Safety

SAFETY AND HEALTH REQUIREMENTS

1. Purpose. This manual prescribes the safety and health requirements for all Corps of Engineers activities and operations.

2. Applicability. This manual applies to Headquarters, US Army Corps of Engineers (HQUSACE) elements, major subordinate commands, districts, centers, laboratories, and field operating activities (FOA), as well as USACE contracts and those administered on behalf of USACE. Applicability extends to occupational exposure for missions under the command of the Chief of Engineers, whether accomplished by military, civilian, or contractor personnel.

3. References.


   b. 29 CFR 1926, Occupational Safety and Health Standards for Construction

   c. 29 CFR 1960, Basic Program Elements for Federal Employees, OSHA

   d. Executive Order (EO) 12196, Occupational Safety and Health Programs for Federal Employees, 26 Feb, 1980

   e. Federal Acquisition Regulation (FAR) Clause 52.236-13, Accident Prevention, Nov 1991

   f. Department of Defense Instruction (DODI) 6055.1, DOD Safety and Occupational Health Program, 14 Oct 2014

   g. Army Regulation (AR) 40-5, Preventive Medicine

   h. AR 385-10, Army Safety Program

This Manual supersedes EM 385-1-1, dated 15 September 2008

a. The provisions of this manual implement and supplement the safety and health standards and requirements referenced above. Where more stringent safety and occupational health standards are set forth in these requirements and regulations, the more stringent standards shall apply.

b. Mission applicability introduced in paragraph 2 above shall include the following:

(1) Construction contract work under the provisions of FAR Clause 52.236-13. Contractors shall comply with the latest version of EM 385-1-1 (including interim changes) that is in effect on the date of solicitation. Prior to making an offer, bidders should check the HQUSACE Safety and Occupational Health web site (see paragraph c) for the latest changes. No separate payment will be made for compliance with this paragraph or for compliance with other safety and health requirements of this contract. Note: Existing contracts will continue to apply the provisions of the previous edition of this manual until contract completion.

(2) Service, supply, and research and development contracting actions. Compliance with this manual shall be a contract requirement for such activities unless technical representatives (in coordination with safety and health professionals) advise that special precautions are not appropriate due to extremely limited scope of services or similar. However, it is understood that this manual in its entirety may be too complex for the type of work being performed under these contracts. These contractors may reference Appendix A, for abbreviated Accident Prevention Plan (APP).

(3) Contracting actions for hazardous, toxic, and radioactive waste site investigation, design, or remediation activities. Compliance with this manual shall be a contract requirement.

c. Changes. All interim changes (changes made between publication of new editions) to this manual, and the effective date of change, will be posted on the Safety and Occupational Health Office web site: http://www.usace.army.mil/CESO/Pages/Home.aspx and in USACE Electronic bid Sets. Hard copies of this manual are available from the local contracting official.

d. Interpretations. Within the Corps of Engineers, interpretations to the requirements contained within this manual shall be executed in accordance with the process contained in Appendix C. Interpretations will apply only to the specific situation in question and may not be used as a precedent to determine the meaning of a requirement as it may apply to another circumstance.
e. Variances and Waivers. Within the Corps of Engineers, variances and waivers to provisions of this manual require the approval of the Chief of Safety and Occupational Health, HQUSACE. Variances or waivers shall provide an equal or greater level of protection, shall be substantiated with a hazard analysis of the activity and shall be documented and forwarded through channels to Chief of Safety and Occupational Health, HQUSACE. The process for requesting variances or waivers is contained in Appendix D.

f. Activities performed OCONUS. Some of the technical requirements of this manual may not be applicable to overseas activities due to conflicting circumstances, practices, and laws or regulations of the locality or the unavailability of equipment. In such instances, means other than the ones specified in this manual may be used to achieve the required protection. In such instances, a hazard analysis must be developed to document that the required protection will be achieved by the alternate means.

g. Unless otherwise indicated, when publications are referenced in this manual, the most recent edition is to be used.

h. The use of underlining in this manual indicates new or changed text from the 2008 version.

i. Supplementation of this manual is not authorized except as published by the Safety and Occupational Health Office, HQUSACE.

(1) Local USACE organizations may develop Standard Operating Procedures (SOPs) to implement the provisions contained within this manual, but may not implement new requirements (e.g., more stringent, differing intent, etc.) without the specific approval of HQUSACE.

(2) Locally developed Safety and Health Requirements will not be included in contract requirements without the approval of HQUSACE.

FOR THE COMMANDER:

[Signature]

WILLIAM H. GRAHAM
COL., EN
Chief of Staff
## Section 1

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Program Management

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SECTION 1
Program Management

01.A General. This Section provides the overall programmatic guidance for developing, managing and implementing a safety and occupational health (SOH) program.

01.A.01 No person shall be required, instructed or allowed to work in surroundings or under conditions that are unsafe or dangerous to his or her health.

01.A.02 The employer is responsible for initiating and maintaining a SOH program that complies with the US Army Corps of Engineers (USACE) SOH requirements.

- **Note 1:** Supplementation of this manual is not authorized except as published by the HQUSACE SOH Office.

- **Note 2:** Local USACE Commands may develop Standard Operating Procedures (SOPs) to implement the provisions contained within this manual, but may not implement new requirements (e.g., more stringent, differing in intent, etc.), without the specific approval of HQUSACE-SO.

01.A.03 Each employee is responsible for complying with applicable SOH requirements, wearing prescribed SOH equipment, reporting unsafe conditions or activities, preventing avoidable mishaps, and working in a safe manner.

01.A.04 Supervisors shall remove employees from exposure to work hazards, or the work site when they are observed acting in an unsafe manner, or otherwise pose a potential SOH threat to themselves or others. Employees may return to the work environment after appropriate supervisory action has occurred (i.e., re-training on proper safe procedures, etc.).

01.A.05 SOH programs, documents, signs, and tags shall be communicated to employees in a language that they understand.

01.A.06 Worksites with non-English speaking workers shall have a person(s), fluent in the language(s) spoken as well as English, on-site when work or training is being performed, to interpret and translate as needed.

01.A.07 SOH Bulletin Board. The Contractor or USACE Project shall erect and maintain a SOH bulletin board in a commonly accessed area in clear view of the on-site workers. The bulletin board shall be continually maintained and updated and placed in a location that is
protected against the elements and unauthorized removal. It shall contain, at minimum, the following SOH information:

a. A map denoting the route to the nearest emergency care facility;

b. Emergency phone numbers;

c. A copy of the most current Accident Prevention Plan (APP) or Project Safety and Occupational Health (SOH) Plan, mounted on/adjacent to the bulletin board, or a notice on the bulletin board stating the location of the Plan. The location of the Plan shall be accessible on the site by all workers;

d. The Occupational Safety and Health Administration (OSHA) Form 300A, Summary of Work Related Injuries and Illnesses, posted in accordance with OSHA requirements (from February 1 to April 30 of the year following the issuance of this form). It shall be mounted on/adjacent to the bulletin board, accessible on the site by all workers;

e. A copy of the SOH deficiency tracking log mounted on/adjacent to the bulletin board or a notice on the bulletin board shall state the location where it may be accessed by all workers upon request; > See 01.A.13.d.

f. SOH promotional posters;

g. Date of last lost workday injury and date of last OSHA recordable injury;

h. OSHA Safety and Health Poster;

i. A copy of the hazardous material inventory, identification of use, approximate quantities and site map detailing location as required by Section 06.B.01.a.

01.A.08 USACE Business Process. USACE Project Managers (PMs), in accordance with the SOH Reference Document (Ref Doc 8016G) contained in the USACE Business Manual, shall ensure that a SOH plan is developed for funded projects and incorporated into each Project Management Plan (PMP)/Program Management Plan (PrgMP).

a. The PM shall collaborate with the customer and the local SOH office (SOHO) on project safety goals and objectives and communicate these through the PMP/PrgMP SOH plan and Project Delivery Team (PDT) meetings.

b. Coordination between local SOHOs of the design district and the construction district shall occur during the development of the PMP.
01.A.09 USACE Project Management Plan. USACE PMs and the PDT shall develop the SOH program requirements to be incorporated in the PMP and are responsible for assuring that SOH requirements are properly addressed and executed throughout the life cycle of each project.

a. The PM shall ensure that identified hazards, control mechanisms, and risk acceptance are formally communicated to all project stakeholders.

b. The current Unified Facilities Guide Specification (UFGS) for Safety and Health in effect on the date of solicitation shall be used in all USACE contract work administered on behalf of the USACE under the provisions of FAR Clause 52.236-13 and on other contracts as deemed appropriate based on the risk assessment.

c. Military Construction (MILCON) Transformation contracts will include the Federal Acquisition Regulation (FAR) Clause 52.236-13 as well as the Model Request for Proposal (RFP).

d. Locally developed SOH requirements will not be included in contract requirements without the concurrence of the Contracting Officer (KO) and local SOHO.

e. When an employee is deemed to be in imminent danger, the COR or a designated representative shall immediately stop the unsafe work being performed. > See Federal Acquisition Regulation (FAR) Clause 52.236-13(d).

01.A.10 USACE Project SOH Plan. For USACE activities where USACE employees are engaged in functions other than routine office or administrative duties, a Project SOH Plan shall be developed, implemented, and updated as necessary.

a. Such activities include operations and maintenance; recreational resource management; in-house conducted environmental restoration (investigation, design, and remediation); surveying, inspection, and testing; construction management; warehousing; transportation; research and development; and other activities when the Government Designated Authority (GDA) and the command's local SOHO agree on the benefit of such a program for accident prevention.

b. The Project SOH Plan shall address applicable items listed in Appendix A, and in addition, any local SOPs or requirements identified in the USACE Command's SOH Program. > See Section 01.A.02, Notes 1 and 2.

c. For Hazardous Waste Operations and Emergency Response (HAZWOPER) sites, refer to Section 33 for Site Safety and Health Plan (SSHP) guidance.
01.A.11 Position Hazard Analyses (PHA) for USACE Employees. A PHA shall be prepared, updated as necessary, documented by the supervisor, and reviewed by the command’s SOHO for each USACE position according to the hazards associated with the position’s tasks. A generic PHA may be used for groups of employees performing repetitive office/administrative tasks where the primary hazards result from ergonomic challenges, lighting conditions, light lifting and carrying tasks, and indoor air quality. > See Figure 1-1 for an outline of a PHA. An electronic, fillable version of a PHA may be found on the HQUSACE Safety Office Website.

a. The USACE Supervisor, in coordination with the SOHO, shall determine the need for analysis of each position within his or her area of responsibility.

b. In developing the analysis for a particular position, supervisors shall draw upon the knowledge and experience of employees in that position in addition to that of the SOHO.

c. A complete PHA document shall indicate that the hazards, medical surveillance requirements, control mechanisms, personal protective equipment (PPE) and training required for the position were discussed with the employee. The PHA shall be signed by the supervisor and employee. A PHA shall contain a copy of the employee’s training certificate of completion for all required training.

d. Supervisors shall review the PHAs with employees upon initial assignment to a position, whenever there is a significant change in hazards and during their annual performance review or at least annually.

01.A.12 Accident Prevention Plans (APP) for Contract Work. Before initiation of work at the job site, an APP shall be reviewed and found acceptable by the GDA. > See Appendix A.

a. APPs shall be developed and submitted by the Contractor. The Contractor shall address each of the elements/sub-elements in the outline contained in Appendix A in the order that they are provided in the manual. If an item is not applicable because of the nature of the work to be performed, the Contractor shall state this exception and provide a justification.

(1) The Contractor shall identify each major phase of work that will be performed on this contract. Within each major phase, all activities, tasks or Definable Features of Work (DFOWs) shall be identified that will require an Activity Hazard Analysis (AHA). > See Section 01.A.14 and Appendix A, paragraph 3.j.
(2) The APP shall also address any unusual or unique aspects of the project or activity.

FIGURE 1-1 Position Hazard Analysis (PHA) for USACE Employees

<table>
<thead>
<tr>
<th>Name: (Print - Last, First, Mi):</th>
<th>Prepared By: (Print – Last, First, MI):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Job Series: ____________________</td>
<td></td>
</tr>
<tr>
<td>Job Title: ______________________</td>
<td></td>
</tr>
<tr>
<td>Job Number (SF52): ______________</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reviewed By (SSHO):_________________</td>
</tr>
<tr>
<td></td>
<td>Date (Mo) _ _ (Day) _ _ (Year) _ _ _</td>
</tr>
</tbody>
</table>

Command Name & Organization Code: ________________________________________________
Primary Duty Location: ____________________________________________________________

Clearances Required

- [ ] EM OPS Team
- [ ] First Aid/CPR
- [ ] Respirator
- [ ] CDL Crane Operator
- [ ] Diver
- [ ] HTRW
- [ ] Other

<table>
<thead>
<tr>
<th>Position Tasks</th>
<th>Safety and/or Occupational Health Hazards*</th>
<th>Recommended Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td>4.</td>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
<td>5.</td>
<td>5.</td>
</tr>
</tbody>
</table>

*Note - Examples of potential hazards are as follows:

<table>
<thead>
<tr>
<th>Safety:</th>
<th>Physical Agent:</th>
<th>Chemical Agent:</th>
<th>Biological Agent:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavating; electrical; slips, trips, falls; falls from heights, motor vehicle/equipment operation; compressed air; fire; etc.</td>
<td>Exposure to heat/cold; noise; stress; vibration; radiation, hot substances; radio frequency; EMF, etc.</td>
<td>Exposure to solvents; cadmium; paints; welding fumes; lead; asbestos; pesticides; etc.</td>
<td>Exposure to bloodborne pathogens; poison ivy; insects; fungi; etc.</td>
</tr>
</tbody>
</table>
FIGURE 1-1 (Cont’d)

Position Hazard Analysis (PHA)

<table>
<thead>
<tr>
<th>Equipment, Materials &amp; Chemicals To Be Used</th>
<th>Inspection Requirements</th>
<th>Training Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>List for each task [include Material Safety Data Sheets (MSDSs)]</td>
<td>List inspection requirements for each work task</td>
<td>List safety/health training requirements</td>
</tr>
</tbody>
</table>

1.  
2.  
3.  
4.  
5.  
6. 

Note: This PHA serves as the hazard assessment required by Sections 01, 05, and 06 of this Manual. The employee covered by this PHA has been instructed in the tasks to be performed, the hazards that may be encountered, potential adverse effects of the hazards and controls to be used. He/she has received adequate, specific training related to safe work practices, administrative and engineering controls and PPE to be used to ensure assigned work tasks are conducted in a safe/healthful manner. He/she has demonstrated an understanding of the safety/health equipment/PPE to be used, including its limitations, useful shelf-life, how to properly don, doff, adjust, and wear required PPE, how to properly care for, inspect, maintain, store, and dispose of same. Attached is documentation of the training received, dates of such training, and the subject matter taught.

Supervisor Signature: __________________  Employee Signature: __________________

Date __ __/__ __/__ __ __ __                  Date __ __/__ __/__ __ __ __
b. The APP shall be written in English by the Prime Contractor and shall articulate the specific work, work processes, equipment to be used, and hazards pertaining to the contract. The APP shall also implement in detail the pertinent requirements of this manual.

c. The APP shall contain appropriate hazard-specific plans as needed for the work being performed (e.g., appendices that include a SSHP for hazardous waste site cleanup operations; a Lead Compliance Plan when working with lead, or an Asbestos Hazard Abatement Plan when working with asbestos).

d. All highly complex or high-hazard projects shall be coordinated with the local SOH office.

e. For limited-scope supply, service and R&D contracts, the KO and local SOHO may authorize an abbreviated APP. > See Appendix A, Paragraph 2 for details.

f. The APP shall be developed and signed by Qualified Person (QP) and then signed. The Contractor shall be responsible for documenting the QPs' credentials.

g. The Contractor's APP shall be job-specific and must include work to be performed by subcontractors.

(1) If at the time of submission of the APP, portions of the work have yet to be known or sub-contracted, that portion will be added to the APP, submitted and accepted by the GDA prior to initiation of the sub-contracted work.

(2) In addition, the APP shall include measures to be taken by the Contractor to control hazards associated with materials, services, or equipment provided by suppliers.

(3) Each sub-contractor shall be provided a copy of the APP by the prime contractor and be required to comply with it.

h. The contractor shall provide on-going evaluations of the APP throughout the life of the project. Changes, revisions and updates to the APP shall be reviewed and accepted by the GDA.

➢ Note: When USACE or other government employees are on a site that is controlled by a contractor and are affected by the contractor-managed APP (e.g., QA’s on construction sites, etc.), they shall comply with the contractor’s APP and associated programs (i.e., Fall Protection, Hazardous Energy Control, Diving, Blasting, etc.).
01.A.13 Inspections - Contractor and USACE Projects.

a. The APP or the USACE Project SOH Plan shall provide for frequent safety inspections/audits, conducted by a Competent Person (CP), of the work sites, material, and equipment to ensure compliance with the plan and this manual. These inspections/audits shall be documented in writing and available upon request to the GDA. They shall include the name of the inspector, date, and all findings.

b. In addition, Contractor Quality Control (QC) and USACE Quality Assurance (QA) personnel as part of their QC and QA responsibilities, shall conduct and document daily SOH inspections in their daily logs.

c. Inspection reports shall document any identified SOH issues and deficiencies, and the actions, timetable, and responsibility for correcting the deficiencies. Follow-up inspections to ensure correction of any identified deficiencies must also be conducted and documented in inspection reports.

d. The Contractor or USACE Project shall establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. The tracking system provides useful information that must be used to evaluate the effectiveness of the APP. A monthly evaluation of the data should be discussed in the QC or SOH meeting with everyone on the project. The list shall be posted on the project bulletin board, be updated daily, and should provide the following information:

(1) Date deficiency identified;
(2) Description of deficiency;
(3) Name of person responsible for correcting deficiency;
(4) Projected resolution date;
(5) Date actually resolved.

e. The Contractor shall immediately notify the GDA of any OSHA or other regulatory agency inspection and provide GDA an opportunity to accompany the Contractor on the inspection. The inspection will not be delayed due to non-availability of the GDA. The Contractor shall provide the GDA with a copy of any citations or reports issued by the inspector and any corrective action responses to the citation(s) or report(s).

f. The GDA shall notify the local SOHO of any regulatory visits.
g. The USACE Project personnel shall immediately notify the local SOHO of any OSHA or other regulatory agency inspection. The Project shall provide the local SOHO with a copy of any citations or reports issued by the inspector and any corrective action responses to the citation(s) or report(s). Local SOHO shall immediately provide this documentation to HQUSACE-SO.

01.A.14 Contractor Risk Management Process. Risk management is a business process that includes the identification, assessment, and prioritization of risks, followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events to an acceptable level. The USACE uses the Activity Hazard Analysis (AHA) as part of a total risk management process. > See Figure 1-2 for a NON-MANDATORY formatted outline of an AHA. An electronic version AHA may be found on the HQUSACE Safety Office Website.

➢ Note: Contractors and other individual employer’s typically use Job Safety Analyses (JSAs), Job Hazard Analyses (JHAs), or similar Risk Management assessment tools. These documents are considered equivalent to, and acceptable substitutes for, the USACE’s AHA provided the data collected is the same as that required by the AHA.

a. AHAs shall define the steps being performed within the activity, task or Defined Feature of Work (DFOW), and identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

b. Before beginning each work activity, task or DFOW, the Contractor performing that work activity shall prepare the initial AHA. A Risk Assessment Code (RAC) is assigned to each step, to the risk that remains after controls have been applied (residual risk).

(1) Once this process has occurred, a RAC will be assigned to the activity as a whole (cannot be lower than the highest step RAC).

(2) Acceptance of risk. This residual risk must then be communicated to the proper authority for acceptance in order to proceed with the activity.

(3) The names of the Competent Person(s) (CP) and Qualified Person(s) (QP) required for a particular activity (e.g., excavation, scaffolding, fall protection, or other activities as specified by OSHA and this manual) shall be identified and included in the AHA, as well as proof of their competency/qualification.

(4) If more than one CP/QP is used on the AHA activity, a list of names and appropriate qualifications shall be submitted as an attachment to the AHA. Those listed must be CPs/QPs for the type of work involved in the AHA and familiar with current site safety issues.
c. Work shall not begin until the AHA with RAC for the work activity has been accepted by the GDA and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.

d. AHA’s are intended to be developed and used by the field crews/workers performing the work, with the assistance of others (SSHO, QC, Superintendent, etc) as needed. The initial, accepted AHA shall be provided to and used by the field crews/workers that are performing that activity. AHAs are to be considered living documents and are intended to be created in the field and updated by the workers as needed.

e. The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change of CP(s)/QP(s).

(1) If a new CP/QP (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new CP/QP shall acknowledge in writing that they have reviewed the AHA and is familiar with current site safety issues.

(2) If the initial RAC increases due to a change made to the AHA by the workers, the AHA shall be resubmitted to GDA for acceptance prior to work proceeding.

(3) Changes to or updates to an AHA that do not increase the RAC are not required to be resubmitted for acceptance by the GDA.

(4) Workers/crews shall have in their possession the current AHA that reflects current site conditions, personnel, equipment, control measures, etc while the work is being performed.

f. The AHA shall be used by the contractor and USACE personnel to assure work is being performed consistent with the AHA. In the event that the work is not being conducted in a safe manner, the contractor and/or the USACE (COR or designated representative) shall immediately stop the unsafe work being conducted until it is in compliance with this manual, APP and the AHA or the APP/ AHA is revised and accepted by the GDA, if necessary.

g. AHAs for completed work for the same contract or project work shall be readily available on site (e.g., office, trailer, etc.) and accessible on site by all workers, for a period of 12 months or, for contract work, the length of the contract;

01.A.15 USACE Risk Management Process. Risk management is a business process that includes the identification, assessment, and prioritization of risks, followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events to an acceptable level. The USACE uses the Activity
Hazard Analysis (AHA) as part of a total risk management process. See Figure 1-2 for a NON-MANDATORY formatted outline of an AHA and an electronic version of this AHA may be found on the HQUSACE Safety Office Website. Work crews may use other forms/formats as long as the information contained within is the same.

a. An AHA shall be prepared and documented for each USACE activity as warranted by the hazards associated with the activity. Typically, an AHA shall be prepared for all field, laboratory, industrial and maintenance activities.

b. The supervisor, utilizing the recommendations of the SOHO, should determine the need for an AHA for each activity within his/her area of responsibility. AHAs shall define the steps being performed within the activity or task, identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

c. Before beginning each work activity, the workers performing that work activity shall prepare the initial AHA. A Risk Assessment Code (RAC) is assigned to each step, to the risk that remains after controls have been applied (residual risk). In developing the AHA for a particular activity, the involved workers should draw upon the expertise (knowledge, skill and experience) of the USACE supervisor for that activity as well as the SOH Office.

   (1) Once this process has occurred, a RAC will be assigned to the activity as a whole (cannot be lower than the highest step RAC).

   (2) Acceptance of risk. This residual risk must then be communicated to the proper authority for acceptance in order to proceed with the activity.

