESTON has taken to reduce or prevent exposure to hazardous chemicals.
- How to reduce or prevent exposure to hazardous chemicals through the use of controls procedures, work practices, and personal protective equipment.
- Hazardous, nonroutine tasks to be performed (if any).
- Chemicals within unlabeled piping (if any).

**Hazardous Nonroutine Tasks**

When employees are required to perform hazardous nonroutine tasks, the affected employee(s) will be given information by the SO about the hazardous chemicals he or she may use during
such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps WESTON is using to reduce the hazards. These steps include, but are not limited to, ventilation, respirators, presence of another employee, and emergency procedures.

**Chemicals in Unlabeled Pipes**

Work activities may be performed by employees in areas where chemicals are transferred through unlabeled pipes. Prior to starting work in these areas, the employee will contact the SO, at which time information as to the chemical(s) in the pipes, potential hazards of the chemicals or the process involved, and the safety precautions that should be taken will be determined and presented.

**Multi-Employer Work Sites**

It is the responsibility of the SO to provide other employers with information about hazardous chemicals imported by WESTON to which their employees may be exposed, along with suggested safety precautions. It is also the responsibility of the SO and the Site Manager to obtain information about hazardous chemicals used by other employers to which WESTON employees may be exposed. WESTON’s chemical listing will be made available to other employers, as requested. MSDSs will be available for viewing, as necessary.

The location, format, and/or procedures for accessing MSDS information must be relayed to affected employees.