   (3) The names of the Competent Person(s) (CP) and Qualified Person(s) (QP) required for a particular activity (e.g., confined space entry, scaffolding, fall protection or other activities as specified by OSHA/this manual) shall be identified and included in the AHA, as well as proof of their competency/qualification.

   (4) If more than one CP/QP is used on the AHA activity, a list of names and appropriate qualifications shall be noted on the AHA. Those listed must be CPs/QPs for the type of work involved in the AHA and familiar with current site safety issues.

d. Work shall not begin until the AHA with RAC for the work activity has been discussed with all engaged in the activity in a job pre-brief (to include Supervisor and/or local SOHO if applicable).
### Activity Hazard Analysis (AHA)

<table>
<thead>
<tr>
<th>Activity/Work Task:</th>
<th>Overall Risk Assessment Code (RAC) (Use highest code)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Location:</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract Number:</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Date Prepared:</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Prepared by (Name/Title):</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviewed by (Name/Title):</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes: (Field Notes, Review Comments, etc.)</td>
<td>Step 1: Review each “Hazard” with identified safety “Controls”. Determine RAC (See above)</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Risk Assessment Code (RAC) Matrix

<table>
<thead>
<tr>
<th>Severity</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequent</td>
</tr>
<tr>
<td>Catastrophic</td>
<td>E</td>
</tr>
<tr>
<td>Critical</td>
<td>E</td>
</tr>
<tr>
<td>Marginal</td>
<td>H</td>
</tr>
<tr>
<td>Negligible</td>
<td>M</td>
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#### RAC Chart

- **E** = Extremely High Risk
- **H** = High Risk
- **M** = Moderate Risk
- **L** = Low Risk

### Step 2: Identify the RAC (probability vs. severity) as E, H, M, or L for each “Hazard” on AHA. Annotate the overall highest RAC at the top of AHA.

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**e.** AHA’s are intended to be developed and used by the field crews/workers performing the work, with the assistance of others (CDSO, Superintendent, etc.) as needed. The initial AHA shall be provided to and used by the field crews/workers that are performing that activity. AHAs are to be considered living documents and are intended to be created in the field and updated by the workers as needed.

**f.** The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change of CP(s)/QP(s).
(1) If a new CP/QP (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new CP/QP shall acknowledge in writing that he/she has reviewed the AHA and is familiar with current site safety issues.

(2) If the initial RAC increases due to a change made to the AHA by the workers, the AHA shall be re-reviewed by the supervisor and local SOHO for acceptance prior to work proceeding.

(3) Changes to or updates to an AHA that do not increase the RAC are not required to be re-reviewed.

(4) Workers/crews shall have in their possession the current AHA that reflects current site conditions, personnel, equipment, control measures, etc while the work is being performed.

g. The AHA shall be used to assure work is being performed consistent with the AHA. In the event that the work is not being performed/conducted in a safe manner, work shall stop until it is in compliance with this manual, and the AHA.

h. Once the activity has been completed, the AHA shall be available and kept on file on site for 6 months minimum.

01.A.16  To ensure compliance with this manual, the Contractor may be required to prepare for review specific SOH submittal items. These submittal items may be specifically required by this manual or may be identified in the contract or by the Contracting Officer’s Representative (COR). All SOH submittal items shall be written in English and provided by the Contractor to the GDA.

01.A.17  Contractor Site Safety and Health Officer (SSHO). The Contractor shall employ a minimum of one CP at each project site to function as the SSHO (primary), depending on job complexity, size and any other pertinent factors.

a. The SSHO shall:

(1) Be a full-time responsibility. The SSHO shall be present at the project site, located so they have full mobility and reasonable access to all major work operations during the shift.

(2) Be an employee other than the supervisor, unless specified differently in the contract and coordinated with the local SOH Office, and

(3) Report to a senior project (or corporate) official.

b. The SSHO, as a minimum, must produce a copy of their instructor-signed OSHA 30-
hour training card (or course completion if within 90 days of having completed the training and card has not yet been issued). They will have completed:

1. The 30-hour OSHA General Industry safety class (may be web-based training if the student is able to directly ask questions of the instructor by chat or phone), or

2. The 30-hour OSHA Construction Industry safety class (may be web-based training if the student is able to directly ask questions of the instructor by chat/phone), or

3. As an equivalent, formal construction or industry safety and health training covering the subjects of the OSHA 30-hour course and the EM 385-1-1 [see Appendix A, Paragraph 3.d.(3)] applicable to the work to be performed and given by qualified instructors - may be web-base training if the student is able to directly ask questions of the instructor by chat/phone).

➢ Note: The local SOHO having jurisdiction over the work shall evaluate the proposed equivalent training for applicability to the contract work to be performed.

c. In addition, the SSHO is also required to have proof of employment for:

1. Five (5) years of continuous construction industry safety experience in supervising/managing general construction (managing safety programs or processes or conducting hazard analyses and developing controls), or

2. Five (5) years of continuous general industry safety experience in supervising/managing general industry (managing safety programs or processes or conducting hazard analyses and developing controls), or

3. If the SSHO has a Third-Party, Nationally Accredited (ANSI or National Commission for Certifying Agencies - NCCA) SOH-related certification, only 4 years of experience is needed. > See Appendix Q for list of certifications.

d. SSHOs shall maintain competency through having taken 8 hours of documented formal, on-line, or self-study safety and health related coursework every year. Examples of continuing education activities that meet this requirement are: writing an article, teaching a class, reading/writing professional articles, attendance/participation in professional societies/meetings, etc.

e. For projects with multiple shifts, an Alternate SSHO as identified in the AHA will be assigned to insure SSHO coverage for the project at all times work activities are conducted.
Note: The Alternate SSHO must meet the same requirements and assume the responsibilities of the project SSHO. > See Appendix Q for “Alternate SSHO” and “SSHO” definitions.

f. If the SSHO is off-site for a period longer than 24 hours, an Alternate SSHO shall be provided and shall fulfill the same roles and responsibilities as the primary SSHO.

g. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and shall be on the project site at all times when work is being performed.

Note: DRs are collateral duty safety personnel, with safety duties in addition to their full-time occupation.

h. If an activity, task or DFOW contains multiple sites and has been assessed and given an activity RAC of low or medium, a DR shall be appointed for each site where remote work locations are more than 45 minutes travel time from the SSHO’s duty location.

1) DRs shall perform safety program tasks as designated by the SSHO and report safety findings to the SSHO.

2) A DR may NOT be assigned to projects that have a RAC level of high or extremely high.

i. The Contractor’s project management team, with the assistance of the SSHO, is responsible for managing, communicating, implementing and enforcing compliance with the Contractor’s APP and other accepted safety and health submittals.

Exception 1: For dredging contracts, the SSHO requirements established in the standardized contract clause for dredging project site safety personnel shall be used as it is included in the current UFGS for Governmental Safety Requirements.

Exception 2: For limited service contracts, for example, mowing only, park attendants, rest room cleaning, etc., the KO and SOH Office may modify SSHO requirements and waive the more stringent elements of this Section. > See Appendix A, Paragraphs 2 and 3.i.

Exception 3: For field walk-over, surface soil sampling, or long term water sampling, in which there is no exposure to mechanical or explosive hazards, the SSHO may be collateral duty and shall have a minimum of 8 hours of training annually and specific knowledge of the potential hazards of the tasks being completed.

01.A.18 USACE SOH Professional and Collateral Duty Safety Officer (CDSO). > See Appendix Q. Organizations shall assign a safety point of contact (POC) for all construction
and/or maintenance activities, dredging, field sampling, drilling and any other potentially hazardous tasks. A safety POC is a worker that has knowledge of the work being performed and the associated hazards and controls associated with it.

a. For all activities with a high potential for injury or illness and/or a RAC on the AHA of high or extremely high, a SOH Professional shall be on site full time. The SOH Professional shall have reviewed the hazards and appropriate controls with the local SOHO.

b. If a project or task has been assessed with a RAC of low:

(1) A Safety POC or CDSO as identified in the AHA, shall be on the project site at all times when work is being performed.

(2) And it contains multiple sites, a Safety POC shall be appointed for each site where remote work locations are more than 45-minutes travel time from the CDSO’s main duty location. POCs shall perform safety program tasks as designated by the SOH Professional, Project Safety Officer or CDSO and report safety findings to the appropriate level.

➢ Note: CDSOs are formerly identified personnel with safety duties in addition to their full-time occupation.

c. If a project or task has been assessed with a RAC for the project of medium:

(1) A CDSO, as identified in the AHA, shall be on the project site at all times when work is being performed.

(2) And it contains multiple sites, a Safety POC shall be appointed for each site where remote work locations are more than 45-minutes travel time from the CDSO’s main duty location. POCs shall perform safety program tasks as designated by the SOH Professional, Project Safety Officer or CDSO and report safety findings to the appropriate level.

d. A CDSO may NOT be assigned to projects that have a RAC level of high or extremely high.

e. The responsibilities of the government Safety POC/CDSO are:

(1) To ensure the hazards identified in the AHA are appropriately addressed;

(2) Provide training on the hazards of the activity and PPE or controls to be utilized;
(3) Provide feedback on the work activities as to how to improve the safety of the activity, and

(4) Document the safety and health controls being used and implemented.

f. Project SO, CDSO and Safety POC shall seek support and information from the local SOHO if there is a verbalized concern or someone becomes injured or ill.

01.A.19 USACE Collateral Duty Safety Officers (CDSOs). USACE organizations shall designate CDSOs as recommended by the SOH Office. CDSOs shall:

a. Be selected, then trained per Section 01.A.19.b, then appointed through written orders;

b. On appointment of an employee to CDSO, SOH training commensurate with the scope of their assigned responsibilities shall be provided. See 29 CFR 1960.58. Training shall include:

(1) USACE EM 385-1-1;

(2) Section 19 of the OSH Act, Executive Order 12196 and 29 CFR 1960.58;

(3) USACE procedures for the reporting, evaluation and abatement of hazards;

(4) Hazard recognition and Risk Management Processes;

(5) USACE procedures for mishap reporting and investigation and use of lessons learned;

(6) Any local SOH SOPs, to include other appropriate rules and regulations; or

(7) A USACE-instructed or provided (e.g., Prospect classes) 30-hour OSHA General Industry safety class or 30-hour Construction Industry safety class can be taken and will successfully satisfy all training material above except for local SOPs and information.

c. Maintain their competency through taking a minimum of 24-hours of documented formal or online safety and health related coursework, training and webinars over a period of 4-years. The training must be applicable to the work being performed. Teaching is not considered the equivalent of attending training.

d. Give their safety duties proper priority;

e. Report directly to their unit manager concerning safety-related matters;
f. Coordinate activities with their supporting SOHO.

01.A.20 Fatigue Management Plan (FMP).

a. A FMP shall be completed as part of the APP/Project SOH Plan whenever work hours:

(1) Exceed 10-hours a day for more than 4 consecutive days;

(2) Exceed 50-hours in a 7-day work week;

(3) Exceed 12-hours a day for more than 3 consecutive days, or (4) Exceed 58-hours a week for sedentary (to include office) work.

b. The FMP shall address the following conditions for operator work hour limitations:

(1) Equipment Operators. Operators of equipment, such as hoisting equipment and draglines, mobile construction equipment, electrical power systems, hydropower plants, industrial manufacturing systems, hydraulically operated equipment, powered vessels, and boats, shall not be permitted to exceed 12-hours of duty time in any 24-hour period, including time worked at another occupation. A minimum of 8 consecutive hours of rest between shifts in a 24-hour period is required.

➢ Note: See “Rest”, in Appendix Q.

(2) Motor Vehicle Operators. Operators of motor vehicles, while on duty, shall not operate vehicles for a continuous period of more than ten 10-hours in any 24-hour period; moreover, no employee, while on duty, may operate a motor vehicle after being in a duty status for more than 12-hours during any 24-hour period. A minimum of 8 consecutive hours shall be provided for rest in each 24-hour period.

(3) Floating Plant. All floating plant personnel shall be scheduled to receive a minimum of 8-hours rest in any 24-hour period, except:

(a) When quarters are provided immediately adjacent to, or aboard the work site, these hours of rest may be divided into no more than 2 periods, one of which must be at least 6 continuous hours in length.

(b) Rest periods may be interrupted in case of emergency, drill, or other overriding operational necessity.

C. FMP shall identify affected workers, management responsibility, training, and the controls established at the worksite.
(1) Training shall include symptoms of fatigue, habits and actions the worker may take to avoid fatigue, actions workers should take if they observe fatigue in a co-worker, and controls in place to prevent fatigue.

(2) Controls for fatigue shall include a discussion of driving to and from work and any possible mitigation of driving as a factor of fatigue. > See Appendix Q, “Rest”.

(3) Controls for fatigue may include work scheduling (limit number of consecutive night shifts), rotating jobs to prevent repetitive work, breaks at critical times in the work cycle, control of environmental factors (heat, cold, use of personal protective equipment), buddy check-in for individuals working alone, and alternate transportation for long commutes.

01.B Indoctrination and Training.

01.B.01 A Competent Person (CP), qualified in the material presented, shall conduct all training required by this manual. All training shall correspond to American National Standards Institute (ANSI) regulation Z490.1.

01.B.02 Employees shall be provided an SOH indoctrination prior to the start of work as well as continuous SOH training to enable them to perform their work in a safe manner. All training, meetings and indoctrinations shall be documented in writing by date, name, content and trainer.

01.B.03 Indoctrination and training should be based upon the existing SOH program of the Contractor or Government agency, as applicable, and shall include but not be limited to:

a. Requirements and responsibilities for accident prevention and the maintenance of safe and healthful work environments;

b. General SOH policies and procedures and pertinent provisions of this manual;

c. Employee and supervisor responsibilities for reporting all mishaps;

d. Provisions for medical facilities and emergency response and procedures for obtaining medical treatment or emergency assistance;

e. Procedures for reporting and correcting unsafe conditions or practices;

f. Job hazards and the means to control/eliminate those hazards, including applicable PHAs and/or AHAs;

g. Specific training as required by this manual.

01.B.04 Visitors and Authorized Entrants.
a. A visitor is anyone coming to the site for short-term action (e.g., inspection, meetings, deliveries, etc.). An authorized entrant is anyone entering the site that is assigned to the site but is not a site worker (e.g., security forces, other military forces, etc.). Signs shall be posted at all site entrances requiring anyone entering the site to report to the project office for a safety briefing.

b. All visitors and authorized entrants to USACE Government- or Contractor-controlled sites presenting hazardous conditions shall be briefed by a CP on the hazards to be expected on the site and the safety and health controls required (e.g., hard hat, foot protection).

c. All personnel who escort visitors are responsible for their visitors and shall ensure that all visitors entering the site are properly protected and are wearing or provided the appropriate PPE.

➢ Note: If visitors can be escorted along a designated safe path through the site where they are not exposed to the hazards, the use of PPE is not necessary.

d. Contractor and/or Project site personnel shall maintain a stock of common PPE, such as hard hats, eye protection, ear plugs, and reflective vests, for use by visitors.

e. All visitors shall be escorted by appropriate site personnel.

f. A visitor sign-in/out log shall be maintained on site. The site manager shall maintain a roster of all authorized entrants that enter the site.

01.B.05 Safety meetings shall be conducted to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent SOH training and motivation.

a. Meetings shall be conducted at least once a month for all supervisors on the project location and at least once a week for all workers by SSHO, supervisors, foremen or CDSO’s.

b. Meetings shall be documented, including the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Documentation shall be maintained and copies furnished to the GDA on request.

c. The GDA shall be informed of all scheduled meetings in advance and be invited to attend.

01.B.06 Emergency situations.
a. The employer shall provide training in handling emergency situations that may arise from project activities or equipment operation.

b. All persons who may have occasion to use emergency and rescue or lifesaving equipment shall be familiarized with the equipment location, trained in its proper use, be instructed in its capabilities and limitations, and medically qualified for its use.

01.C Physical Qualifications of Employees.

01.C.01 All persons shall be physically and medically qualified for performing the duties to which they are assigned. Some factors to be considered in making work assignments are strength, endurance, agility, coordination, and visual and hearing acuity.

   a. At a minimum, employees shall meet the physical requirements for specific job tasks and hazards as required by this document, the position, the job description, OSHA guidelines, applicable Department of Transportation (DOT) regulations or applicable U.S. Coast Guard (USCG) requirements.

   b. Medical documentation shall be recorded using applicable medical screening and/or medical history and examination forms and shall be maintained in accordance with 5 CFR 293 and Privacy Act requirements.

01.C.02 While on duty, employees shall not use or be under the influence of alcohol, narcotics, intoxicants, or similar performance or mind-altering substances.

   a. Contractors shall enforce the drug-free workplace requirements. Employees found to be under the influence of or consuming such substances will be immediately removed from the job site.

   b. Any employee under a physician’s treatment and taking prescribed narcotics or any medication that may prevent one being ready, willing and able to safely perform position duties shall provide a medical clearance statement to his supervisor.

01.C.03 Operators of any equipment or vehicle shall be able to read and understand the signs, signals, and operating instructions in use.

01.D Mishap Reporting and Investigation.

01.D.01 A mishap is any unplanned, undesired event that occurs during the course of work being performed. The term “mishap” includes accidents, incidents and near misses. > See Appendix Q and reporting thresholds and criteria in Section 01.D.03.
01.D.02 All mishaps occurring incidentally to an operation, project, or facility for which this manual is applicable shall be reported, investigated and analyzed as prescribed below and in accordance with ER 385-1-99.

  a. Employees are responsible for reporting ALL mishaps immediately to their employer or supervisor.

  b. Employers and supervisors are responsible for reporting all recordable mishaps to
the GDA within 24-hours after notification from the affected employee. > See also
immediate notification requirements in Sections 01.D.04 and 01.D.05.

  c. No supervisor may decline to accept a report of an mishap from a
subordinate.

01.D.03 In addition to the reporting requirements identified above, the employer is required
to report:

  a. Property damage (exceeding $5,000 is recordable);

  b. Days Away Injuries;

  c. Days Away Illnesses;

  d. Restricted/Transfer Injuries.

01.D.04 Boards of Investigation. Any accident that has, or appears to have, any of the
consequences listed below shall be immediately reported to the GDA. These accidents
shall be investigated in depth to identify all causes and to recommend hazard control
measures. The GDA shall immediately notify the SOHO when any of these occurs and
subsequently follow-up with official accident reports as prescribed by regulation. a. Fatal
injury/illness;

  b. Permanent totally disabling injury/illness;

  c. Permanent partial disabling injury/illness;

  d. One (1) or more persons hospitalized as inpatients as a result of a single
occurrence;

  e. $500,000 or greater accidental property damage;

  f. Three (3) or more individuals become ill or have a medical condition which is
suspected to be related to a site condition, or a hazardous or toxic agent on the site;
g. USACE aircraft destroyed or missing;

h. Contractors are responsible for notifying OSHA in accordance with 29 CFR 1904.39 within 8-hours when their employee(s) is fatally injured or 1 or more persons are hospitalized as inpatients as a result of a single occurrence.

01.D.05 In addition to the above, any mishap occurring in any of the following high hazard areas shall be immediately reported to the GDA. These mishaps shall be investigated in depth to identify all causes and to recommend hazard control measures. The GDA shall immediately notify the local SOHO when any one of these occurs and subsequently followup with official reports as prescribed by regulation. HQUSACE-SO must also be notified immediately (within 24-hours) and provided follow-up investigative findings within 10-days of occurrence.

a. Electrical – to include Arc Flash, electrical shock, etc.;

b. Uncontrolled Release of Hazardous Energy (includes electrical and non-electrical);

c. Load Handling Equipment (LHE) or Rigging;

d. Fall-from-Height (any level other than same surface), and

e. Underwater Diving.

➢ Note: The reporting and associated investigation of these mishaps is considered a leading indicator. As such, this information is to be used for data collection, data trending and correction of hazards or program deficiencies before they result in an accident. To encourage reporting of these mishaps, for the betterment of all, this data is NOT to be used for any other reason. ➢ See Appendix Q for “Mishap” definitions.

01.D.06 Except for rescue and emergency measures, the mishap scene shall not be disturbed until it has been released by the investigating official.

01.D.07 The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. The Contractor shall assist and cooperate fully with the GDA conducting the Government investigation(s) of any mishap.

01.D.08 Records of all first aid treatments shall be maintained and submitted to the GDA upon request.

a. Records shall include, at a minimum, employee’s name, job title, date and type of
mishap, causes and corrective actions taken (i.e., AHA review, process changes, establishment of controls, personnel qualifications and training, etc.).

b. This data shall be reviewed and analyzed by the SSHO and/or SOHO for corrective action as appropriate.

01.E Emergency Planning.

01.E.01 Emergency Plans to ensure employee safety in case of fire, inclement weather or other emergency shall be prepared, in writing, and reviewed with all affected employees. Emergency plans shall be tested to ensure their effectiveness.

a. Plans shall include escape procedures and routes, critical plant operations, employee accounting following an emergency evacuation, rescue and medical duties, means of reporting emergencies, and persons to be contacted for information or clarification.

b. On-site emergency planning shall be integrated with off-site emergency support. Documentation of specific on-site emergency services shall be made and may include written agreements, memoranda for record, telephone conversation logs, etc. The emergency services provider should be offered an on-site orientation of the project and associated hazards.

c. The SSHO or designated on-site personnel, shall be responsible for checking the weather conditions at a minimum of twice a day.

d. The employer’s APP or Project SOH Plan shall include a discussion of:

(1) Severe weather triggers to alert the SSHO to monitor weather conditions continuously;

(2) Training on severe weather precautions and actions;

(3) Identified area of retreat, or other actions to be taken such as evacuation, work delay, etc.

(4) If lightning is observed, all Load Handling Equipment (LHE), drill rigs, work on elevated platforms or scaffolding, roofing activities, tree trimming activities, pole climbing activities, or work in open areas shall stop. A determination shall be made as to the proximity to the operation being performed. Once lightning is seen, count the number of
seconds until you hear the thunder. Divide number of seconds by 5 to get the distance the lightning is away from you. If lightning is 10-miles away or less, work should stop until 30 minutes after the last audible thunder or visible flash of lightning.

(5) For floating plant, boats, and marine activities, the APP shall address securing the vessel and evacuation of personnel during severe weather. > See Sections 19.A.03 and 19.A.04.

01.E.02 Planning for any operation shall include the total system response capabilities to minimize the consequences of accidents or natural disaster and shall consider communications, rescue, first aid, medical, emergency response, emergency equipment, and training requirements.

01.E.03 The number of persons permitted in any location shall correspond to rescue and escape capabilities and limitations.

01.E.04 Emergency alert systems shall be developed, tested, and used to alert all persons likely to be affected by existing or imminent disaster conditions and to alert and summon emergency responders.

01.E.05 Emergency telephone numbers and reporting instructions for ambulance, physician, hospital, fire, and police shall be clearly communicated to all employees, conspicuously and clearly posted at the work site.

01.E.06 Employees working alone in a remote location or away from other workers shall be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means).

a. The selected communication shall be readily available (easily within the immediate reach) of the employee and shall be tested prior to the start of work to verify that it effectively operates in the area/environment.

b. An employee check-in/check-out communication procedure shall be developed to ensure employee safety.

01.F Emergency Operations. In addition to the other pertinent parts of this manual, Civil Disaster Emergency Operations for floods, earthquakes, hurricanes and other natural disasters shall be conducted in accordance with this manual, generally and with Appendix B specifically, for both USACE and Contractor activities.
01.G Explosives Activities and Operations.

a. The requirements for the safe use, storage and transportation of commercial explosives on non-military lands/installations are found in Section 29 of this manual.

b. The requirements for the safe use, storage and transportation of commercial explosives on military lands/installations, are found in EM 385-1-97, Explosives Safety and Health Requirements Manual.

c. For all work performed under USACE activities and operations dealing with ammunition and explosives (military munitions), refer to EM 385-1-97.
STUDY QUESTIONS

1. The provisions of this manual implement and supplement the safety and health standards and requirements contained in 29 CFR 1910, 29 CFR 1926, 29 CFR 1960, EO 12196, FAR Clause 52.236.13, DODI 6055.1, AR 40-5, and AR 385-10. Where more stringent safety and occupational health standards are set forth in these requirements and regulations, ____________.
   a. COE-385-1-1 will apply
   b. 29 CFR 1910 will apply
   c. 29 CFR 1926 will apply
   d. the more stringent shall apply

2. For limited scope supply, service and R&D contracts, the Contracting Officer:
   a. doesn't need to worry about safety.
   b. may not change the contract safety requirements.
   c. may authorize an abbreviated APP.
   d. may combine contracts.

3. Frequent inspections/audits by a Competent Person of the work sites, material, and equipment will be done to ensure compliance with the APP and the EM385. These inspections/audits will be documented to include:
   a. the name of the inspector.
   b. the date.
   c. all findings.
   d. all of the above.

4. Before beginning each work activity, task, or DFOW, the contractor performing that work activity shall prepare the ____________.
   a. Preparatory Phase Checklist
   b. APP
   c. initial AHA
   d. Demolition Plan

5. The AHA will be continuously reviewed and modified as necessary to address ____________.
   a. changing site conditions
   b. changing operations
   c. change of competent/qualified person(s)
   d. all of the above
6. The SSHO(s), as a minimum, must have completed __________ or equivalent.
   a. 10-hour OSHA training
   b. 30-hour OSHA construction training class
   c. STS certification
   d. High school

7. In addition to the training requirements, the SSHO is also required to have proof of employment for: (1) Five (5) years of continuous construction safety experience, or (2) Five (5) years of continuous general industry safety experience, or (3) If the SSHO has a Third-party, Nationally accredited SOH-related certification, only four (4) years of experience is needed.
   a. True
   b. False

8. All training will be documented in writing, to include the date, name, content, and __________.
   a. Trainer.
   b. Test scores.
   c. Certificates issued.
   d. Weather.

9. Contractors are responsible for notifying OSHA in accordance with 29 CFR 1904.39 within 8-hours when their employee(s) is:
   a. Fatally injured
   b. 1 or more persons are hospitalized
   c. Both a and b
   d. Contractors are not required to notify OSHA

10. In areas with frequent inclement weather, the APP shall include discussion of:
    a. Severe weather triggers to alert the SSHO to monitor weather triggers.
    b. Training on severe weather precautions and actions.
    c. Identified area of retreat, preferably a substantial building.
    d. All of the above.
11. Employees working in a remote location or away from other workers shall be provided:

   a. an effective means of emergency communications.
   b. a box lunch.
   c. a vehicle at their disposal.
   d. a map.
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SECTION 2
Sanitation

02.A General. Employers shall establish and maintain hygienic sanitation provisions for all employees in all places of employment as specified in the following paragraphs.

02.B Housekeeping.

02.B.01 Places of employment shall be kept as clean as possible, taking into consideration the nature of the work. Regular cleaning shall be conducted in order to maintain safe and sanitary conditions in the workplace.

   a. Periodic sanitation inspections of food preparation areas (kitchens and dining facilities) shall be conducted at least weekly and documented.

   b. In workplaces where toxic dusts, fumes, or mists are generated, all surfaces in the work area and adjacent common use areas shall be cleaned in accordance with a written Housekeeping Plan based on the frequency and quantity of toxic material generation.

02.B.02 The floor of every workroom shall be kept as dry as possible. Drainage shall be maintained where wet processes are used, and false floors, platforms, mats, or other dry standing places shall be provided, when possible. Appropriate footwear shall also be provided.

02.B.03 To facilitate cleaning, every floor, working place, and passageway shall be kept free from protruding nails, splinters, loose boards, clutter and unnecessary holes and openings.

02.C Drinking Water.

02.C.01 An adequate supply of potable water shall be provided in all places of employment, for both drinking and personal cleansing.

   a. Drinking water shall be provided, whenever possible, from a local municipal water supply that is in compliance with federal, state, and local drinking water standards.

   b. When drinking water is obtained from an on-site well, the water shall be tested and the system supplied in accordance with the Safety Drinking Water Act, 40 CFR 141-143, and any state or local drinking water regulations.
c. If water is not available from a local municipal water supply or on-site well, a temporary potable water system shall be provided from a licensed drinking water source.

d. Outside the Continental United States (OCONUS), drinking water at military fixed facilities shall be provided in compliance with country-specific Final Governing Standards (FGS). In the absence of FGS, the National Primary Drinking Water Regulations (NPDWR) as outlined in the Overseas Environmental Baseline Guidance Document (OEBGD), Department of Defense Instruction (DODI) 4715.5-G shall be followed. In addition, sanitary control and surveillance of water supplies and chlorination and fluoridation shall be conducted according to applicable Department of Defense (DoD) Component guidelines, or if more stringent, the host nation requirements.

e. Drinking water on all Army floating vessels shall be provided according to 40 CFR 141 and Chapter 6 of Navy Medical (NAVMED) P-5010. Drinking water and water for washing on all Army floating vessels shall be provided from a potable water source which meets the federal and state requirements or, if generated on the vessel, shall be tested and shall meet the federal and state drinking water requirements.

   (1) All hoses, pumps, and valves, shall be dedicated to potable drinking water only and shall be rinsed before each use.

   (2) Before connecting at shore side, the supply water should be flushed for 30 seconds.

   (3) After transfer is complete, the vessel hose shall be removed first, then the shore side hose removed, and the supply source shall be flushed again and capped.

   (4) Drain all hoses, pumps, and valves after each use.

   (5) Storage tanks on vessels shall be either chemically or mechanically disinfected when the water fails to meet two consecutive drinking water tests.

02.C.02 Cool drinking water shall be provided during hot weather.

02.C.03 Only approved potable water systems may be used for the distribution of drinking water. Construction trailers and other temporary or semi-permanent facilities shall be properly connected to the local municipal water supply unless the remoteness of the location makes this prohibitive. When unable to connect to the municipal supply, temporary potable water systems shall be utilized and the services provided by a licensed potable water contractor. “Reclaimed water” (treated wastewater) use in potable systems is strictly prohibited.

02.C.04 Drinking water shall be dispensed by means that prevent contamination between the consumer and the source.
02.C.05 Portable drinking water dispensers shall be designed, constructed, and serviced to ensure sanitary conditions, shall be capable of being closed and shall have a tap. Any container used to distribute drinking water shall be clearly marked “DRINKING WATER” and may not be used for other purposes.

02.C.06 Open containers (i.e., barrels, pails, or tanks) or any container (with or without a fitted cover) from which the water is dipped or poured are prohibited for drinking water. Lid shall remain on a container except when being sanitized, washed or filled.

02.C.07 Fountain dispensers shall have a guarded orifice.

02.C.08 Use of a common cup (a cup shared by more than one worker) and other common utensils is prohibited. Employees shall use cups when drinking from portable water coolers/containers. Unused disposable cups shall be kept in sanitary containers and a waste receptacle shall be provided for used cups.

02.C.09 Potable drinking water dispensers shall only contain drinking water and shall not be used to store or cool drinks or food or other items.

02.C.10 All potable wells intended for drinking water or human contact shall include appropriate wellhead protection to ensure sanitary quality. Wellhead protection shall include methods or accessories to prevent fecal contamination, insect infestation, and deliberate human actions that might jeopardize the quantity and quality of the water supply.

02.D Non-Potable Water.

02.D.01 Outlets dispensing non-potable water shall be conspicuously posted "CAUTION - WATER UNSAFE FOR DRINKING, WASHING, OR COOKING". Outlets dispensing non-potable water at Corps Dumping Stations within campgrounds may, in lieu of this requirement, be posted in accordance with USACE’s Engineering Pamphlet (EP) 310-1-6A and EP 310-1-6B.

02.D.02 There shall not be any cross-connection, open or potential, between a system furnishing potable water and a system furnishing non-potable water.

02.D.03 Non-potable water may be used for cleaning work areas, except food processing and preparation areas and personal service rooms, provided this non-potable water does not contain concentrations of chemicals, fecal coliform or other substances which could create unsanitary conditions or be harmful to employees.

02.E Toilets.

02.E.01 General. Toilets shall be present in all places of employment and shall contain the following:
Exception: The requirements below do not apply to mobile crews or to normally unattended work locations if employees working at these locations have transportation readily available to nearby toilet and/or washing facilities which meet the other requirements of this paragraph.

a. Separate toilet facilities, in toilet rooms provided for each sex shall be provided in all places of employment according to Table 2-1. Separate toilet rooms for each sex need not be provided if toilet rooms can only be occupied by one person at a time, can be locked from the inside and contain at least one toilet seat (where such single-occupancy rooms have more than one commode, only one commode in each toilet room may be counted);

b. Hot and cold running water, or tepid running water [tepid water is 60°F - 100°F (15.5°C - 37.8°C)]

c. Hand soap or similar cleansing agents shall be provided;

d. Individual disposable paper towels or warm air blowers designed for hand-drying, convenient to the lavatories;

e. An adequate supply of toilet paper and a holder for each seat;

f. Contained within an individual compartment and equipped with a door and separated from other toilet fixtures by walls or partitions sufficiently high to ensure privacy;

g. Adequate interior lighting;

h. Washing and toilet facilities shall be cleaned regularly and maintained in good order;

i. Each commode shall be equipped with a toilet seat and toilet seat cover. Each toilet facility - except those specifically designed and designated for females - shall be equipped with a metal, plastic or porcelain urinal trough; and

j. Adequate ventilation. All windows and vents shall be screened; seat boxes shall be vented to the outside [minimum vent size 4 in (10.1 cm)] with vent intake located 1 in (2.5 cm) below the seat.

02.E.02 Construction Sites. Toilet facilities on construction sites shall be provided as follows (the requirements of this subsection do not apply to mobile crews or to normally unattended work locations if employees working at these locations have transportation immediately available to nearby toilet facilities):

a. Where sanitary sewers are not available, job sites shall be provided with chemical toilets, re-circulating toilets, or combustion toilets unless prohibited by state/local codes;
b. Each toilet facility shall be equipped with a toilet seat and toilet seat cover. Each toilet facility - except those specifically designed and designated for females - shall be equipped with a metal, plastic, or porcelain urinal trough. All shall be provided with an adequate supply of toilet paper and a holder for each seat;

TABLE 2-1

<table>
<thead>
<tr>
<th>Number of employees</th>
<th>Minimum number of Toilets(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 15</td>
<td>One (1)</td>
</tr>
<tr>
<td>16 to 35</td>
<td>Two (2)</td>
</tr>
<tr>
<td>36 to 55</td>
<td>Three (3)</td>
</tr>
<tr>
<td>56 to 80</td>
<td>Four (4)</td>
</tr>
<tr>
<td>81 to 110</td>
<td>Five (5)</td>
</tr>
<tr>
<td>111 to 150</td>
<td>Six (6)</td>
</tr>
<tr>
<td>Over 150</td>
<td>Refer to Note (^2)</td>
</tr>
</tbody>
</table>

Note:
\(^1\)Where toilet facilities will not be used by women, urinals may be provided instead of commodes, except that the number of commodes in such cases shall not be reduced to fewer than 2/3 of the minimum number specified.
\(^2\)One additional toilet fixture for each additional 40 employees.

c. Toilets shall be provided for each sex according to Table 2-2. Separate toilet rooms for each sex need not be provided if toilet rooms can only be occupied by one person at a time, can be locked from the inside and contain at least one toilet seat;

d. Where it is not practical to provide running water, hand sanitizers may be used as a substitute for running water. Hand sanitizers must contain at least 60% ethyl alcohol as its active ingredient and workers shall be trained to properly use the sanitizer.

e. Toilet facilities shall be constructed so that the occupants are protected against weather and falling objects; all cracks shall be sealed; the door shall be tight-fitting, self-closing, and capable of being latched from the inside;

f. Adequate ventilation shall be provided; all windows and vents shall be screened; seat boxes shall be vented to the outside [minimum vent size 4 in (10.1 cm)] with vent intake located 1 in (2.5 cm) below the seat;

g. Toilet facilities shall be constructed so that the interior is lighted; and
h. Provisions for routinely servicing and cleaning all toilets and disposing of the sewage shall be established before placing toilet facilities into operation. The method of sewage disposal and the placement location selected shall be in accordance with Federal, state, and local health regulations.

**TABLE 2-2**

Minimum Toilet Facilities
(Construction Sites)

<table>
<thead>
<tr>
<th>Number of employees</th>
<th>Minimum number of Toilets¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 or fewer</td>
<td>One (1)</td>
</tr>
<tr>
<td>20 or greater</td>
<td>One (1) toilet seat and</td>
</tr>
<tr>
<td></td>
<td>One (1) urinal per 40 workers.</td>
</tr>
<tr>
<td>200 or greater</td>
<td>One (1) toilet seat and</td>
</tr>
<tr>
<td></td>
<td>One (1) urinal per 50 workers.</td>
</tr>
</tbody>
</table>

Note: ¹Where toilet facilities will not be used by women, urinals may be provided instead of commodes, except that the number of commodes in such cases shall not be reduced to fewer than 2/3 of the minimum number specified.

02.E.03 Employees working in temporary field conditions, in mobile crews or in normally unattended work locations shall be provided at least one toilet facility unless transportation to nearby toilet facilities is readily available.

02.F Washing Facilities.

02.F.01 Washing facilities shall be provided at toilet facilities and as needed to maintain healthful and sanitary conditions.

02.F.02 Each washing facility shall be maintained in a sanitary condition and provided with water from an approved potable water supply. Water shall be either hot and cold or tepid running water. Soap and either individual disposable paper towels or warm air blowers designed for hand-drying shall be provided. If impractical to provide running water, hand sanitizer and individual disposable paper towels may be used.

02.F.03 Washing facilities shall be in close proximity to the worksite.

02.G Showers.

02.G.01 Washing facilities for persons engaged in application of paints, coatings, herbicides, insecticides, or other operations where contaminants may be harmful shall be at or near the work site and shall be equipped to enable employees to remove such substances.
02.G.02 Whenever showers are required by a particular standard, the showers shall be provided in accordance with the following:

a. One shower shall be provided for every ten employees (or fraction thereof) of each sex, who are required to shower during the same shift;

b. Body soap or other appropriate cleansing agents for the showers shall be provided;

c. Showers shall be equipped with hot and cold water from an approved potable water supply feeding a common discharge line; and

d. Employees who use showers shall be provided with individual clean towels.

02.H Changing Rooms. Whenever employees are required by a particular standard to wear protective clothing, changing rooms shall be equipped with separate storage facilities for both street clothes and protective clothing.

02.I Laundry of Work Clothing. If non-disposable work clothing provided by the employer becomes contaminated, provisions shall be made to ensure clothing is laundered and decontaminated by the employee prior to reuse. Employees shall not wear contaminated clothing when leaving the worksite. If contaminated work clothing is taken to a commercial laundry, the laundry representative must be advised of the potential contaminants on the clothing.

02.J Food Service.

02.J.01 All USACE food service facilities and facilities operated under USACE contracts, including galleys aboard vessels, shall be compliant with the US Public Health Service (USPHS) Food and Drug Administration (FDA) Food Code.

02.J.02 All employee food service facilities and operations shall be conducted in accordance with sound hygienic principles.

02.J.03 In places of employment where all or part of the food service is provided, the food dispensed shall be wholesome, free from spoilage, and shall be processed, prepared, handled, and stored in such a manner as to be protected against contamination.

02.J.04 No employee may be allowed to consume food or beverages in a toilet room or in any area exposed to a toxic material.

02.J.05 No food or beverages may be stored in toilet rooms or in an area exposed to a toxic material.
02.J.06 Food handlers are not required to have a general medical exam, but must obtain a statement from a licensed physician, physician’s assistant, or nurse practitioner attesting that they are free of communicable diseases. Food handlers shall complete at least 8 hours of food service sanitation training annually.

02.J.07 All USACE food service facilities and facilities operated under USACE contracts, including galleys aboard vessels, shall be inspected for compliance with the USPHS FDA Food Code at least semi-annually.


02.K.01 An adequate number of waste receptacles shall be provided in a food service area and used for the disposal of waste food. Receptacles shall be constructed of smooth, corrosion-resistant, easily cleanable, or disposable materials, provided with solid tight-fitting covers, emptied at least daily and maintained in a sanitary condition.

02.K.02 Receptacles used for putrescible solid or liquid waste or refuse shall be constructed in order to prevent leakage and to allow thorough cleaning and sanitary maintenance. Such receptacles shall be equipped with solid tight-fitting covers, unless they can be maintained in sanitary conditions without covers.

02.K.03 All sweepings, solid or liquid wastes, refuse, and garbage shall be removed in a manner which avoids creating a menace to health and should be discarded as often as necessary or appropriate to maintain sanitary conditions in the place of employment.

02.L Vermin Control.

02.L.01 Every enclosed workplace shall be constructed, equipped, and maintained, as practicable as possible, in order to prevent the entrance or harborage of rodents, insects, or other vermin.

02.L.02 A continuing and effective extermination program shall be instituted when the presence of vermin is detected. The use of licensed exterminators/pest control personnel is required.
STUDY QUESTIONS

1. Outlets dispensing non-potable water shall:
   a. have a conspicuously posted Caution sign.
   b. not be allowed on Government construction sites.
   c. have a failsafe lock.
   d. be no larger than one inch in diameter.

2. Open containers such as barrels, pails, or tanks, may be used for drinking water if properly sterilized.
   a. True
   b. False

3. Reclaimed water (treated wastewater) used in potable systems is _____.
   a. permitted when properly labeled
   b. permitted only when approved by the APP
   c. strictly prohibited
   d. prohibited unless no other means is available to obtain drinking water

4. Open containers such as barrels, pails, or tanks, or any container from which the water is dipped or poured may be permitted for drinking water when tested.
   a. True
   b. False

5. No employee may be allowed to consume food or beverages _____.
   a. outdoors on the worksite
   b. in any area exposed to a toxic material
   c. in rooms containing cleaning supplies
   d. in offices or meeting rooms
Section 3
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Medical and First Aid

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SECTION 3
Medical and First Aid

03.A General.

03.A.01 Prior to the start of work by a contractor and for all USACE locations, arrangements shall be made for medical facilities and personnel to provide prompt attention to injured employees. For work or tasks with a high or extremely high risk assessment code (RAC) on the Activity Hazard Analysis (AHA), the arrangements with the medical facility shall be confirmed in writing. > See Sections 01.A.14 and 01.A.15.

a. An effective means of communication (i.e., hard-wired or cellular telephone, two-way radio, etc.) with #911 access or other emergency response source, and transportation to effectively care for injured workers shall be provided. Communication devices shall be tested in the area of use to assure functionality.

b. The telephone numbers of physicians, hospitals, or ambulances shall be conspicuously posted, at a minimum, on the safety bulletin board and near the on-site project office telephones. Medical facilities and personnel expected to treat injured employees shall be informed of the nature of the work to be performed and the injuries/illnesses prevalent on such job sites. Depending on the scope and size of the job, the GDA may require a formal written agreement.

c. A highly visible map delineating the best route to the nearest medical facility shall be prepared and posted on the safety bulletin board. For mobile field crews, it shall be readily available.

03.A.02 First aid and cardiopulmonary resuscitation (CPR) availability.

a. When emergency medical services are not accessible within 5 minutes of work location and there are 2 or more workers at the location, at least 2 employees on each shift shall be qualified to administer first aid and CPR. > Minimum qualifications are listed in Section 03.D.

b. For job sites with more than 100 employees on one shift, a list of qualified individuals shall be maintained by the site security personnel and in the site trailer. > Minimum qualifications are listed in Section 03.D.

c. Training and Retraining. First aid attendants shall hold current certification in first aid and CPR from the American Red Cross (ARC), the American Heart Association (AHA), or from an organization whose training adheres to the standards of the International Liaison Committee on Resuscitation (as stated in writing), or from a Licensed Physician.
(1) All classes shall contain a hands-on component that cannot be taken online.

(2) The certificate(s) shall state the date of issue and length of validity.

(3) All first aid and CPR attendants shall be retrained every 2 years.

d. Individuals who are required to work alone in remote areas shall be trained in first aid and shall be provided with an effective means of communication to call for assistance in the event of an emergency.

03.A.03 First aid and medical facility requirements.

a. All projects, activities, or contracts (USACE or contractor operated), for which fewer than 100 persons are employed (greatest total number of employees on a shift) at the site of the work, and where neither a first aid station nor a health clinic is available or the site is more than 5 minutes from a hospital, medical clinic, or doctors’ office which has agreed to provide emergency medical support, shall be provided with a first aid kit complying with the criteria contained in ANSI Z308.1.

(1) There shall be one first aid kit for every 25 (or fewer) employees.

(2) In addition to the basic fill requirements of the first aid kit, the contractor or local USACE Safety and Occupational Health Office (SOHO), in consultation with a health care professional, shall evaluate the hazards found in the work environment to determine the necessity of optional fill contents.

b. All projects, activities, or contracts (USACE or contractor operated) for which more than 99 and fewer than 300 persons are employed (greatest total number of employees on a shift) at the site of the work, shall establish and equip a first aid station (per Section 03.C). In non-rural locations, the use of a medical clinic, hospital, or doctor’s office, that has agreed to provide emergency medical support and is accessible within 5 minutes of the work location, may be approved instead of a first aid station, provided at least two employees per shift are CPR qualified as defined in 03.A.02.c and a first aid kit complying with the criteria contained in ANSI Z308.1 is available.

c. Where tunnels are being excavated, a first aid station and transportation facilities shall be provided so that treatment is available within 5 minutes of the occurrence of an injury.

d. All medium, high, or extremely high risk operations, projects, activities, or contracts (USACE or contractor operated) for which 300 or more persons are employed (greatest total number of employees on a shift) at the site of the work shall establish and equip, as directed by a licensed physician, a health clinic. Requirements for health clinics are in Section 03.C.
e. All locations where the work efforts are primarily administrative, such as a district or regulatory office, shall have either: an accessible, staffed infirmary in the building or a medical clinic, hospital, or doctors' office that has agreed to provide emergency medical support and is accessible within 5 minutes. If an outside emergency medical clinic, hospital, or doctor's office is used, the location shall also have a minimum of 2 employees on each shift qualified to administer first aid and CPR and are trained according to Section 03.A.02.c. The work location shall also have several first aid kits meeting the requirements of this document.

03.A.04 Should work activities present any potential exposure (of any part of the body) to toxic or corrosive materials, drenching and/or flushing facilities shall be provided in the work area for immediate emergency use. > See Section 06.B.

03.A.05 Blood-Borne Pathogen (BBP) Program. Employees designated as responsible for rendering first aid or medical assistance shall be included in their employer's BBP program in accordance with 29 CFR 1910.1030 and shall:

a. Be instructed in the sources, hazards, and avoidance of BBPs and be provided the training specified in 29 CFR 1910.1030;

b. Be provided with, and shall use and maintain, PPE (i.e., breathing barrier, latex-free gloves, gowns, masks, eye protectors, and/or resuscitation equipment) when appropriate for rendering first aid or other medical assistance to prevent contact with blood or other potentially infectious materials;

c. Institute a site-specific BBP program to include a site-specific Exposure Control Plan with provisions for engineering and administrative controls, Hepatitis B vaccination, PPE, training, recordkeeping, and a Post-Exposure Control Plan in the event of a blood-borne exposure. Post-exposure protocol shall include a plan to ensure immediate medical evaluation of exposed individual(s) per current recommendations of the Center for Disease Control (CDC) for human immunodeficiency virus (HIV), Hepatitis B virus (HBV), and Hepatitis C virus (HCV).

03.A.06 Prior to the start of work outside the employee’s normal geographical area, the employer shall inform employees of parasitic, bacterial, viral and environmental diseases endemic to the geographical work location (i.e., Lyme Disease, West Nile Virus, Hantavirus, Histoplasmosis, Rocky-Mountain Spotted Fever, Dengue Fever, Malaria, etc.)

a. For guidance on the potential biological and environmental diseases in the work location, the employer shall consult the CDC Travel webpage, U.S. Army Public Health Command – Institute of Public Health web site, and the health department in the local area.
b. Information to be provided to the employee traveling in areas where such diseases are endemic shall include:

(1) Modes of disease transmission;

(2) Specific health risks associated with the disease;

(3) Preventive measures such as available vaccines and PPE (gloves, eye and skin protection, respirator);

(4) Appropriate work practices to prevent contact with infected agents (bird/rodent droppings, etc.), such as watering areas prior to dust-generating activities;

(5) Vaccine information, to include information on the effectiveness, risk, and availability;

(6) Safe removal of source where applicable;

(7) Symptom recognition and medical referral.

03.B First Aid Kits.

03.B.01 The performance requirements of the first aid kits shall be based on the storage area location of the first aid kit and shall conform to ANSI/ISEA Z308.1. Content of all first aid kits shall be to the level of training attained by the responders using the first aid kit.

a. Type I kits are intended for use in stationary, indoor settings where the potential for damage of kit supplies due to environmental factors and rough handling is minimal. Type I first aid kits are required to contain the minimum fill in Table 3-1.

b. Type II, Type III, and Type IV first aid kits shall, at a minimum, meet the requirements of the minimum fill in Table 3-1:

(1) Type II kits are for portable indoor settings where the potential for damage of kit supplies due to environmental factors and rough handling is minimal;

(2) Type III kits are for portable use in mobile, indoor and/or outdoor settings where the potential for damage of kit supplies due to environmental factors is not probable (includes general indoor, sheltered outdoor use).

(3) Type IV kits are intended for portable use in mobile industries (i.e., utilities, construction, transportation, armed forces) and/or outdoor settings where the potential for damage of kit supplies due to environmental factors and rough handling is significant.

c. The contents of the first aid kit shall, at a minimum, contain the items detailed in Table 3-1.
d. First aid kits shall be easily accessible to all workers and protected from the weather. The individual contents of the first aid kits shall be kept sterile. First aid kit locations shall be clearly marked and distributed throughout the site(s).

03.B.02 The contents of first aid kits shall be checked by the employer prior to their use on site and at least every 3 months when work is in progress to ensure that they are complete, in good condition, and have not expired.

03.B.03 All employees who work where there is a first aid kit shall receive a tool box training on the content and use of the kit supplies.

03.B.04 Automatic External Defibrillator (AED). The placement of AEDs is optional (except for health clinics, see 03.C.03.d) but highly recommended. The placement of AEDs on the worksite shall be preceded by an assessment of the time and distance to emergency medical services (EMS) and a justification for such equipment. For the ease of use and program maintenance, all AEDs in a location and/or Command should be the same manufacturer and model. For guidance, USACE facilities should refer to Guidelines for Public Access Defibrillation Programs in Federal Facilities (www.foh.dhhs.gov/whatwedo/aed/hhsaed.asp). An AED program shall include, at minimum:

a. Training and Retraining: Workers required to use an AED shall be trained per Section 03.A.02.c. All classes shall contain a hands-on component and cannot be taken online. Training shall be on the same model and manufacturer of AED available in the work area. The certificate(s) shall state the date of issue and length of validity;

b. Licensed Physician direction and oversight;

c. Documented weekly battery and functionality checks;

d. Standard Operating Procedures (SOPs) for placement, maintenance, inspections, and EMS activation;

e. Equipment Maintenance Program based on the manufacturer’s recommendations that, at a minimum, shall include pad replacement (regular and after use) and battery replacement.
TABLE 3-1
Requirements for Basic First Aid Unit Package

<table>
<thead>
<tr>
<th>Unit first aid item</th>
<th>Minimum Size or Volume (metric)</th>
<th>Minimum Size or Volume (US)</th>
<th>Item quantity per unit package</th>
<th>Unit package size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorbent Compress</td>
<td>206 cm$^2$</td>
<td>32 in$^2$</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Adhesive Bandage</td>
<td>2.5 x 7.5 cm</td>
<td>1 x 3 in</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Adhesive Tape</td>
<td>2.3 m</td>
<td>2.5 yd (total)</td>
<td>1 or 2</td>
<td>1 or 2</td>
</tr>
<tr>
<td>Antiseptic Wipe</td>
<td>2.5 x 2.5 cm</td>
<td>1 x 1 in.</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Aspirin, Individually Wrapped</td>
<td>325 mg</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Bandage Compress (2 in-4 in)</td>
<td>5 x 91 cm</td>
<td>2 x 36 in.</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Burn Dressing</td>
<td>10 x 10 cm</td>
<td>4 x 4 in</td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>Burn Treatment</td>
<td>0.9</td>
<td>1/32 fl. Oz.</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Cold Pack</td>
<td>10 x 12.5 cm</td>
<td>4 x 5 in</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>*Combat style Tourniquet with Windlass</td>
<td>95.3 x 3.8</td>
<td>37.5 x 1.5 in. width</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>CPR Breathing Barrier</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Eye Covering, with means of attachment</td>
<td>19 cm$^2$</td>
<td>2.9 in$^2$</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Eye/Skin Wash</td>
<td>118 ml (total)</td>
<td>4 fl. oz total</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>First Aid Guide</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Gloves, latex free</td>
<td>XL</td>
<td>XL</td>
<td>2 pair</td>
<td>1</td>
</tr>
<tr>
<td>Hand Sanitizer</td>
<td>0.9 g</td>
<td>1/32 oz.</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Occlusive Dressing</td>
<td>10.2 x 10.2</td>
<td>4 x 4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Roller Bandage (2 in.)</td>
<td>5 x 366 cm</td>
<td>2 in. x 4 yd.</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Roller Bandage (4 in.)</td>
<td>10 x 366 cm</td>
<td>4 in. x 4 yd.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sterile pad</td>
<td>7.5 x 7.5 cm</td>
<td>3 x 3 in.</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Triangular Bandage</td>
<td>101 x 101 x 14 cm</td>
<td>40 x 40 x 56 in.</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* Required when power tools in use.
03.C First Aid Stations and Health Clinics.

03.C.01 General.

a. For activities requiring a first aid station or a health clinic, the type of facilities and equipment provided shall be determined after consideration is given to the proximity and quality of available medical services. The facilities and equipment shall also be in accordance with the recommendation of a Licensed Physician, Board-Certified and Licensed, Physician’s Assistant (PA-C), or Licensed Nurse Practitioner (LNP). Alternative facilities that provide the quantity and quality of services outlined in this section may be used if recommended by the consulting Licensed Physician, PA-C or LNP.

b. Identification and directional markers shall be used to readily denote the location of all first aid stations and health clinics.

c. Emergency lighting shall be provided for all first aid stations and health clinics.

03.C.02 A certified first aid provider shall be on duty in first aid stations at all hours when work is in progress (except when on emergency calls).

03.C.03 Health Clinics.

a. Health Clinics shall provide privacy, adequate lighting, climate control, adequate toilet facilities, hot and cold water, drainage, and electrical outlets. Walls and ceilings shall be finished with the equivalent of two coats of white paint; windows and doors shall be screened; floors shall be constructed with impervious materials.

b. In remote locations where medical care is not available within 5 minutes, a properly equipped emergency vehicle, helicopter, or mobile first aid unit shall be provided during work hours at sites requiring a health clinic. The emergency vehicle shall not be used for any other purpose, except in the case of a helicopter, which may be used for shift crew changes.

c. A Registered Nurse (RN), a certified Emergency Medical Technician (EMT), Intermediate/Paramedic, or a Licensed Practical Nurse (LPN), with physician oversight, shall be assigned on a full-time basis to each installation requiring a health clinic.

d. Health clinics shall be equipped with an AED.

03.D Personnel Requirements and Qualifications.

03.D.01 All projects, activities, or contracts (USACE or contractor) where work or tasks with a high or extremely high risk assessment code (RAC) exists and which 1,000 persons or more are employed (greatest total number of employees on a shift) shall have the full-time services of a Licensed Physician.
Note: A certified Nationally Registered Emergency Medical Technician (NREMT) Intermediate/Paramedic, RN, LPN, LNP, or a PA-C having direct communication with a Licensed Physician, may be used when a full-time Licensed Physician is not available.

03.D.02 First aid attendants shall hold certification in first aid and CPR training as defined in Section 03.A.02. The certificate(s) shall state the date of issue and length of validity.

03.D.03 First aid attendants, RNs, LPNs, NREMT-Intermediates/Paramedics, LNP and PA-C shall be under the direction of a Licensed Physician.

03.D.04 Military personnel with equivalent qualifications and certifications may be used in lieu of the above personnel.
STUDY QUESTIONS

1. Medical facilities and personnel expected to treat injured employees shall _____.
   a. be informed of the nature of the work to be performed.
   b. be informed of the injuries/illnesses prevalent on such jobsites.
   c. both a & b
   d. have proper insurance coverage.

2. When emergency medical services are not accessible within 5 minutes of work location and there are 2 or more workers at the location, at least 2 employees on each shift shall be qualified to administer:
   a. EMT duties and first responder duties.
   b. First aid and CPR
   c. CPR and EMT duties
   d. First responder duties and first aid

3. A highly visible map delineating the best route to the nearest medical facility shall be prepared and shall be _____.
   a. posted on the safety bulletin board
   b. included in the AHA
   c. located in the cab of each vehicle
   d. appended to the SHMP

4. The best type of ANSI Z308.1 first aid container for an outdoor setting such as a construction site is ______ and should be checked by the employer ______.
   a. Type I; prior to their use on site and monthly
   b. Type III; prior to their use and at least every six weeks
   c. Type IV; prior to their use and bi-weekly
   d. Type III or Type IV; prior to their use on site and at least every three months

5. For activities requiring a first aid station or a health clinic, the type of facilities and equipment provided shall be determined after consideration is given to:
   a. The duration of the construction project.
   b. The degree of risk as determined by the initial AHA.
   c. The proximity and quality of available medical services.
   d. The type and nature of the construction project.
### Section 4
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<tr>
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</tbody>
</table>
SECTION 4
Temporary Facilities

04.A General.

04.A.01 Plans for the layout of temporary construction buildings, facilities, fencing, access routes and anchoring systems for temporary structures shall be submitted to and approved by the GDA. > See Section 09.A.18 for temporary building spacing requirements; Section 11 for temporary power distribution approval requirements; Section 24 for temporary ramp, trestle, scaffold, and platform approval requirements.

04.A.02 The design and construction of temporary structures shall consider the following loadings. > See American Society of Civil Engineers (ASCE) 7-10, Minimum Design Loads for Buildings and Other Structures:

- a. Dead and live loads;
- b. Soil and hydrostatic pressures;
- c. Wind loads;
- d. Rain and snow loads;
- e. Flood and ice loads, and
- f. Seismic forces.

04.A.03 Trailers and other temporary structures used as field offices, as personnel housing, or for storage shall be anchored with rods and cables or by steel straps to ground anchors. The anchor system shall be designed to withstand winds and must meet applicable state or local standards for anchoring mobile trailer homes.

04.A.04 Fencing and warning signs.

- a. Temporary project fencing (or a substitute acceptable to the GDA and delineated in the APP) shall be provided on all projects located in areas of active use by members of the public, including those areas in close proximity to family housing areas and/or school facilities.

- b. Fencing shall extend from grade to a minimum of 4 ft (1.2 m) above grade and shall have a maximum mesh size of 2 in (5 cm). Fencing shall remain
rigid/taut with a minimum of 200 lbs (.9 kN) of force exerted on it from any direction with less than 4 in (10 cm) of deflection.

c. Signs warning of the presence of construction hazards and requiring unauthorized persons to keep out of the construction area shall be posted on the fencing. At minimum, signs shall be posted every 150 ft (45.7 m). Fenced sides of projects that are less than 150 ft shall, at minimum, have at least one warning sign. > See also Section 8.

d. Depending upon the nature and location of the project site, the GDA may determine that fencing is not required. This will be based on a risk analysis of public exposure and other project specific considerations, and will be included in the applicable AHA. In those locations where the GDA has determined fencing is not required, signs, warning of construction hazards, shall be conspicuously posted.

04.A.05 Temporary Work Camps (Floating plant excluded). The design and construction of work/labor camps shall be IAW 29 CFR 1910.142.

a. All sites used for temporary work camps shall be adequately drained. They shall not be subject to periodic flooding nor located within 200 ft (61 m) of swamps, pools, sink holes, or other surface collections of water unless adequate mosquito control methods have been implemented. The sites shall be graded, ditched, and rendered free from depressions in which water may become a nuisance.

b. Sites shall be sized to prevent overcrowding of necessary structures.

c. The grounds and open areas surrounding the shelters shall be maintained free of rubbish, debris, waste paper, garbage, or other refuse.

d. Shelters will provide protection from the elements, and each room used for sleeping purposes shall contain at least 55 ft² (5.06 m²) of floor space for each occupant and at least 7 ft-6 in (2.3 m) ceilings. The floor space does not include areas occupied by closets or wall lockers.

e. Beds, cots, or bunks, and suitable storage facilities (such as wall lockers for clothing and personal articles) shall be provided in every room used for sleeping purposes. Beds shall be spaced not closer than 3 ft (1 m) both laterally and end-to-end and shall be elevated at least 1 ft (.3 m) from the floor. Double-decked bunk beds shall be spaced not fewer than 4 ft (1.2 m) both laterally and end-to-end with a minimum space of not fewer than 27 in (68.5 cm) between the upper and lower bunk. Triple deck bunks are prohibited.
f. Floors shall be constructed of wood, asphalt, or concrete. Wooden floors shall be of smooth and tight construction. Floors shall be kept in good repair.

g. All wooden floors shall be elevated not less than 1.5 ft (0.5 m) above the ground level at all points to prevent dampness and permit free circulation of air beneath, and for easier and safer maintenance.

h. Living quarters shall be provided with windows that may be opened for purposes of ventilation.

i. All exterior openings shall be effectively screened with 16-mesh material and screen doors shall be equipped with self-closing devices.

j. Temporary sleeping quarters shall be heated, cooled, ventilated, lighted, and maintained in a clean and safe condition.


04.A.06 Unless otherwise indicated, throughout this manual, lumber dimensions are given in nominal sizes.

04.A.07 Temporary Explosives Storage Areas. Temporary Explosives Storage Areas shall be IAW the EM 385-1-97, Explosives Safety and Health Requirements.


04.B.01 Prior to construction, the Contractor shall provide the GDA with a copy of an Access/Haul Road Plan for review and acceptance. Access/haul roads shall be designed in accordance with current engineering criteria. Work on the haul road shall not commence until the GDA has accepted the plan. The plan shall address the following items:

a. Equipment usage, traffic density and patterns, right-of-way rules, and hours of operation;

b. Road layout and widths, horizontal and vertical curve data, and sight distances; c. Sign and signalperson requirements, road markings, and traffic control devices; d. Drainage controls;

e. Points of contact between vehicles and the public, vehicles and pedestrians, and safety controls at these points;
f. Maintenance requirements, including roadway hardness and smoothness and dust control, and

g. Hazards adjacent to the road (e.g., bodies of water, steep embankments).

04.B.02 No employer shall move, or cause to be moved, any equipment or vehicle upon an access or haul road unless the roadway is constructed and maintained to safely accommodate the movement of the equipment or vehicle involved.

04.B.03 When road levels are above working levels, berms, barricades, or curbs shall be constructed to prevent vehicles overrunning the edge or end of embankment. Berms/curbs shall be constructed to one-half the diameter of the tires of the largest piece of equipment using the roadway.

04.B.04 Roadways shall have a crown and ditches for drainage. Water shall be intercepted before reaching a switch back or large fill and be led off.

04.B.05 Haul roads shall be constructed to widths suitable for safe operation of the equipment at the travel speeds proposed by the Contractor and accepted by the GDA.

04.B.06 All roads, including haul roads, shall be posted with maximum speed limits.

04.B.07 An adequate number of turn-outs shall be provided on single lane roads with two-way traffic. When turn-outs are not practical, the Contractor shall provide a traffic control system to prevent accidents.

04.B.08 Whenever possible, use a right-hand traffic pattern on two-way haul roads.

04.B.09 Curves.

a. All curves shall have open sight lines and as great a radius as practical.

b. Vehicle speed shall be limited on curves so that vehicles can be stopped within one-half the visible distance of the roadway.

c. The design of horizontal curves shall consider vehicle speed, roadway width and surfacing, and super elevation.

04.B.10 Grades.

a. When necessary, based on grade and machine and load weight, machines shall be equipped with retarders to assist in controlling downgrade descent.
b. Access/haul roads should be kept to less than a 10% grade. There should be no more than 400 ft (121.9 m) of grade exceeding 10%.

c. The maximum allowable grade shall not exceed 12% p.p.

04.B.11 Adequate lighting shall be provided. > See Section 7.

04.B.12 Traffic control lights, barricades, road markings, signs, and signalpersons for the safe movement of traffic shall be provided in accordance with the DOT Federal Highway Administration’s “Manual on Uniform Traffic Control Devices” and this Section.

04.B.13 Roadway hardness, smoothness, and dust control shall be used to maintain the safety of the roadway.

04.B.14 All roads shall be maintained in a safe condition and eliminate or control dust, ice, and similar hazards.

04.B.15 The deposition of mud and or other debris on public roads shall be minimized to the extent possible and in accordance with local requirements.

STUDY QUESTIONS

1. Trailers and other temporary structures used as field offices must be:

   a. Anchored to ground anchors.
   b. Designed to withstand winds.
   c. Meet applicable state or local standards.
   d. All of the above.

2. Temporary project fencing shall extend from grade to _______ above grade.

   a. a minimum of 48 inches
   b. a safe distance
   c. no more than 60 inches
   d. a minimum of 6 feet

3. Signs warning of the presence of construction hazards and requiring unauthorized person to keep out shall be posted at every ________ feet of fencing.

   a. 50
   b. 100
   c. 150
   d. 200
4. Depending upon the nature and location of the project site, the GDA may determine that temporary project fencing is not required.

   a. True  
   b. False

5. Work on a haul road shall not commence until ______.

   a. all equipment is in place and in good working order
   b. local environmental impact statement has been completed
   c. the SSHO has approved the engineering plan
   d. the GDA has accepted the Access/Haul Road Plan
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SECTION 5
Personal Protective and Safety Equipment

05.A General.

05.A.01 Responsibilities.

a. The use of personal protective and safety equipment (PPE) is a control measure that is to be used only after a hazard evaluation identifies hazards associated with a particular job or activity, and it is determined that the hazards cannot be eliminated and/or controlled to an acceptable level through engineering design or administrative actions. Utilize process and engineering controls before PPE to protect employees.

b. Based on hazard evaluations conducted by supervisors, employers shall identify and select, and each affected employee shall use PPE that will provide appropriate protection. > See 29 CFR 1910.132.

c. Employers shall communicate PPE decisions to each affected employee. Employees shall use all PPE that may be required to maintain their exposure within acceptable limits.

d. The employer will make all reasonable efforts to accommodate employees with religious beliefs that may conflict with determined PPE requirements. However, when reasonable efforts to accommodate employee’s religious beliefs do not provide the necessary safe working environment (without PPE), then the employee must use the appropriate PPE or the employee will not be allowed to work in the area where the hazard requiring protection exists.

05.A.02 Employees shall be appropriately trained in the use, care, and limitations of all required PPE.

a. Employees must be trained in and shall demonstrate an understanding of the following aspects of PPE prior to use: selection (for specific hazard); donning, doffing and adjusting; limitations and useful life; inspection and testing; and proper care including maintenance, storage and disposal.

b. When the employer has reason to believe that any affected employee who has been trained does not have the understanding and skill required for the use of the PPE, the employer shall make certain that the employee receives the necessary re-training to acquire the appropriate skills.
c. The employer shall verify through written certification that each affected employee has received and understood the required training. The written certification shall identify the name of each employee trained, the date(s) of the training, and the subjects taught.

05.A.03 A copy of the manufacturer’s use, inspection, testing, and maintenance instructions shall be maintained at the job site and be readily available to personnel using the PPE and safety equipment.

05.A.04 PPE shall be tested, inspected, and maintained in a serviceable and sanitary Condition as recommended by the manufacturer.

a. Defective or damaged equipment, or equipment that has exceeded its useful life, shall not be used. It shall be tagged as out of service and/or immediately removed from the work site to prevent use.

b. Previously used PPE must be cleaned, inspected, and repaired as necessary before issuing to another employee.

05.A.05 When employees provide their own PPE, the employer is responsible for assuring its adequacy in protecting against the hazard and its state of repair.

05.A.06 Minimum requirements.

a. Employees shall wear clothing suitable for the weather and work conditions. For fieldwork (e.g., construction sites, industrial operations and maintenance activities, emergency operations, regulatory inspections, etc.), at a minimum, this shall be:

   (1) Short sleeve shirt;

   (2) Long pants (excessively long or baggy pants are prohibited); and

   (3) Leather or other protective work shoes or boots. Open-toed shoes are prohibited. > See Section 5.E.

b. Protective equipment shall be of heat, fire, chemical, and/or electrical-resistive material when conditions require protection against such hazards.

05.A.07 Persons involved in activities that subject the hands to injury (for example, cuts, abrasions, punctures, burns, chemical irritants, toxins, vibration, and forces that can restrict blood flow) shall select and use hand protection appropriate for the hazard in accordance with ANSI/International Safety Equipment Association (ISEA) 105. > See Section 5.H.
05.A.08 Protective leg chaps shall be worn by workers who operate chainsaws. Protective leg chaps must meet the specifications in American Society for Testing and Materials (ASTM) Standard F1897.

05.A.09 For personal fall arrest equipment, including lineman's equipment (electrically rated harnesses), see Section 21.I.05.

05.B Eye and Face Protection.

05.B.01 Persons shall be provided with eye and face protection for the specific jobsite hazards, as listed in Table 5-1, when machines or operations present potential eye or face injury.

   a. Eye and face protection shall meet the requirements of ANSI/American Society of Safety Engineers (ASSE) Z87.1, and bear a legible and permanent "Z87" logo to indicate compliance with the standard.

   b. Eye and face protection shall be distinctly marked to identify manufacturer.

05.B.02 When eye protection is required by this regulation, persons whose vision requires the use of corrective lenses, whether via the use of contact lenses or eyeglasses, shall be protected by one of the following:

   a. Prescription safety glasses providing optical correction and equivalent protection;

   b. Protective glasses with sideshields designed to fit over corrective lenses without disturbing the adjustment of the glasses;

   c. Goggles that can be worn over corrective lenses without disturbing the adjustment of the glasses, or

   d. Goggles that incorporate corrective lenses mounted behind the protective lenses.

05.B.03 Personnel who are considered blind in one eye and are working in other than administrative functions shall wear safety glasses with sideshields at all times.

05.B.04 Operations that require the use of, or exposure to, hot or molten substances (e.g., babbitting, soldering, pouring or casting of hot metals, handling of hot tar, oils, liquids, and molten substances) shall require eye protection, such as goggles with safety lenses and screens for side protection, or face masks, shields, and helmets giving equal protection. Lens mountings shall be able to retain in position all parts of a cracked lens.
05.B.05 Operations that require handling of harmful materials (e.g., acids, caustics, hot liquids, or creosoted materials) and operations where protection from gases, fumes, and liquids is necessary, shall require the wearing of goggles with cups of soft pliable rubber and suitable faceshields, masks, or hoods that cover the head and neck, and other protective clothing appropriate to the hazards involved.

05.B.06 Operations where protection from radiant energy with moderate reduction of visible light is necessary, including welding, cutting, brazing, and soldering, shall require eye and face protection suitable to the type of work, providing protection from all angles of direct exposure, and with lenses of the appropriate shade. > See Table 5.2.

05.B.07 Glare-resistant glasses that comply with ANSI Z80.3 with an ultraviolet A-region (UVA) and ultraviolet B-region (UVB) 99% filtration shall be worn when conditions require protection against glare. When conditions so warrant, polarized lenses shall also be considered.

05.B.08 Tinted or automatically darkening lenses should not be worn when work tasks require the employee to pass often from brightly to dimly lighted areas.
TABLE 5-1
Eye and Face Protector Selection Guide

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Spectacle, No sideshield</td>
</tr>
<tr>
<td>B</td>
<td>Spectacle, Half sideshield</td>
</tr>
<tr>
<td>C</td>
<td>Spectacle, Full sideshield</td>
</tr>
<tr>
<td>D</td>
<td>Spectacle, Detachable sideshield</td>
</tr>
<tr>
<td>E</td>
<td>Spectacle, Non-Removable Lens</td>
</tr>
<tr>
<td>F</td>
<td>Spectacle, Lift Front</td>
</tr>
<tr>
<td>G</td>
<td>Cover Goggle, No Ventilation</td>
</tr>
<tr>
<td>H</td>
<td>Cover Goggle, Indirect Ventilation</td>
</tr>
<tr>
<td>I</td>
<td>Cover Goggle, Direct Ventilation</td>
</tr>
<tr>
<td>J</td>
<td>Cup Goggle, Direct Ventilation</td>
</tr>
<tr>
<td>K</td>
<td>Cup Goggle, Indirect Ventilation</td>
</tr>
<tr>
<td>L</td>
<td>Spectacle, Headband Temple</td>
</tr>
</tbody>
</table>
TABLE 5-1 (Continued)

Eye and Face Protector Selection Guide

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M. Cover Welding</strong></td>
<td><strong>Q. Welding Helmet,</strong></td>
<td><strong>S. Respirator</strong></td>
</tr>
<tr>
<td><strong>Goggle, Indirect</strong></td>
<td><strong>Lift Front</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ventilation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N. Faceshield</strong></td>
<td><strong>O. Welding</strong></td>
<td><strong>T1. Respirator</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Helmet,</strong></td>
<td><strong>T2. Respirator</strong></td>
</tr>
<tr>
<td></td>
<td><strong>hand Hold</strong></td>
<td></td>
</tr>
<tr>
<td><strong>P. Welding Helmet,</strong></td>
<td><strong>R. Respirator</strong></td>
<td><strong>U. Respirator</strong></td>
</tr>
<tr>
<td><strong>Stationary Window</strong></td>
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</table>
### TABLE 5-1 (Continued)

**Eye and Face Protector Selection Guide**

<table>
<thead>
<tr>
<th>IMPACT: Chipping, grinding, machining, masonry work, riveting and sanding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment</strong></td>
</tr>
<tr>
<td>See Note (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HEAT: Furnace operations, pouring, casting, hot dipping, gas cutting, and welding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment</strong></td>
</tr>
<tr>
<td>See Note (1)</td>
</tr>
<tr>
<td>Hot sparks</td>
</tr>
<tr>
<td>Splash from Molten Metals</td>
</tr>
<tr>
<td>High Temperature Exposure</td>
</tr>
<tr>
<td>CHEMICAL: Acid and chemical handling, degreasing, plating</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Assessment</td>
</tr>
<tr>
<td>See Note (1)</td>
</tr>
<tr>
<td>Splash</td>
</tr>
<tr>
<td>Irritating mists</td>
</tr>
</tbody>
</table>

| DUST: Woodworking, buffing, general industry conditions |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Assessment      | Protector Type  | Protectors       | Limitations     | Not Recommended |
| See Note (1)    | G, H, K         | Goggles, eyecup and cover types | Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleaning may be required. |                 |
| Nuisance dust   |                 |                  |                 |                 |

<table>
<thead>
<tr>
<th>OPTICAL RADIATION: Welding: electric arc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
</tr>
<tr>
<td>See Note (1)</td>
</tr>
</tbody>
</table>
NOTES:

(1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards must be provided.
(2) Operations involving heat may also involve optical radiation. Protection from both hazards shall be provided.
(3) Faceshields shall only be worn over primary eye protection.
(4) Filter lenses shall meet the requirements for shade designations in Table 5-2.
(5) Persons whose vision requires the use of prescription (Rx) lenses shall wear either protective devices fitted with prescription (Rx) lenses with sideshields or protective devices designed to be worn over regular prescription (Rx) eyewear.
(6) Wearers of contact lenses shall also be required to wear appropriate covering eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.
(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.
(8) Refer to ANSI/ASSE Z87-1, Section 6.5, Special Purpose Lenses.
(9) Welding helmets or hand shields shall be used only over primary eye protection.
(10) Non-sideshield spectacles are available for frontal protection only.
TABLE 5-2
Required Shades for Filter Lenses/Glasses in Welding, Cutting, Brazing and Soldering

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>SHADE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soldering</td>
<td>2</td>
</tr>
<tr>
<td>Torch Brazing</td>
<td>3 or 4</td>
</tr>
<tr>
<td>Cutting (light) up to 1 in (2.5 cm)</td>
<td>3 or 4</td>
</tr>
<tr>
<td>Cutting (medium) 1 to 6 in (2.5 to 15.2 cm)</td>
<td>4 or 5</td>
</tr>
<tr>
<td>Cutting (heavy) 6 in (15.2 cm) or more</td>
<td>5 or 6</td>
</tr>
<tr>
<td>Gas welding (light) up to 1/8 in (0.3 cm)</td>
<td>4 or 5</td>
</tr>
<tr>
<td>Gas welding (medium) 1/8 to 1/2 in (0.3 to 1.2 cm)</td>
<td>5 or 6</td>
</tr>
<tr>
<td>Gas welding (heavy) 1/2 in (1.2 cm) or more</td>
<td>6 or 8</td>
</tr>
<tr>
<td>Atomic hydrogen welding</td>
<td>10 – 14</td>
</tr>
<tr>
<td>Inert-gas metal-arc welding (nonferrous): 1/16 in to 5/32 in (0.1 to 0.4 cm) electrodes</td>
<td>11</td>
</tr>
<tr>
<td>Inert-gas metal-arc welding (ferrous) - 1/16 to 5/32 in (0.1 to 0.4 cm) electrodes</td>
<td>12</td>
</tr>
<tr>
<td>Shielded metal-arc welding - 1/16 to 5/32 in (0.1 to 0.4 cm) electrodes</td>
<td>10</td>
</tr>
<tr>
<td>Shielded metal-arc welding - 3/16 to 1/4 in (0.4 to 0.6 cm) electrodes</td>
<td>12</td>
</tr>
<tr>
<td>Shielded metal-arc welding - 5/16 to 3/8 in (0.7 to 0.9 cm) electrodes</td>
<td>14</td>
</tr>
<tr>
<td>Carbon arc welding</td>
<td>14</td>
</tr>
<tr>
<td>Plasma arc cutting up to 100 amps</td>
<td>8</td>
</tr>
<tr>
<td>Plasma arc cutting 100 to 200 amps</td>
<td>10</td>
</tr>
<tr>
<td>Plasma arc cutting 200 to 400 amps</td>
<td>12</td>
</tr>
<tr>
<td>Plasma arc cutting greater than 400 amps</td>
<td>14</td>
</tr>
</tbody>
</table>
05.C Hearing Protection and Noise Control.

05.C.01 The employer shall evaluate the workplace for noise hazards initially and regularly during the course of work. When noise hazards are known or expected, the employer shall develop a Hearing Conservation Program that includes identification and assessment of noise hazards and the measures to be taken to protect personnel against them.

a. USACE workplace hearing conservation programs shall comply with the requirements of ER 385-1-89.

b. Contractors programs shall comply with American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) and this manual at a minimum.

05.C.02 Identification of noise hazards.

a. Noise measurements shall be made whenever there is difficulty in communicating at distances greater than 2 ft (0.6 m), upon worker complaint of excessive noise, or whenever hazardous noise levels are suspected.

b. Noise assessments and/or measurements shall be performed and documented when any new facility or new equipment is placed in service and when areas that in the past were not noise hazardous become noise hazardous for any reason.

05.C.03 Assessment of noise hazards.

a. Instruments used to measure noise shall meet or exceed the requirements listed below.

b. For continuous (steady-state) noise and impact (impulse) noise, the instrument settings shall be in accordance with Table 5-3.

c. Dosimeters shall measure the entire employee’s work shift to be considered full-shift sampling.

d. Calibration of noise measuring equipment shall be in accordance with manufacturer’s instructions (USACE refer to ER 385-1-89).

e. Workplaces known or suspected to include hazardous noise will be surveyed initially, annually and whenever site conditions change impacting noise generation.

f. Exposure standards.

(1) For impact (impulse) noise, personnel exposures may not exceed 140 dBA (unweighted) without effective hearing protection devices.
(2) For continuous (steady-state) noise, personnel exposures may not exceed 85 dBA without effective hearing protection devices.

(3) Contractor personnel shall comply with the ACGIH, TLV continuous noise exposure standards, outlined in Table 5-4.

(4) USACE personnel shall refer to ER 385-1-89.

(5) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, the combined effects must be considered. Exposure to different levels for various periods of time shall be computed according to the following formula:

\[ C_0 = \frac{T_1}{L_1} + \frac{T_2}{L_2} + \ldots + \frac{T_x}{L_x} \]

Where:
- \( C_0 \) = combined noise exposure factor;
- \( T \) = the total time of exposure at a specified sound-pressure level (in hours), and
- \( L \) = the total time of exposure permitted at that level (in hours), from Tables 5-2 or 5-3, as appropriate

If the sum exceeds 1, the mixture of exposure periods exceeds the TLV.

05.C.04 Noise controls. Practical engineering or administrative controls shall be considered and implemented when personnel exposed to continuous (steady-state) sound-pressure levels exceeding the limits specified stated above.

a. Engineering controls are the primary means of controlling exposures to excessive noise in the workplace. These controls may include lubrication, isolation, damping, baffles, or other methods.

b. Administrative controls.

(1) Noise-hazardous areas include all areas where the noise values exceed the standards above and shall be posted to indicate the presence of hazardous noise levels and the requirement for hearing protection. Equipment identified as noise hazardous shall be labeled as a noise hazard requiring the use of hearing protection. If noise hazards impact personnel working in adjacent areas, the individuals in the adjacent areas shall be notified of the noise values and offered hearing protection.

(2) If noise exposure to employees cannot be reduced to below the required standard, operating time limits may be imposed.
### TABLE 5-3

Settings for Noise Measuring Equipment

<table>
<thead>
<tr>
<th>Feature</th>
<th>Dosimeter (ACGIH)</th>
<th>Dosimeter (DoD and USACE)*</th>
<th>Type 2 (or better) Sound Level Meter for Continuous Noise (USACE)*</th>
<th>Type 1 Sound Level Meter for Impulse Noise (USACE)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criterion Time</td>
<td>8 hours</td>
<td>8 hours</td>
<td>8 hours</td>
<td>8 hours</td>
</tr>
<tr>
<td>Criterion Level</td>
<td>85 dB</td>
<td>85 dB</td>
<td>85 dB</td>
<td>85 dB</td>
</tr>
<tr>
<td>Weighting</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>Unweighted, linear, or Z</td>
</tr>
<tr>
<td>Peak Weighting</td>
<td>Unweighted</td>
<td>Unweighted, linear, or Z</td>
<td>Unweighted, linear, or Z</td>
<td>Unweighted, linear, or Z</td>
</tr>
<tr>
<td>Threshold Level</td>
<td>80 dB</td>
<td>80 dB</td>
<td>80 dB</td>
<td>140 dB</td>
</tr>
<tr>
<td>Upper bound on integration</td>
<td>130 dB</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Time Weighting</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Impulse</td>
</tr>
<tr>
<td>Exchange Rate</td>
<td>5 dB</td>
<td>3 dB</td>
<td>3 dB</td>
<td>3 dB</td>
</tr>
</tbody>
</table>

**NOTE:** * When used for the purposes of delineating noise hazardous areas or evaluating noise exposures to personnel.

### TABLE 5-4

Non-DoD Continuous Noise Exposures  
(OSHA Standard)

<table>
<thead>
<tr>
<th>Duration per day (hours)</th>
<th>Permissible sound-pressure level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>85</td>
</tr>
<tr>
<td>4</td>
<td>88</td>
</tr>
<tr>
<td>2</td>
<td>91</td>
</tr>
<tr>
<td>1</td>
<td>94</td>
</tr>
<tr>
<td>0.5 = 30 min</td>
<td>97</td>
</tr>
<tr>
<td>0.25 = 15 min</td>
<td>100</td>
</tr>
</tbody>
</table>
c. **Personal Protective Equipment (PPE).**

(1) Hearing protection devices shall provide for the attenuation of noise to acceptable levels (i.e., 85 dBA for continuous (steady-state) noise). If necessary to hear audible warnings, hearing protection devices should not attenuate hearing levels below an individual’s hearing threshold.

(2) Dual hearing protection (earplugs and a second method such as ear muffs worn concurrently), shall be based on the attenuation of the specific hearing protection. Generally, double hearing protection should be used whenever employees are exposed to continuous noise greater than 115 dBA.

(3) The attenuation of the specific hearing protection, except custom ear mold hearing protection, shall be determined using the NIOSH de-rating scheme.

(4) Ear insert devices, to include disposable, pre-formed, or custom-molded earplugs, shall be fitted to the exposed individual by an individual trained in such fitting and able to recognize the difference between a good and poor fit. Plain cotton is not an acceptable hearing protection device.

**05.C.05 Hearing Conservation Program (HCP) Requirements.**

a. A HCP shall include all personnel who are exposed to hazardous noise or ototoxic chemicals (including arsenic, carbon disulfide, carbon monoxide, cyanide, lead and derivatives, manganese, mercury and derivatives, n-hexane, Stoddard solvent, styrene, trichloroethylene, toluene, and xylenes). The usage of these chemicals shall be considered in development of the HCP.

b. All contractors who expose employees to noise greater than the values listed above shall have a written HCP as part of their APP which includes:

(1) The identification, documentation, engineering controls, PPE and hearing testing for all employees;

(2) Employee training on the hazards of noise and the methods of protection provided;

(3) Labeling of all noise hazardous equipment and areas as required above, and

(4) Pre-employment and end-of-employment hearing testing of individuals who will be working in noise hazardous environments greater than 30 days a year for the contractor.
05.D  Head Protection.

05.D.01  All persons working in or visiting hard hat areas shall be provided with and required to wear Type I or Type II, Class G (General – not to exceed 2,200 volts) or Class E (Electrical-not to exceed 20,000 volts) headgear as appropriate. The selection of the type of hardhat shall be based on the activity and identified in the AHA. For emergency response operations and other activities with greater need for side impact protection, Type II head protection is required. > See Appendix B.

   a. Hard hat areas or activities are those areas with potential hazard of head injury; in general, all construction areas are considered hard hat areas. However, specific areas may be designated as non-hard hat areas, or activities may be considered non-hard hat activities, if identified and properly documented in the associated AHA. The identification and analysis of head hazards will be documented in an AHA or project safety and health plan, as appropriate.

   b. Points of entry to a hard hat area shall have a sign warning of the requirement to wear hard hats.

05.D.02  All protective headgear shall meet the requirements of ANSI Z89.1.

   a. No modification (i.e., paint) to the shell or suspension is allowed except when such changes are applied or approved by the manufacturer. Stickers are allowed on the hard hat provided they do not interfere with the ability to properly inspect it. > See 05.D.03.

   b. Hard hats shall be worn with the bill facing forward unless the GDA has determined exceptions for certain trades in order to accommodate appropriate mission accomplishments. Headgear must be designed to accommodate these needs.

   c. Protective headgear worn near electric lines and equipment shall be Class E.

   d. No ball caps, knit caps, or other headdress shall be worn under the hard hat that could interfere with the fit or stability of the hard hat.

05.D.03  Protective headgear and components shall be visually inspected daily for signs of damage (dents, cracks, etc.) that might reduce the degree of safety integrity originally provided. Headgear will be periodically inspected for ultraviolet degradation as evidenced by cracking or flaking of the helmet.

05.D.04  Drilling holes or in any way changing the integrity of the hard hat is prohibited. Alterations that will reduce the dielectric or impact strength will not be made.

05.D.05  Protective headgear worn by USACE employees shall (in addition to complying with the preceding specifications) be:
a. White in color and marked with a 1 in (2.5 cm) band of red reflective material placed along the base of the crown with a 5 in (12.7 cm) break in front. A red Corps of Engineers castle insignia will be centered at the front of the hat with the base of the insignia approximately ¾ in (1.9 cm) above the base of the crown. Personnel may place their name above the insignia and their organization title below the insignia: the rank of military personnel should precede their name. An American Flag insignia may be worn on the back of the hard hat.

b. Requests for variations in color and marking to accommodate occupational specialties shall be submitted for consideration to HQUSACE Safety and Health Office.

c. Chin straps will be worn when wearers are subject to high wind conditions and/or working on elevated structures.

05.E Protective Footwear.

05.E.01 Protective footwear that is rated to protect against the hazard(s) identified in the PHA/AHA shall be provided and worn.

05.E.02 All protective footwear shall meet ASTM F2413 standards.

05.E.03 Add-on type devices, such as strap-on foot, toe or metatarsal guards, shall not be used as a substitute for protective footwear and must be demonstrated by the employer to be equally effective via independent testing data for these devices.

05.E.04 For activities in which USACE or contractor personnel or official visitors are potentially exposed to foot hazards, the applicable PHA/AHA, APP, or project safety and health plan shall include an analysis of, and prescribe specific protective measures to be taken for, reducing foot hazards.

05.E.05 Personnel shall, as a minimum, wear safety-toed boots meeting ASTM Standard F2413 while working on construction sites unless it can be demonstrated by a PHA/AHA to the GDA’s satisfaction that a different type of foot protection is required.

05.E.06 Footwear providing protection against impact and compressive forces, conduction hazards, electrical hazards, and sole puncture shall comply with the applicable requirements of ASTM F2413. Footwear providing protection against impact and compression hazards shall be rated as I/75 and C/75.

a. Unexploded ordnance (UXO) personnel whose job tasks required protective footwear but require no metal parts in or on their footwear shall wear Conductive footwear (Cd) with protective toe cap/composite toe footwear.
b. Personnel participating in wild land fire management activities shall wear leather lace-up boots with slip-resistant soles, such as a hard rubber lug-type or tractor tread, a top height of 8 in (20.3 cm) or more with composite toes. Soles shall not be made of composition rubber or plastic, which have low melting points.

05.F High-Visibility Apparel.

05.F.01 High-visibility apparel meeting, at minimum, ANSI/ISEA 107, Performance Class 2 requirements, shall be worn by workers (i.e., signal persons, spotters, survey crews, inspectors, etc.) whenever:

   a. There is limited visibility of workers exposed to mobile/heavy equipment operations, vehicles, load handling, or other hazardous activities;

   b. Reduced visibility conditions exist due to weather conditions, illumination, or visually complex backgrounds where ambient visibility is at least 50 ft (15.2 m); OR

   c. Workers are exposed to vehicular or equipment traffic at speeds up to 35 mph (56.3 kph).

05.F.02 If any or all of the following conditions exist, Class 3 high-visibility apparel meeting ANSI/ISEA 107 shall be worn for higher visibility (i.e., signal persons, spotters, survey crews, inspectors, etc.) whenever:

   a. Reduced visibility conditions exist due to weather conditions, illumination, or visually complex backgrounds where ambient visibility is less than 50 ft (15.2 m);

   b. Workers are exposed to vehicular or equipment traffic in excess of 35 mph (56.3 kph);

   c. Workers are performing tasks which divert attention from approaching vehicular traffic, traveling in excess of 35 mph (56.3 kph), as posted; OR

   d. Workers are involved in activities in close proximity to vehicular traffic with no protective barriers.

05.F.03 When working at night, on or near sites where vehicles are present, workers (i.e., signal persons, spotters, survey crews, inspectors, etc.) shall wear, at a minimum, a Class 3 high-visibility safety coverall/jumpsuit or a Class 3 high-visibility safety jacket and Class E high-visibility pants, or bib overalls.
05.F.04 If the use of high-visibility apparel proves to create a greater hazard due to moving machinery, pinch points, heat stress or other reasons, an AHA detailing rationale for infeasibility of use and alternate safety measures to be used to ensure same level of worker safety, shall be developed, signed and submitted by the responsible person and accepted by the GDA, supervisor or the command's local Safety and Occupational Health Office (SOHO). Work shall not commence until such acceptance has been obtained.

05.F.05 The apparel background material color shall be either fluorescent yellow-green, fluorescent orange-red, or fluorescent red (see ANSI/ISEA 107). When choosing color, optimization of color conspicuity between the wearer and work environment shall be considered.

05.F.06 The apparel shall be:

a. Free of roughness, sharp edges and projections that could cause irritation or injury;

b. Should fit correctly to ensure that the vest remains in place for the expected period of use, environmental conditions, and wearer movements;

c. Cleaned, laundered and/or dry-cleaned in accordance with the label located on the apparel; and

d. In useable condition with limited rips, tears or fading; and

e. Replaced if it fails to comply with and of the above or ANSI/ISEA 107.

05.G Respiratory Protection.

05.G.01 General. The use of respirators is required when occupational exposure levels exceed OSHA Permissible Exposure Limits (PELs) or ACGIH TLVs, and engineering or administrative exposure controls are not feasible to implement.

05.G.02 The employer may allow the voluntary use of respirators, such as a filtering face pieces (nuisance dust masks) in atmospheres that are not hazardous. Prior to use of the voluntary respirators, the respirator must be evaluated and approved by the respiratory program administrator to ensure that its use will in itself not create a hazard. The employee shall be instructed in the limitations of the respirator and the correct method of wearing and using the respirator.

05.G.03 Written respiratory protection program. A written respiratory protection program shall be developed and implemented when respirators are used.
a. All employees using respirators, with the exception of employees voluntarily using only filtering face pieces (NIOSH-approved dust masks), shall be included in the respiratory protection program.

b. A respiratory protection program administrator with the technical qualifications (training and experience) and administrative authority to develop, implement and update (as necessary) the respiratory protection program shall be identified and so designated in the program.

   (1) The program administrator shall ensure that all respirator users comply with the requirements of the program.

   (2) Program Administrator Qualifications. The program administrator shall have the documented knowledge and experience to understand OSHA’s respiratory protection standard (29 CFR 1910.134), evaluate respiratory hazards at the facility/project or similar facility/project, select appropriate respirators based on similar hazards as the facility/project hazards or potential hazard, and train employees on the use of similar respirators.

   c. Respiratory protection programs shall address each of the following topics:

      (1) Methods used to identify and evaluate workplace respiratory hazards;

      (2) Procedures for selecting respirators for use in the workplace;

      (3) Medical evaluations of employees required to use respirators;

      (4) Fit testing procedures for tight-fitting respirators;

      (5) Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;

      (6) Procedures and schedules for cleaning, disinfecting, storing, inspecting, cartridge and canister change-out, repairing, discarding, and otherwise maintaining respirators;

      (7) Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;

      (8) Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

      (9) Training of employees in the proper use of respirators, including putting on and removing (donning and doffing) the respirator, any limitations on their use of the respirator, pre-use testing procedures, and respirator maintenance;

      (10) Procedures for regularly evaluating the effectiveness of the program; and

05.G.04 Medical evaluation. All employees, with the exception of employees voluntarily using filtering face pieces, shall be medically evaluated to ensure they are fit enough to wear the selected respirators before being fit tested. Evaluation options for respirator use are as follows:

a. Completion of the respirator questionnaire from 29 CFR 1910.134, Appendix C which is reviewed by a medical professional and a follow-up of the recommended medical exam and testing if required by the reviewing medical professional. Medical clearances to wear respirators shall include the following:

   (1) Telephone, e-mail, and physical address of the medical facility/provider;

   (2) Printed name of the licensed, certified health care provider along with his/her signature;

   (3) The statement of clearances or respiratory limitations only (no personal medical information shall be included. Employee identification shall not include the full social security number);

   (4) Date of examination and date that clearance expires.

b. Respirator Medical Evaluation Service. An on-line, mail-in or in-person evaluation service for the purpose of clearing an employee to wear selected respirators may be used provided it is supervised by a Board-Certified or Board-Eligible Occupational Medicine Physician and based upon Appendix C to 29 CFR 1910.134, OSHA Respirator Medical Evaluation Questionnaire. Medical clearances to wear respirators shall include the information in (1) – (4) above.

c. Additional medical evaluations shall be provided when:

   (1) An employee reports medical signs or symptoms that are related to the ability to use a respirator;

   (2) A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature, etc..) that may result in a substantial increase in the physiological burden placed on an employee.
d. All USACE respirator users shall have a pre-placement history and targeted physical. The exam shall include a pulmonary function test, evaluation of the cardiovascular and respiratory systems, and any tests required by the Occupational Health Provider.

05.G.05 Respirator Selection. Respirator selection shall be completed by the Respirator Program Administrator (RPA).

a. The selection shall be based on objective industrial hygiene data for this or similar operations.

b. Before industrial hygiene data is obtained, the RPA shall use knowledge of the hazard and work methods to determine the highest potential exposure, which shall be used to select the respiratory protection.

c. To determine the change out schedule of the respirator cartridge or respirator canister, the respirator program administrator shall use manufacturer recommended change-out based on the operations or the objective industrial hygiene data or data from similar operations.

d. An air purifying respirator shall not be used in an atmosphere with less than 19% oxygen or an atmosphere that is immediately dangerous to life and health (IDLH).

05.G.06 Fit testing. Employees wearing respirators with tight-fitting face pieces [Supplied Air Respirators (SARs) and Self-Contained Breathing Apparatus (SCBAs) included] shall be fit tested to ensure that selected respirators achieve a proper face-to-facepiece seal. Fit testing shall be performed before initial use of the selected respirator, whenever respirator size, make or model is changed, and at least annually. Fit testing requirements shall comply with respiratory protection program requirements.

05.G.07 Airline Respirators (SARs and SCBAs). If airline respirators are used, the following apply (excludes underwater diving SCBAs, see Section 30):

a. All SARs or SCBA respirators shall meet the Grade D Breathing Air requirements from ANSI/Compressed Gas Association Commodity Specification for Air;

b. If an airline respirator is used in an environment that has the potential to become IDLH, the respirator shall have an alternate source of breathing air for escape from the environment;
c. If an airline respirator is used in an environment that has the potential to become IDLH, there shall be a respirator air attendant to prevent the lines from becoming tangled or tied, to change the air supply tanks, and/or to confirm the air source (compressor or air supply tank manifold) is adequately working. If the air supply is interrupted, the attendant shall notify the respirator users to leave the area where the respirators are required.

05.G.08 Training and information. The RPA or his designee shall provide respirator training annually (or earlier if the requirements change significantly due to process changes or changes in site specific operations) to personnel using respirators at the facility or project. Annual training shall ensure that each employee using a respirator can demonstrate knowledge of the following topics:

a. Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;

b. Limitations and capabilities of the respirator;

c. How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

d. How to inspect, put on and remove, use, and check the seals of the respirator;

e. Procedures for maintenance and storage of the respirator;

f. How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

g. The general requirements of the OSHA respirator standard at 29 CFR 1910.134.

05.G.09 Recordkeeping. Establish and retain written information regarding medical evaluations, fit testing, and the respirator program. The following shall be made available upon request:

a. Records of medical approval must be retained and made available, as needed;

b. Fit test records must be maintained for respirator users until the next fit test is administered. Establish a record of the Qualitative Fit Test (QLFT) and Quantitative Fit Test (QNFT) administered to an employee including:

(1) The name or identification of the employee tested;

(2) Type of fit test performed and name of the test administrator;

(3) Specific make, model, style, and size of respirator tested;
(4) Date of test; and

(5) The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

c. Retain a written copy of the current respirator program.

05.H Hand Protection.

05.H.01 Employers shall select, and require employees to use, appropriate hand protection when employees’ hands are exposed to hazards such as skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, harmful temperature extremes, high hand vibration and sharp objects. > See Table 5-5.

05.H.02 Employers shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

05.H.03 Employees shall be trained to recognize hand hazards, select appropriate gloves for all anticipated hazards and to inspect and properly store gloves.

05.H.04 Gloves should fit snugly. Workers shall wear the correct gloves for the hazard (e.g., heavy-duty rubber gloves for concrete work, welding gloves for welding, insulated gloves and sleeves when exposed to electrical hazards, etc.).

05.H.05 Gloves will be inspected thoroughly prior to use to assure they are in good condition and will provide the protection required.

05.I Electrical Protective Equipment.

05.I.01 Persons working on electrical distribution systems shall be provided with the appropriate electrical protective equipment. This equipment shall be inspected, tested, and maintained in safe conditions in accordance with Table 5-6.

05.I.02 Employees shall use rubber gloves, sleeves, blankets, covers and line hoses as required by special conditions for work on energized facilities. Rubber goods provided to protect employees who work on energized facilities must meet ASTM F18 standards. Electrical workers’ rubber insulating protective equipment shall be visually inspected for damage and defects prior to each use.
05.I.03 Rubber protective equipment must be subjected to periodic electrical tests. Rubber insulating gloves shall be inspected before first issue and every 6 months thereafter; rubber insulating blankets and sleeves shall be inspected before their first issue and every 12 months thereafter. Rubber insulating covers shall be inspected upon indication that insulating value is suspect (per 29 CFR1910.137).

**TABLE 5-5**

**Hand and Arm Protection**

<table>
<thead>
<tr>
<th>Protective Equipment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Mesh, Leather, or Canvas Gloves</td>
<td>- Sturdy gloves made from metal mesh, leather, or canvas provide protection from cuts, burns, and sustained heat.</td>
</tr>
<tr>
<td>Leather Gloves</td>
<td>- Protection against sparks, moderate heat, blows, chips, and rough objects.</td>
</tr>
<tr>
<td></td>
<td>- Welders in particular need the durability of higher-quality leather gloves.</td>
</tr>
<tr>
<td>Aluminized Gloves</td>
<td>- Provide reflective and insulating protection against heat. However used for welding, furnace, and foundry work.</td>
</tr>
<tr>
<td></td>
<td>- Normally require an insert made of synthetic material that protect against heat and cold.</td>
</tr>
<tr>
<td>Aramid Fiber Gloves</td>
<td>- Aramid is a synthetic material that protects against heat and cold and is also used to make gloves that are cut- and abrasive-resistant and wear well.</td>
</tr>
<tr>
<td>Fabric and Coated Fabric Gloves</td>
<td>- Gloves made of cotton or other fabric protect against dirt, slivers, chafing, and abrasion but do not provide sufficient protection to be used with rough, sharp or heavy materials.</td>
</tr>
<tr>
<td></td>
<td>- Cotton flannel gloves coated with plastic transform fabric gloves into general-purpose hand protection offering slip-resistant qualities.</td>
</tr>
<tr>
<td></td>
<td>- Coated fabric gloves are used for tasks ranging from handling bricks and wire rope to handling chemical containers in laboratory operations.</td>
</tr>
<tr>
<td></td>
<td>- For protection against chemical exposure hazards, always check with manufacturer to determine the gloves’ effectiveness against the specific chemicals/conditions in the workplace.</td>
</tr>
<tr>
<td>Chemical and Liquid-Resistant Gloves</td>
<td>- Gloves made of rubber (latex, nitrile, or butyl), plastic, or synthetic rubber-like material such as neoprene protect workers from burns, irritation, and dermatitis caused by contact with oils, greases, solvents, and other chemicals.</td>
</tr>
<tr>
<td></td>
<td>- Use of rubber gloves also reduces the risk of exposure to blood and other potentially infectious substances.</td>
</tr>
<tr>
<td>Butyl Rubber Gloves</td>
<td>- Protect against nitric acid, sulfuric acid, hydrofluoric acid, red fuming nitric acid, and peroxide. Resist oxidation, ozone corrosion, abrasion and remain flexible at low temperatures.</td>
</tr>
</tbody>
</table>
| Natural Latex or Rubber Gloves | - Comfortable wear and pliability along with their protective qualities make them popular general purpose glove.  
- Resist abrasions caused by sandblasting, grinding, and polishing and protect workers’ hands from most water solutions of acids, alkalis, salts and ketones.  
- Hypoallergenic gloves, glove liners, and powderless gloves possible alternatives for those allergic to latex. |
| Neoprene Gloves | - Good pliability, dexterity, high density, and tear resistance.  
- Provide protection from hydraulic fluids, gasoline, alcohols, organic acids, and alkalis. |
| Nitrile Rubber Gloves | - Provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene.  
- Intended for jobs requiring dexterity and sensitivity, yet stand up to heavy use even after prolonged exposure that cause other gloves to deteriorate.  
- Resist abrasion, puncturing, snagging, and tearing. |
| Anti-vibration Gloves | - Gloves with gel insert and padding to absorb the tool vibration. For best effectiveness, gloves should meet the requirements of ANSI S2.73 |

05.I.04 Electric arc flash protection shall be provided for any person entering the flash protection boundary. > See Section 11.B.

a. Arc-rated clothing and PPE must be worn as determined by the incident exposure associated with the specific task. Refer to NFPA 70E for specific Hazard Risk Classifications and NFPA PPE Category Level Chart for Clothing/Equipment Requirements. > See Table 5-7.

b. Synthetic clothing such as acetate, nylon, polyester, rayon, either alone or in blends with cotton, may not be worn while in the flash protection boundary.

c. Employees must wear protective eye equipment whenever there is a danger from electric arcs, flashes, flying objects, or electrical explosion.

d. Employees must wear arc-rated clothing whenever they may be exposed to potentially energized electrical equipment.

(1) Arc-rated suits and their closure design must permit easy and rapid removal.

(2) The entire arc-rated suit, including the window, must have energy-absorbing characteristics suitable for arc flash exposure.

(3) Clothing and equipment required by the degree of electrical hazard exposure can be worn alone or be integrated with normal apparel.
4) Protective clothing and equipment must cover associated parts of the body and all normal apparel that is not flame-resistant, while allowing movement and visibility.

e. Employees must wear rubber-insulating gloves where there is a danger of hand or arm injury from electric shock or arc flash burns due to contact with energized parts. Gloves made from layers of flame-resistant material provide the highest level of protection. Leather glove protectors should be worn over voltage-rated rubber gloves.

f. Dielectric overshoes are required where electrically insulated footwear is used for protection against step and touch potential.

05.1.05 An air test shall be performed on electrical workers' rubber insulating gloves before each use.

05.1.06 Protective equipment of material other than rubber shall provide equal or better electrical and mechanical protection.

05.1.07 Tools must be insulated and manufactured to meet ASTM F18. The insulating tool portion shall be made of fiberglass-reinforced plastic (FRP).

05.1.08 Only live-line tool poles having a manufacturer's certification to withstand at least the following test shall be used: 100 (kilovolts) kV AC per ft (305 mm) of length for 5 minutes or 75 kV AC per ft (305 mm) for FRP tools. Records shall be maintained for all live-line tools to demonstrate satisfactory accomplishment of laboratory and shop test.

05.1.09 Wooden tools are not authorized for use.

05.1.10 When using live-line tools, workers shall use voltage rated gloves and not place their hands closer than necessary to energized conductors or to the metal parts of the tool.
### TABLE 5-6
Standards for Electrical Protective Equipment

<table>
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<tr>
<th>SUBJECT</th>
<th>NUMBER AND TITLE</th>
</tr>
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<tbody>
<tr>
<td>Head Protection</td>
<td>ISEA/ANSI Z89.1, Requirements for Protective Headwear for Industrial Workers</td>
</tr>
<tr>
<td>Eye and face Protection</td>
<td>ANSI Z87.1, Practice for Occupational and Educational Eye and Face Protection</td>
</tr>
<tr>
<td>Gloves</td>
<td>ASTM D120-02a, Standard Specification for Rubber Insulating Gloves</td>
</tr>
<tr>
<td>Sleeves</td>
<td>ASTM D1051, Standard Specification for Rubber Insulating Sleeves</td>
</tr>
<tr>
<td>Gloves and sleeves</td>
<td>ASTM F496, Standard Specification for In-Service Care of Insulating Gloves and Sleeves</td>
</tr>
<tr>
<td>Leather protectors</td>
<td>ASTM F696, Standard Specification for Leather Protectors for Rubber Insulating Gloves and Mittens</td>
</tr>
<tr>
<td>Footwear</td>
<td>ASTM F1117, Standard Specification for Dielectric Overshoe Footwear</td>
</tr>
<tr>
<td></td>
<td>ASTM 2412, Standard Test Methods for Foot Protection</td>
</tr>
<tr>
<td></td>
<td>ASTM 2413, Standard Specification for Performance Requirements for Foot Protection</td>
</tr>
<tr>
<td>Apparel</td>
<td>ASTM F1506, Standard Performance Specification for Flame Resistant Textile Materials for Wearing Apparel for Use by Electrical Workers When Exposed to Momentary Electric Arc and Related Thermal Hazards</td>
</tr>
<tr>
<td>Hazard/Risk Category</td>
<td>Protective Clothing and PPE</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>0</td>
<td>Protective Clothing, Non-melting or Untreated Natural Fiber (i.e., untreated cotton, wool, rayon, or silk, or blends of these materials) with a fabric weight of at least 4.5 oz/yd² Shirt (long sleeve) Pants (long) Protective Equipment: Hard hat; Safety glasses/ goggles (SR); Hearing Protection (ear canal inserts); Heavy-duty leather gloves (AN) (See Note 1); Leather work boots</td>
</tr>
<tr>
<td>1</td>
<td>Arc-Rated Clothing, Minimum Arc Rating of 4 cal/cm² (See Note 3) Arc-rated long-sleeve shirt and pants or arc-rated coverall Arc-rated faceshield (See Note 2) or arc flash suit hood Arc-rated jacket, parka, rainwear, or hard hat liner (AN) Protective Equipment: Hard hat; Safety glasses/goggles (SR); Hearing protection (ear canal inserts); Heavy-duty leather gloves (See Note 1); Leather work boots</td>
</tr>
<tr>
<td>2</td>
<td>Arc-Rated Clothing, Minimum Arc Rating of 8 cal/cm² (See Note 3) Arc-rated long-sleeve shirt and pants or arc-rated coverall Arc-rated flash suit hood or arc-rated faceshield (See Note 2) and arc-rated balaclava Arc-rated jacket, parka, rainwear, or hard hat liner (AN) Protective Equipment: Hard hat; Safety glasses/goggles (SR); Hearing protection (ear canal inserts); Heavy-duty leather gloves (See Note 1); Leather work boots</td>
</tr>
<tr>
<td>3</td>
<td>Arc-Rated Clothing selected so the System Arc Rating meets the required minimum arc rating of 25 cal/cm² (See Note 3) Arc-rated long-sleeve shirt (AR) Arc-rated pants (AR) Arc-rated coverall (AR) Arc-rated arc flash suit jacket (AR) Arc-rated arc flash suit pants (AR) Arc-rated arc flash suit hood Arc-rated gloves (See Note 1) Arc-rated jacket, parka, rainwear, or hard hat liner (AN) Protective Equipment: Hard hat; Safety glasses/goggles (SR); Hearing protection (ear canal inserts); Leather work boots</td>
</tr>
</tbody>
</table>
Arc-Rated Clothing selected so the System Arc Rating meets the required minimum Arc Rating of 40 cal/cm²
(See Note 3)
- Arc-rated long-sleeve shirt (AR)
- Arc-rated pants (AR)
- Arc-rated coverall (AR)
- Arc-rated arc flash suit jacket (AR)
- Arc-rated arc flash suit pants (AR)
- Arc-rated arc flash suit hood
- Arc-rated gloves (See Note 1)
- Arc-rated jacket, parka, rainwear, or hard hat liner (AN)

Protective Equipment: Hard hat; Safety glasses/goggles (SR); Hearing protection (ear canal inserts); Leather work boots

Notes:

(1) If rubber insulating gloves with leather protectors are required by NFPA 70E. Table 130.7(C)(9), additional leather or arc-rated gloves are not required. The combination of rubber insulating gloves with leather protectors satisfies the arc flash protection requirement.

(2) Face shields are to have wrap-around guarding to protect not only the face but also the forehead, ears, and neck, or, alternatively, an arc-rated arc flash suit hood is required to be worn.

(3) Arc rating is defined in Article 100 and can be either the arc thermal performance value (ATPV) or energy of break open threshold (EBT). ATPV is defined in ASTM F 1599, Standard Test Method for Determining the Arc Thermal Performance Value of Materials for Clothing, as the incident energy on a material, or a multilayer system of materials, that results in a 50 percent probability that sufficient heat transfer through the tested specimen is predicted to cause the onset of a second-degree skin burn injury based on the Stoll curve, in cal/cm². EBT is defined in ASTM F 1599 as the incident energy on a material or material system that results in a 50 percent probability of breakopen. Arc rating is reported as either ATPV or EBT, whichever is the lower value.

05.I.11 Only tools and equipment intended for live-line bare hand work should be used on transmission lines. The tools shall be kept dry and clean and shall be visually inspected before use each day.

05.I.12 See Section 05.A.09 for requirements on lineman’s personal fall protection equipment.

05.J Personal Flotation Devices.

05.J.01 Inherently buoyant Type III, Type V work vests, or better USCG-approved personal flotation devices (PFDs) shall be provided and properly worn in closed fashion (zipped, tied, latched, etc.) by all persons in the following circumstances: > See 05.J.02 and Figure 5-1.

a. On floating pipelines, pontoons, rafts, or stages;

b. On structures or equipment extending over or next to water except where guardrails, personal fall protection system, or safety nets are provided for employees;
c. Working alone at night where there are drowning hazards, regardless of other safeguards provided;

d. In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit; or

e. Whenever there is a drowning hazard.

05.J.02 Automatic-Inflatable PFDs Type V or better, USCG-approved for Commercial Use, may be worn by workers in lieu of inherently buoyant PFDs (see conditions 05.J.01.a-e above), provided the following criteria is met:

a. PFDs are worn only by workers over 16 years of age and those who weigh 90 lb (40.8 kg) or more;

b. An AHA shall be developed for the intended activity and shall be used to select the most appropriate PFD for the activity;

c. PFDs must be inspected, maintained, stowed and used in accordance with the manufacturer’s instructions. PFDs used in heavy construction or maintenance activities or where hot work (welding, brazing, cutting, soldering, etc.) is to be performed must be designed, tested and certified by the manufacturers for this type of work;

➢ Note: The standard commercial auto-inflatable PFD does not meet these requirements.

d. PFDs shall provide a 30-pound minimum buoyancy, post-deployment, and shall have a status indicator window;

e. Personnel shall be trained in the use, maintenance, restrictions, care, storage, inspection and post-deployment procedures per manufacturer’s instructions;

f. The USCG-approval for auto-inflatable PFD’s is contingent upon the PFD being worn, not stowed. All auto-inflatable PFDs must be worn at all times a drowning hazard exists.

g. In-water testing is required for all first time users so that wearers become familiar with the feel and performance of the PFD.

05.J.03 All wearable PFDs shall be of an international orange (or orange/red) or ANSI 107 yellow-green color.

a. Each inherently buoyant PFD shall have at least 31 in² (200 cm²) of retroreflective material attached to its front side and at least 31 in² (200 cm²) on its back side, per USCG requirements (46 CFR Part 25.25-15).
b. Each auto-inflatable PFD shall have at least 31 in\(^2\) (200 cm\(^2\)) of retroreflective material attached to its front side and at least 31 in\(^2\) on its bladder, to be visible when deployed (with the exception of Work Vests, which are allowed to have a total of 31 in\(^2\) front and back, combined).

05.J.04 Each PFD shall be equipped with a USCG-approved automatically activated light. Lights are not required for PFDs on projects performed exclusively during daylight hours.

05.J.05 Before and after each use, the PFD shall be inspected for defects that would alter its strength or buoyancy.

05.J.06 Throwable devices (Type IV PFD).

a. On USCG-inspected vessels, ring buoys are required to have automatic floating electric water lights (46 CFR 160).

b. On all other floating plant and shore installations, lights on life rings are required only in locations where adequate general lighting (e.g., floodlights, light stanchions) is not provided. For these plant and installations, at least one life ring, and every third one thereafter, shall have an automatic floating electric water light attached.

c. All PFDs shall be equipped with retroreflective tape in accordance with USCG requirements.

d. Life rings (rope attachment not required) and ring buoys (rope attachment required) shall be USCG-approved; shall have at least 90 ft (27.4 m) of 3/8 in (0.9 cm) of attached solid braid polypropylene, or equivalent. Throw bags may be used in addition to life rings or ring buoys. These throwable devices and lifelines shall be inspected at a minimum, every 6 months and shall be stored in such a manner as to allow immediate deployment and will be protected from degradation from weather and sunlight. Life rings or ring buoys shall be readily available and shall be provided at the following places:

(1) At least one not less than 20 in (51 cm) on each safety skiff up to 26 ft (7.9 m) in length (46 CFR 117.70);

(2) At least one (1) 24 in (61 cm) in diameter on all motor boats longer than 26 ft (7.9 m) in length up to 65 ft (19.8 m) in length and for motor boats 65 ft (19.8 m) in length or longer, a minimum 3 life buoys of not less than 24 in (61 cm) and one additional for each increase in length of 100 ft (30.4 m) or fraction thereof; and
(3) At least one (1) at intervals of not more than 200 ft (60.9 m) on pipelines, walkways, wharves, piers, bulkheads, lock walls, scaffolds, platforms, and similar structures extending over or immediately next to water, unless the fall distance to the water is more than 45 ft (13.7 m), in which case a life ring shall be used. (The length of line for life rings at these locations shall be evaluated, but the length may not be less than 90 ft (27.4 m).

05.J.07 At navigation locks, an analysis of the benefits versus the hazards of using floating safety blocks (blocks that may be quickly pushed into the water to protect individuals who have fallen in the water from being crushed by vessels) shall be made.

a. This analysis shall be documented as an AHA.

b. If the use of blocks is found acceptable, consideration shall be given to the size and placement of the blocks, the appropriate means of securing and signing the blocks, etc. When the use of blocks is found unacceptable, alternative safety measures shall be developed.

**FIGURE 5-1**

Personal Flotation Devices
05.K Lifesaving and Safety Skiffs.

05.K.01 During construction activities, at least one skiff shall be immediately available at locations where employees work over or immediately next to water.

➢ Note: This requirement is applicable to any Operations and Maintenance activities that cause an employee to work outside the designed, permanently installed safety controls (i.e., guardrails).

05.K.02 Personnel trained in launching and operating the skiff shall be readily available during working hours. Lifesaving personnel shall perform a lifesaving drill, including the launching and recovery of the skiff, before the initiation of work at the site and periodically thereafter as specified by the GDA (but at least monthly or whenever new personnel are involved).

05.K.03 Skiffs shall be kept afloat or ready for instant launching.

05.K.04 Required equipment must be onboard and meet or exceed USCG requirements and the requirements of Section 19 of this manual. Skiffs shall be equipped as follows:

a. Four (4) oars (two (2) if the skiff is motor powered);

b. Oarlocks attached to gunwales or the oars;

c. One (1) ball-pointed boat hook;

d. One (1) ring buoy with 90 ft (21.3 m) of 3/8 in (0.9 cm) solid braid polypropylene, or equivalent, line attached; and

e. PFDs in number equaling the skiff rating for the maximum number of personnel allowed on board.

f. Fire Extinguisher.

05.K.05 In locations where waters are rough or swift, or where manually operated boats are not practical, a power boat suitable for the waters shall be provided and equipped for lifesaving.

05.K.06 Skiffs and power boats shall have buoyant material capable of floating the boat, its equipment, and the crew.

05.K.07 On vessels (such as skiffs) without permanently mounted navigation lights, portable battery-operated navigation lights will be available and used for night operations.
STUDY QUESTIONS

1. Personal Protective Equipment is the first measure to be taken to control hazards to an acceptable level.
   a. True
   b. False

2. When employees provide their own safety equipment or PPE, the __________ is responsible for assuring its adequacy in protecting against the hazard and its state of repair.
   a. employee
   b. employer
   c. OSHA
   d. Government

3. When noise hazard are known or expected, the employer shall develop a(n) _______________ that includes identification and assessment of noise hazards and the measures to be taken to protect personnel against them.
   a. APP
   b. AHA
   c. Hearing Conservation Program
   d. Noise Reduction Rating

4. Certain activities and areas may be considered as non-hard hat areas if:
   a. the job is indoors.
   b. the hard hat is stressing the worker’s neck.
   c. identified and properly documented in the AHA.
   d. Never.

5. Respiratory protection programs shall address ________________.
   a. respirator selection procedures
   b. medical evaluations and fit testing procedures
   c. training of employees
   d. all of the above
6. In order to protect against electric arc flash, the following is required for any person who enters the arc flash zone:

   a. Clothing of synthetic materials shall not be worn.
   b. Wooden tools will not be used.
   c. Use clothing and equipment in accordance with NFPA 70E.
   d. All of the above.

7. At least one __________ shall be immediately available at locations where employees work over or immediately next to the water.

   a. lifeguard
   b. skiff
   c. SCUBA tank
   d. trained diver

8. Which of the following is not a requirement for using Automatic-Inflatable Personal Flotation Devices:

   a. Provides 100 pounds minimum buoyancy post deployment.
   b. Only used by workers over 16 years old and who weigh more than 90 pounds.
   c. Type V or better, USCG approved for Commercial Use.
   d. An AHA is performed for the activity.

9. All Personal Flotation Devices shall be of a highly visible orange/reddish color. In addition, PFD’s shall:

   a. Have retroreflective material on front and back per USCG requirements.
   b. Have a USCG approved automatically activated light unless used only during daylight hours.
   c. Both a & b
   d. Be replaced every six months
## Section 6

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SECTION 6
Hazardous or Toxic Agents and Environments

06.A General.

06.A.01 Exposure standards.

   a. Exposure, through inhalation, ingestion, skin absorption, or physical contact, to any chemical or biological agent in excess of the acceptable limits specified in the current American Conference of Governmental Industrial Hygienist (ACGIH) guideline, "Threshold Limit Values and Biological Exposure Indices", published Department of the Army (DA) or Department of Defense (DoD) Exposure Limits, or by OSHA shall be prohibited. For the purpose of this document, the applicable standard is the Occupational Exposure Limit (OEL). Physical agents are addressed individually in this section.

   ➢ Note: For Beryllium, the Department of Energy’s exposure value of 0.2 ug/m³ may be allowed with written permission from the HQUACE-50.

   b. In case of conflicts between ACGIH, OSHA, DoD or DA standards or regulations referenced in this manual, the more stringent shall be used as the OEL.

   c. The employer shall comply with all applicable standards and regulations to reduce contaminant concentration levels As Low As is Reasonably Achievable (ALARA).

   d. Activities where occupational exposure to a chemical or biological warfare agent is possible, shall comply with current DA safety and occupational health requirements for chemical and biological agents.

   e. Activities involving ammunition and explosives or their constituents or chemical warfare agents may have additional requirements as specified in EM 385-1-97, Explosives Safety and Health Requirements Manual.

06.A.02 Hazard evaluation.

   a. Jobsite operations, materials, and equipment involving potential exposure to hazardous or toxic agents or environments shall be evaluated by a qualified Industrial Hygienist, or equivalent competent person in Industrial Hygiene operations, to formulate a hazard control program. A description of the methods to be used must be accepted by the GDA or local Safety and Occupational Health Office (SOHO) before the start of the specific operation. > This evaluation shall be performed at least annually for USACE operations.
b. Activity Hazard Analysis (AHA) and/or Position Hazard Analysis (PHA) shall be used to document the evaluation of the hazards and the controls present. The hazard evaluation shall identify all substances, agents, and environments that present a health, explosive or fire hazard to workers or visitors, the risk of the hazard, and recommend hazard control measures. Engineering and administrative controls shall be used to control hazards; in cases where engineering or administrative controls are not feasible, personal protective equipment (PPE) may be used.

c. The hazard evaluation shall document: the nature of the evaluation (air, biological or radiological samples, etc.); that it serves as certification of hazard evaluation; the workplace and activity evaluated; the name, position and credentials of the person certifying that the evaluation has been performed; any controls and training being utilized; and the date of the evaluation. This evaluation shall be documented in a written report and available for review by the GDA or SOHO for USACE operations.

06.A.03 Testing and monitoring.

a. Approved and calibrated testing devices shall be provided to measure hazardous or toxic agents and environments. Devices shall be labeled with calibration information (name of individual performing the calibration and date of the most current calibration). Calibration results shall be maintained in a calibration log.

b. Individuals performing testing and monitoring shall be trained in hazards and testing and monitoring procedures. Testing devices shall be used, inspected, and maintained in accordance with the manufacturer’s instructions, a copy of which shall be maintained with the devices.

c. NIOSH, OSHA, Environmental Protection Agency (EPA) or DA sampling and analytical methods or other independently verified sampling and analytical methods shall be used. Laboratories used for analysis shall be accredited by nationally recognized bodies, such as the American Industrial Hygiene Association (AIHA), for the type of analysis performed.

d. Determination of the concentration of, and hazards from, hazardous or toxic agents and environments shall be made by a qualified industrial hygienist or other competent person during initial startup and as frequently as necessary to ensure the safety and health of the workers or other potentially exposed individuals.

e. Records of testing/monitoring shall be maintained on site and shall be available to the GDA or SOHO for USACE operations upon request.

06.A.04 The following methods shall be utilized for the control of exposure to hazardous or toxic agents and environments and shall be followed in the order below, unless infeasible:
a. Substitution: if the substitute process or product is determined to provide the same outcome and to be less of a hazard;

b. Engineering controls: (i.e., local/general ventilation), to limit exposure to hazardous or toxic agents and environments within acceptable limits;

c. Work practice controls: when engineering controls are not feasible or are not sufficient to limit exposure to hazardous or toxic agents and environments within acceptable limits;

d. Appropriate PPE (i.e., respirators, gloves, etc.) and associated programs: shall be instituted when engineering, work practice controls, or material substitution are not feasible or are not sufficient to limit exposure to hazardous or toxic agents;

e. Regular housecleaning (work and break area surface cleaning) and personal decontamination procedures: shall be instituted in areas where the operations generate toxic dust and fume hazards. The frequency of surface cleaning and of decontamination procedures is dependent on the nature of the hazard, and frequency and risk from the exposure and shall be documented in the Project Safety and Occupational Health (SOH) Plan or Accident Prevention Plan (APP).

06.B Hazardous or Toxic Agents Handling.

06. B.01 Chemical Hazard Communication (HazCom). A written HazCom Program shall be developed when hazardous or toxic agents (any chemical which is a physical/health hazard) are present or procured, stored or used at a project site (per 29 CFR 1910.1200). The written HazCom program shall address the following in project- specific detail:

a. Hazardous or Toxic Agent Inventory. A list of the hazardous or toxic agents with the following information:

(1) Explanation of how the agents are to be used at the project.

(2) For emergency response purposes, approximate quantities (e.g., liters, kilograms, gallons, pounds) that are onsite or will be on site at any given time shall be provided for each material. If the chemical name and/or quantity and/or location are classified information, it shall be maintained in a location so that it can be provided to emergency responders during an emergency. This could be in a secure area outside of the area the chemical is used or stored, or just outside the entrance to the location in a secure box.

(3) A site map will be attached to the inventory showing where inventoried substances are stored.
(4) The inventory and site map will be updated annually at a minimum, but as frequently as necessary to ensure it is current and accurately reflects those materials on site.

b. Hazardous or Toxic Agent Labeling. Procedures for assuring that containers used to store and transport hazardous or toxic agents around the project site are appropriately labeled to communicate the physical and health hazards associated with the agents in the containers. The pictorial labels required by the OSHA HazCom standard are acceptable labels.

c. Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) Management. Procedures to ensure MSDSs (SDSs) are maintained at project site for each chemical, combustible dust, or product. During the period of 2013 through 2016, the MSDS will be phased out and replaced with the SDS. The new SDSs content is mandated and allows for the toxicological hazard to be based on similar chemicals. For the purpose of this manual, either a MSDS or SDS meeting the criteria of the OSHA globally harmonized system standard is acceptable.

(1) Employees shall have access to the MSDSs (SDSs) and the safety and health protection procedures.

(2) Applicable information contained in the MSDS (SDS) shall be incorporated in the AHA/PHAs. If the chemical or toxic agent is used extensively in the operation, the applicable information shall be incorporated into the AHA and MSDS (SDS) shall be attached to the AHA.

(3) The information will be followed in the use, storage, and disposal of material and selection of hazard control and emergency response measures.

d. Employee Information and Training. Procedures to ensure employees are trained initially and periodically when use of hazardous or toxic agents is altered or modified to accommodate changing on-site work procedures. Training shall be provided to employees working with or in the area of use of any potentially hazardous chemical. Training shall cover the following topics:

(1) Requirements of the HazCom program on the project;

(2) The location of all hazardous or toxic agents at the project;

(3) Identification and recognition of hazardous or toxic agents on the project;

(4) Physical and health hazards of the hazardous or toxic agents pertinent to project activities;
(5) Protective measures employees can implement when working with project-specific hazardous or toxic agents.

(6) The location and content of the MSDS (SDS) for the chemicals. The content and meaning of the information provided on the MSDS.

(7) All workers in locations covered by the HazCom standard shall be briefed on the recent changes to the standard. These changes include MSDS to SDS, label content, the new pictographs on the labels, and an explanation of chemical banding.

06.B.02 When engineering and work practice controls or substitution are either infeasible or insufficient, appropriate PPE and chemical hygiene facilities shall be provided and used for the transportation, use, and storage of hazardous or toxic agents.

a. When irritants or hazardous substances may contact skin or clothing, chemical hygiene facilities and PPE shall be provided. PPE may include suitable gloves, face/eye protection and chemical protective suits.

(1) The qualified IH or other competent person shall determine the scope and type of PPE required.

(2) Special attention shall be given to selecting proper chemical protection when working with materials designated with a “skin” notation by OEL. Such materials may produce systemic toxic effects through absorption through unbroken skin. > See Section 5.

(3) Before commencing use of epoxy resins, concrete, or other dermatitis-producing substances, employees shall be made aware of the manufacturer’s skin protection recommendations. Barrier cream ointment or other skin protection measures recommended by the manufacturer for the specific exposure shall be available for use.

b. When eyes or body of any person may be exposed to hazardous or toxic agents, suitable facilities that comply with ANSI Z358.1, Emergency Eyewash and Shower Equipment, for quick drenching or flushing of the eyes and body shall be provided in the work area for immediate emergency use and shall be no more than 10 seconds from the hazardous material. > See ANSI Z358.1.

(1) Emergency eyewash equipment must be provided where there is the potential for an employee’s eyes to be exposed to corrosives, strong irritants, or toxic chemicals.

(2) The emergency eyewash equipment must irrigate and flush both eyes simultaneously while the operator holds the eyes open.

(3) The emergency eyewash equipment must deliver at least 0.4 gal (1.5 L) of water per minute for 15 minutes or more, providing a minimum of 6 gal (22.7 L) of water.
(4) Water used in emergency eyewashes and showers shall meet drinking water standards. When these items are exposed to the elements, steps will be taken to ensure the water does not freeze or become stagnant.

(5) Personal eyewash equipment may be used to supplement emergency washing facilities. They must not be used as a substitute. Personal eyewash fluids shall be visually inspected monthly to ensure they remain sanitary with no visible sediments.

(6) All plumbed emergency eyewash facilities and hand-held drench hoses shall be connected to an approved potable water supply and activated weekly and inspected annually to ensure that they function correctly and that the quality and quantity of water is satisfactory for emergency washing purposes.

c. When personal protective clothing is required:

(1) An area shall be established for the removal of the personal protective clothing which limits the spread of any chemical waste, dust, or fume;

(2) Workers shall be trained in the removal of personal protective clothing and equipment to prevent further spread or contamination.

06.B.03 Storage prior to transportation of hazardous chemicals, materials, substances and wastes shall be under the supervision of a qualified person.

a. Transportation, use, and storage of hazardous or toxic agents shall be planned and controlled to prevent contamination of people, animals, food, water, equipment, materials, and environment.

b. All storage of hazardous or toxic agents shall be in accordance with the recommendations of the manufacturer, OSHA and NFPA requirements and accessible only to authorized personnel.

c. Disposal of surplus or excess hazardous or toxic agents shall occur in a manner that will not contaminate or pollute any water supply, ground water, or streams; and will comply with Federal, State, and local regulations and guidelines.

d. Containers used to hold hazardous or toxic agents should not be used to hold other materials unless they have been managed or cleaned under hazardous waste and DOT regulatory requirements.

e. Every hazardous or toxic agent being transported for disposal shall be transported with a copy of the substance's MSDS (SDS) whenever applicable.
f. Persons who prepare shipments of hazardous chemicals, materials, substances and/or wastes that are defined as hazardous material under DOT regulations are required to be DOT trained, certified and issued an appointment letter in accordance with Defense Transportation Regulation 4500.9-R, Chapter 204.

06.B.04 A Process Safety Management (PSM) Program of highly hazardous chemicals shall be employed in accordance with 29 CFR 1910.119 or 29 CFR 1926.64 whenever a work activity involves:

a. A process that involves a chemical at or above the threshold quantities listed in Appendix A of the above-cited CFRs; or

b. A process that involves a flammable liquid or gas on site in one location in a quantity of 10,000 lb (4,535.9 kg) or more as defined in 29 CFR 1926.59(c), except:

(1) Hydrocarbon fuels used solely for workplace consumption as a fuel if such fuels are not part of a process containing another highly hazardous chemical covered by the standards cited above; or

(2) Flammable liquids stored in atmospheric tanks or transferred that are kept below their normal boiling point without benefit of chilling or refrigeration.

06.C Lead and Asbestos Hazard Control.

06.C.01 General.

a. No asbestos-containing materials (ACMs) shall be used or brought onto any USACE projects. Lead-based paints (LBP) shall only be used with written approval of the GDA or USACE SOHO and shall never be used inside a residence, child care facility, or medical treatment facility.

b. All construction or maintenance projects will be evaluated for the potential to contact ACM and LBP.

(1) Lead and asbestos sources are to be labeled as a lead or asbestos hazard that should not be disturbed without proper protection. If infeasible to label each source, a site map may be posted which points out the location of the lead and asbestos hazards.

(2) If the evaluation shows the potential for activities to generate unacceptable occupational exposure to LBP, a written lead compliance plan shall be written. The lead compliance plan shall be in accordance with 29 CFR 1910.1025 and 29 CFR 1926.62.
(3) If the evaluation shows the potential for activities to disturb ACM, an asbestos abatement plan shall be developed. The plan shall be in accordance with 29 CFR 1910.1001; 29 CFR 1926.1101; and 40 CFR 61, Subpart M.

(4) These plan(s) shall be developed as an appendix to the APP or, for USACE operations, the Project SOH Plan. The written plan(s) shall be submitted for acceptance by the GDA or local SOHO before beginning work.

06.C.02 Lead Compliance Plan. A lead compliance plan shall describe the procedures to be followed to protect employees from lead hazards while performing lead hazard control activities. The Plan shall address the following:

a. A description of each work activity in which lead is emitted, to include equipment and materials used, controls in place, crew size, job responsibilities, operating procedures, and maintenance practices, work activity locations and lead-containing components keyed to the project drawings;

b. Description of means to be used to achieve exposure compliance, including any engineering controls;

c. Employee exposure assessment procedures to monitor and document employee lead exposure. Exposure monitoring shall include two types:

   (1) Initial determination (may be omitted if there is sufficient objective/historical data showing action level compliance according to the requirements); and

   (2) Continued exposure monitoring required as a result of initial exposure determinations.

d. Protective clothing, housekeeping procedures to prevent spread of lead contamination both in and beyond the lead hazard control area, and hygiene facilities and practices to prevent employees from inadvertent ingestion of lead;

e. Administrative controls to limit employee exposure to lead, including employee rotation schedule to be employed, if engineering controls or PPE fail to eliminate exposures exceeding the PEL;

f. Medical surveillance procedures to monitor employee exposures and ensure fitness for wearing respiratory protection;

g. Competent person (CP) and employee training required;

h. Detailed sketches identifying lead hazard control areas, including decontamination areas and facilities, critical barriers, and physical and air distribution boundaries;
i. Perimeter or other area air monitoring outside or adjacent to the regulated area;

j. Security required for each lead hazard control area; and

k. Waste generation, characterization, transportation, and disposal (including recordkeeping).

06.C.03 Asbestos Abatement Plan. An asbestos abatement plan shall describe procedures to be followed to protect employees from asbestos hazards while performing work that will disturb ACM. It shall address the following:

a. A description of each activity where asbestos will be disturbed, including OSHA class of work, equipment required, controls to be used, crew size, job responsibilities, maintenance practices, and locations keyed to the project drawings;

b. The method of notification of other employers at the worksite;

c. A description of regulated areas, types of containment, decontamination unit plan, and engineering controls;

d. Air monitoring plan - personal, environmental and clearance. Employee exposure assessment procedures shall address monitoring and documenting employee exposures.

(1) An initial determination (may be omitted if there is sufficient objective/historical data showing compliance with the requirements);

(2) Continued exposure monitoring may be required as a result of initial exposure determinations;

(3) Environmental monitoring shall demonstrate the absence of asbestos fiber migration outside the regulated area; and

(4) Clearance monitoring to document that the area has met specified clearance criteria.

e. PPE, including respirators and clothing;

f. Housekeeping procedures that address prevention of spread of contamination both in and beyond the regulated area;

g. Hygiene facilities and practices;

h. CP and employee training required;
Medical surveillance, as required, to assess exposure and to monitor employee fitness to perform work tasks while wearing PPE to include respiratory protection devices;

- Waste generation, containerization, transportation, and disposal (including recordkeeping); and

- Security, fire, and medical emergency response procedures.

06.D  Hot Substances.

➢ Note: For heating devices and melting kettles, see Section 09.E.

06.D.01  Protection from Hot Substances.  Hazards from hot substances include increased inhalation and skin hazards and burns from the heat.  When working with hot substances the following shall be considered:

- PPE (respirators, gloves, etc.) shall be evaluated for efficiency in hot atmospheres and protectiveness from heat as well as the chemical hazard;

- Heat stress precautions and measurements shall be taken as required by Section 06.I;

- Location where hot substances are heated shall be located away from any ventilation intake air vents.  If hot substances are being applied to a roof, the ventilation intake air vents shall be temporarily relocated so as to prevent the uptake of the fumes into the building or the work shall be completed at a time when the building is not occupied.

06.D.02  Transporting and handling hot substances.

- Runways or passageways, clear of obstructions, shall be provided for all persons carrying hot substances.

- Hot substances shall not be carried up or down ladders.

- When hoists are used to raise or lower hot substances, attention shall be given to assuring that the hoisting mechanism is adequate for the loads imposed and is securely braced and anchored.

- All persons handling hot substances shall be provided protection against contact with, or exposure to radiant heat, glare, fumes, and vapors of the substances.  At a minimum, roofers handling roofing materials shall be fully clothed including long sleeved shirts, shoes secured and at least 6 in (15 cm) in height, and gloves up to the wrist.  > See Section 5.
e. Containers for handling and transporting hot substances shall be of substantial construction (minimum 24-gauge sheet steel), free from any soldered joints or attachments, and shall not be filled higher than 4 in (10.1 cm) from the top.

f. Piping used to transport hot substances shall have an entry and exit shut off valve and shall be made of flexible metallic hoses fitted with insulated handles. In cold climates, piping shall be insulated to prevent material from solidifying on the inside of the pipe.

06.E Harmful Plants, Animals and Insects.

06.E.01 Protection against hazards from insects and/or animals harboring fleas or disease-carrying insects shall include, as applicable, the following:

a. PPE such as netted hoods, leather work gloves, and high-top work boots worn in conjunction with trousers and long-sleeved shirts;

b. Clothing treated at the factory with DEET or Permethrin are recommended in areas of high insect population;

c. Drainage or spraying of breeding areas;

d. Destroying or flagging (marking as hazard) of nests;

e. Smudge pots and aerosols for protecting workers and small areas;

f. Elimination of actions or conditions that propagate insects or vermin;

g. Extermination measures by a certified pesticide applicator or, for over the counter items, following the instructions on the label;

h. Approved first aid procedures for employees; employees allergic to bee stings shall be encouraged to self identify to the supervisor and to carry an EpiPen;

i. Inoculation against diseases known to be a local hazard; and

j. Instruction in recognition of the animals and insects and their common nesting habits, aggressiveness, etc.

06.E.02 In areas where there is exposure to poisonous snakes or lizards, employees shall be required to:

a. Wear snake chaps or knee-high snake boots worn in conjunction with trousers and long-sleeved shirts;
b. Be trained in recognition of the snakes and their common nesting habits, aggressiveness, etc.; and

c. Be trained in the proper first aid procedures for bites.

06.E.03 In areas where employees are exposed to poisonous plants, the following protective measures, as applicable, shall be provided:

a. Removal or destruction of plants, where practical;

b. Appropriate protective clothing such as gloves;

c. Protective ointments;

d. Soap and water for washing exposed parts; and

e. Instruction in recognition and identification of the plants.

06.E.04 When burning poisonous plants, controls shall be instituted to prevent contact with or inhalation of toxic elements contained in the smoke.

06.F_ Ionizing Radiation.

06.F.01 Anyone who procure(s), uses, possesses, transports, transfers, or disposes of radioactive materials or radiation generating devices shall:

a. Notify, in writing, the GDA or USACE Command Radiation Safety Officer (RSO) of the nature of the material or device, a description of intended use, the location of use and storage, and all transportation and disposal requirements;

b. Secure appropriate authorization or permit if any radioactive material or a radiation generating device is to be used on a DoD installation (a lead time of at least 45 days should be allowed for obtaining a DoD authorization or permit);

c. Provide to the GDA or USACE Command RSO a copy of all US Nuclear Regulatory Commission (NRC) or Agreement State licenses, the Army Radiation Authorization (ARA), Army Radiation Permit, and reciprocity forms (to include NRC Form 241), as applicable.

d. When a USACE Radiation Safety Program exists at a location/facility that has potential Radon-222 emissions from radioactive material use, the more restrictive of the specific limits, the specific license condition or the NRC requirements in 10 CFR 20 for Radon-222 shall apply. If USACE employees work in a building, structure, or tunnel that has naturally occurring Radon-222, then OSHA requirements in 29 CFR 1910.1096 are applicable as specified in Section 06.F.14, Radon.
06.F.02 Qualified Personnel.

a. Operations involving radiation hazards or use of radioactive material or radiation generating devices shall be performed under the direct supervision of a RSO, who is qualified and responsible for radiological safety.

b. The RSO will be technically qualified and will meet the experience, training, and education requirements listed below:

(1) Formally trained in radiation protection topics including the following: physics of radiation; radiation’s interaction with matter; mathematics necessary for the subject matter; biological effects of radiation; type and use of instruments for detection, monitoring and surveying radiation; radiation safety techniques and procedures; and use of time, distance, shielding, engineering controls, and PPE to reduce radiation exposure;

(2) Hands-on training in the uses of equipment, instrumentation, procedures, and theory used in their unit;

(3) Knowledge of applicable regulations including those of the NRC, EPA, DOE, OSHA, DOT and DoD, to include all applicable DoD Components, pertaining to radioactive materials, radiation generating devices, and radioactive and mixed waste; and

(4) Knowledge of the USACE Radiation Safety Program, and recordkeeping requirements for work with radioactive materials and radiation generating devices.

06.F.03 Radiation Safety Program.

a. Operations involving radiation hazards, and users of radioactive material or radiation generating devices, shall develop and implement a Radiation Safety Program.

(1) The program shall be managed by the RSO and based on sound radiation safety principles that shall keep occupational doses and doses to the public ALARA.

(2) The RSO is responsible for performing or ensuring the performance of an annual review of the program. Documentation of the review shall be retained for two (2) years.

(3) A Radiation Safety Committee (RSC) shall be established in accordance with 10 CFR 20 and DA PAM 385-24 as part of the Radiation Safety Program.
b. All personnel entering an area where radioactive material or radiation generating devices are used, and where there is a potential for an individual to receive a Total Effective Dose Equivalent (TEDE) of 100 mrem or more in one (1) year, shall receive instruction in:

(1) The presence of the material or device;

(2) Health and safety problems associated with exposure to radiation, including the potential effects of radiation on a pregnant female, the fetus, or embryo;

(3) Precautions and controls used to control exposure;

(4) Proper use of instrumentation and dosimetry in the area;

(5) The Radiation Safety Program required in 06.F.03.a; and

(6) Their rights and responsibilities.

c. Users of radioactive material or radiation generating devices without a potential to receive a TEDE of 100 mrem or more in one (1) year and visitors to a site shall coordinate with the RSO for appropriate training.

d. The Radiation Safety Program will include plans and procedures for handling credible emergencies involving radiation and radioactive materials. This will include coordination with civilian and/or military emergency response organizations as necessary.

06.F.04 Dose Limits.

a. Occupational dose limits shall be based on the TEDE. > See Table 6-1.

(1) An annual (calendar year) limit that is the more limiting of: 5 rem [0.05 sieverts (Sv)] TEDE, or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue of 50 rem (0.5 Sv), or 15 rem (0.15 Sv) to the lens of the eye, or 50 rem (0.05 Sv) shallow dose equivalent to the skin or any extremity.

(2) Without the written approval of the USACE Radiation Safety Staff Officer (RSSO), the annual occupational dose shall not exceed the more limiting of: 0.5 rem (0.005 Sv) TEDE, or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue of 5 rem (0.05 Sv), or 1.5 rem (0.015 Sv) to the lens of the eye, or 5 rem (0.05 Sv) shallow dose equivalent to the skin, or any extremity.
TABLE 6-1

Occupational Dose Limits

<table>
<thead>
<tr>
<th>Body part</th>
<th>Annual limits with RSSO approval</th>
<th>Annual limits without RSSO approval</th>
<th>Suggested ALARA limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole body</td>
<td>5 rem (0.05 Sv)</td>
<td>0.5 rem (0.005 Sv)</td>
<td>0.1 rem (0.001 Sv)</td>
</tr>
<tr>
<td>Individual organ</td>
<td>50 rem (0.5 Sv)</td>
<td>5 rem (0.05 Sv)</td>
<td>0.5 rem (0.005 Sv)</td>
</tr>
<tr>
<td>Lens of eye</td>
<td>15 rem (0.15 Sv)</td>
<td>1.5 rem (0.015 Sv)</td>
<td>0.15 rem (0.0015 Sv)</td>
</tr>
<tr>
<td>Skin or extremity</td>
<td>50 rem (0.5 Sv)</td>
<td>5 rem (0.05 Sv)</td>
<td>0.5 rem (0.005 Sv)</td>
</tr>
</tbody>
</table>

(3) To keep doses ALARA, the user shall set administrative action levels below the annual dose limits. These action levels shall be realistic and attainable. Suggested action levels are the more limiting of: 0.1 rem (0.001 Sv) TEDE, or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue of 0.5 rem (0.005 Sv), or 0.15 rem (0.0015 Sv) to the lens of the eye, or 0.5 rem (0.005 Sv) shallow dose equivalent to the skin or any extremity.

(4) Any exposure in excess of an ALARA limit requires investigation by the RSO.

b. In accordance with DA PAM 385-24, planned special exposures shall not be performed.

c. No employee under 18 years of age shall receive occupational exposure to ionizing radiation (excluding exposure to Radon-222).

d. The dose to a declared pregnant employee shall not exceed 0.5 rem (0.005 Sv) during the entire gestation period and efforts shall be made to avoid variations in a uniform monthly exposure rate. If the dose to the embryo/fetus is between 0.05 rem and 0.5 rem at the time of declaration, then dose to the embryo/fetus is limited to 0.05 rem for the remainder of gestation.

06.F.05 Radiation Monitoring, Surveys, and Dosimetry.

a. Users of radioactive material or radiation generating devices shall conduct surveys and monitoring to ensure occupational dose limits are not exceeded.

b. Instruments used for radiation monitoring and surveying shall be:
(1) Available and used whenever radioactive material or radiation generating devices are used;

(2) Properly calibrated at least annually to a National Institute of Standards and Technology (NIST) traceable source;

(3) Appropriate for the type and intensity of the radiation surveyed;

(4) Operationally checked against a dedicated check source before each use; and

(5) The RSO must maintain at least two survey instruments to accommodate maintenance and calibration downtime.

c. Users of radioactive material or radiation generating devices and visitors or personnel performing work tasks in the area shall coordinate with the RSO for appropriate dosimetry use whenever any of the following situations exist:

(1) An individual enters a Radiation Area (> 5 mrem [50 microsieverts (µSv)] in any one (1) hour at 1 ft (30 cm) from the radiation source), or a High Radiation Area (> 100 mrem [1 mSv] in any one (1) hour at 1 ft (30 cm) from the radiation source), or a Very High Radiation Area (>500 rad [5 Gray (Gy)] in 1 hour at 3.3 ft (1 m) from the radiation source);

(2) An individual has the potential to receive greater than the ALARA limits established pursuant to Section 06.F.04.a.(3) in 1 year.

d. All external dosimetry shall be processed by a National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratory. USACE personnel shall use dosimetry provided by the Army Dosimetry Center.

e. Users of unsealed radioactive material sources shall institute an internal dosimetry program:

(1) When there is a potential for an employee to receive an internal dose of greater than 0.5 rem (5 mSv) per year;

(2) That is reviewed and approved by a qualified health physicist, and

(3) That contains provisions for a pre-exposure bioassay, a bioassay method capable of detecting internal radioactive materials, at a level below 10% of the annual limits of intake (ALI) listed in Appendix B of 10 CFR 20 for each radionuclide used, appropriate action levels for requiring additional bioassay, actions for individuals found to have internally deposited radioactive materials, and provisions for post-exposure bioassay.

06.F.06 Access, Storage, and Control.
a. All radiological devices and radioactive materials shall be designed, constructed, installed, used, stored, transported, and disposed of in such a manner to ensure personnel exposures are kept ALARA.

b. Users of radioactive materials or radiation generating devices shall post signs and control access to radiation areas in accordance with Section 06.F.08.

c. Where radiation levels exceed 2 mrem (20 μSv) in any 1 hour period, users shall use engineering controls, shielding, access time limitation, and/or physical separation to keep doses to the public ALARA.

d. Users shall secure radioactive material and radiation generating devices against theft or unauthorized use.

e. Storage shall be in accordance with any license or permit requirements.

f. Radioactive material and radiation generating devices, not in storage, shall be under constant control and surveillance.

g. Operations involving regulated radiation hazards or users of regulated radioactive material or radiation generating devices shall conduct surveys to ensure that the public dose limit of 0.01 rem (0.0001 Sv) is not exceeded.

06.F.07 Respiratory Protection and other Controls.

a. Users of radioactive material shall, to the extent practicable, institute process or engineering controls to limit concentrations of radioactive materials in air.

b. Where process or engineering controls are unable to control airborne radioactive material concentrations, users shall increase monitoring and limit intakes of radioactive materials through control of access, limitation of exposure times, use of respiratory protection equipment, or other controls.

c. The use of respiratory protection equipment shall be in compliance with Section 05.G of this manual, and shall be limited by the protection factors listed in Appendix A of 10 CFR 20.

06.F.08 Signs, Labels, and Posting Requirements.

a. The RSO shall post in a conspicuous location a sign or signs bearing the standard radiation symbol shown in Figure 8-7 and the following words:

(1) "Caution, Radiation Area" - areas where radiation field is equal to or greater than 5 mrem (0.05 mSv) in any 1 hour and less than 100 mrem (1 mSv) in any 1 hour at 30 cm from the radiation source;
(2) "Caution, High Radiation Area" - areas where radiation field is equal to or greater than 100 mrem (1 mSv) in any 1 hour at 12 in (30 cm) from the radiation source and less than 500 rads (5 Gy) in any 1 hour at 3.3 ft (1 m) from the radiation source;

(3) "Grave Danger, Very High Radiation Area" - areas where the radiation field is equal to or greater than 500 rads (5 Gy) in any 1 hour;

(4) "Caution, Airborne Radioactivity Area" – rooms, enclosures, or areas where airborne radioactive material concentrations are greater than the derived air concentration (DAC) limits listed in 10 CFR 20, Appendix B or where concentrations (excluding Radon-222) exist to such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6% of the annual limit on intake (ALI) or 12 DAC-hours; or

(5) "Caution, Radioactive Material" – areas or rooms where quantities of radioactive materials in excess of ten times the 10 CFR 20, Appendix C quantities are used or stored.

b. Users who receive or expect to receive a package containing radioactive material shall follow the package receipt procedures listed in 10 CFR 20.1906.

c. When a site has an NRC license, the RSO shall post an NRC Form 3 in a location visible to all employees who work with or around radioactive materials

06.F.09 Radioactive Waste Disposal

a. Radioactive sealed sources (and gauges) when no longer needed may be returned (transferred) to the manufacturer. The local USACE RSO must be notified and any applicable licenses or permits amended or terminated.

b. Radioactive waste disposal shall be coordinated with the GDA. For disposal actions specific to USACE operations and activities the GDA or Project Manager shall coordinate with the USACE Command RSO and the USACE Environmental and Munitions Center of Expertise.

c. Tritium (H-3) and Carbon-14 used in liquid scintillation counting, at concentrations below 0.05 microcuries per gram (μCi/g), may be disposed without regard to its radioactivity. (Note: Many liquid scintillation fluids are hazardous wastes and must be disposed of as such.)

06.F.10 Records.

a. All users of radioactive material or radiation generating devices shall prepare and maintain records of the Radiation Safety Program for three (3) years after termination of the license or permit.
b. For any individual for whom monitoring was required by Section 06.F.05, the RSO shall prepare and maintain documentation of that person’s occupational dose during the current year. The RSO shall also attempt to obtain records of cumulative occupational radiation dose.

c. All users of radioactive material or radiation generating devices shall prepare and maintain records of all calculated or monitored radiation dose to individual members of the public so as to document compliance with Section 06.F.05.

06.F.11 Reports.

a. Any loss, theft, damage, or overexposure shall immediately upon discovery be reported to the RSO who will then file a report (if required) with NRC in accordance with the requirements of 10 CFR 20.

b. **Mishaps** involving radioactive material or radiation generating devices shall be reported immediately to the RSO and the USACE RSSO.

c. Annual reports shall be issued by the RSO for each individual USACE radiation employee with the recorded or calculated dose assigned to the USACE individual for the year or specific work project. These shall be maintained in such a manner that accumulated exposure can be determined at a future date.

06.F.12 Transportation.

a. Users of radioactive material shall comply with the requirements of the DOT for inter- and intra-state transport contained in 49 CFR.

b. Persons who prepare shipments of radioactive materials that are defined as hazardous material under DOT regulations are required to be trained (49 CFR 173.1(b)), certified, and issued an appointment letter in accordance with DoD 4500.9-R, Chapter 204.

06.F.13 Medical surveillance. > See Section 33 for requirements specific to work conducted under the provisions of 29 CFR 1910.120 and 29 CFR 1926.65.

a. Medical examinations are not routinely required before occupational exposure to ionizing radiation. For USACE personnel, a medical examination shall be conducted in accordance with DA PAM 40-501, when deemed necessary, by a physician, the RSO, or other regulations. The RSO will coordinate with supporting medical personnel to help ensure that personnel receive appropriate occupational health surveillance.

b. All cases of overexposure and suspected ingestion or inhalation of radioactive materials shall be referred to a physician for examination.

06.F.14 Radon-222.
a. If a work area is occupied for 40-hours per week or more by an individual 18 years of age or older, and average natural occurring radon-222 concentration is greater than 100 pCi/L, then number of hours worked in the area by the individual shall be reduced or engineering controls introduced to reduce the radon-222 concentration. If the exposure is due to a regulated radiation source, the requirements of the NRC license shall apply. > See 29 CFR 1910.1096(c)(1) which references 10 CFR 20 Appendix B Table 1 and Table 2.

b. Any work area in a structure, building, or tunnel, wherein workers may be reasonably expected to be exposed to naturally occurring radon-222 exceeding 25 pCi/L averaged over a 40-hour work week, is an Airborne Radioactivity Area and shall be posted in accordance with 29 CFR 1910.1096(e)(4)(ii).

c. All individuals working in or frequenting any portion of an area posted per Section 06.F.14.b shall receive instruction regarding exposure to radiation as per 29 CFR 1910.1096(i).

06.G Non-ionizing Radiation, Magnetic and Electric Fields.

06.G.01 Lasers.

a. Only qualified and trained employees may be assigned to install, adjust, and operate laser equipment. Proof of qualification of the laser equipment operator shall be in the operator’s possession during operation. A qualified employee shall design or review for adequacy all radiation safety Standard Operating Procedure (SOP).

b. Laser equipment shall bear a label to indicate make, maximum output, and beam spread.

c. Areas in which lasers are used shall be posted with standard laser warning signs. > See Figures 8-5 and 8-6

d. Employees whose work requires exposure to laser beams shall be provided with appropriate laser safety goggles that will protect for the specific wavelength of the laser and be of optical density adequate for the energy involved, as specified in Table 6-2. Protective goggles shall bear a label identifying the following data: the laser wavelengths for which use is intended, the optical density of those wavelengths, and the visible light transmission.
TABLE 6-2
Laser Safety Goggle Optical Density Requirements

<table>
<thead>
<tr>
<th>Intensity, continuous wave maximum power density (watts/cm²)</th>
<th>Attenuation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Optical density</td>
</tr>
<tr>
<td>0.01</td>
<td>5</td>
</tr>
<tr>
<td>0.1</td>
<td>6</td>
</tr>
<tr>
<td>1.0</td>
<td>7</td>
</tr>
<tr>
<td>10.0</td>
<td>8</td>
</tr>
</tbody>
</table>

e. Beam shutters or caps shall be used, or the laser turned off, when laser transmission is not required. When the laser is left unattended for a period of time (e.g., during lunch hour, overnight, or at change of shifts) the laser shall be turned off.

f. Only mechanical or electronic means shall be used as a detector for guiding the internal alignment of the laser.

g. The laser beam shall not be directed at employees: whenever possible, laser units in operation shall be set above the heads of employees.

h. When it is raining or snowing or when there is dust or fog in the air, the operation of laser systems shall be prohibited (as practical); during such weather conditions employees shall be kept out of range of the areas of source and target.

i. Employee exposure to laser power densities shall be within the TLVs as specified by the ACGIH in "Threshold Limit Values and Biological Exposure Indices."

j. Only Class 1, 2, or 3a lasers may be used as hand-held pointing devices. Lasers used as pointing devices (e.g., during briefings) shall not be directed toward employees and shall be handled and stored in accordance with the manufacturer’s recommendations.

k. Suspected LASER eye injuries: Immediately evacuate personnel suspected of experiencing potentially damaging eye exposure from LASER radiation to the nearest medical facility for an eye examination. LASER eye injuries require immediate specialized ophthalmologic care to minimize long-term visual acuity loss. Medical personnel should obtain medical guidance for LASER injuries from the Tri-Service LASER Incident Hotline, (800) 473-3549 (24-hour phone line).

06.G.02 Radio frequency and electromagnetic radiation.
a. Ensure that no employee is exposed to electric or magnetic fields, radio frequency (RF) including infrared, ultraviolet, and microwave radiation levels exceeding the values listed in the ACGIH Threshold Limit Values and Biological Exposure Indices.

b. Routine use of RF protective clothing to protect personnel is prohibited.

(1) Protective equipment, such as electrically insulated gloves and shoes for protection against RF shock and burn, or for insulation from the ground plane, is permissible when engineering controls or procedures cannot eliminate exposure hazards.

(2) Users will identify, attenuate, or control potentially hazardous RF electromagnetic fields and other radiation hazards associated with electronic equipment by engineering design, administrative actions, or protective equipment, (in that order), or a combination thereof. Use process and engineering controls before PPE to protect employees.

c. All personnel routinely working with RF emitting equipment where exposures may exceed TLVs will receive training in RF hazards, procedures for minimizing these hazards, and their responsibility to limit potential overexposures. Operator’s manuals, Training Orders, Equipment SOPs, etc. will be available for all RF generating equipment and safety guidance will be followed.

d. Whenever personnel are potentially exposed to RF fields exceeding PELs, the fields will be measured and evaluated using Institute of Electrical and Electronics Engineers (IEEE) guidance. District and/or project safety personnel will use this information and document RF environments. Where multiple RF electromagnetic radiation emitters are located in fixed arrangements, RF evaluation data will include a determination of weighted contributions from expected simultaneously operated emitters.

0.6.H Ventilation and Exhaust Systems.

06.H.01 Portable and Temporary Ventilation Systems.

a. All portable or temporary ventilation systems shall remove dusts, fumes, mists, vapors and gases away from the worker and the work environment or provide air to prevent an oxygen deficient atmosphere.

b. Portable or temporary ventilation systems shall be used as designed by the manufacturer. All hoses shall be only as long as the maximum allowed by the manufacturer to provide the required air flow at the supply or exhaust point. If adding or changing hoses, only hoses and/or connectors shall be used that are comparable and compatible with the hoses and connectors provided by the manufacturer.

c. Make-up air for air supply ventilation systems shall draw air free of contaminants and away from any potential contaminant source.
d. Any portable or temporary ventilation system and the locations where the systems are to be used shall be approved by the GDA or SOHQ before use. Manufacturer information or design criteria shall be provided with the request for approval.

e. Airborne contaminants created by portable or temporary ventilation systems (such as drills, saws, and grinding machines) in concentrations exceeding acceptable safe limits shall be effectively controlled at the source. > See Section 06.A.03.

f. The use of high efficiency, filtered, recirculated ventilation units shall be allowed when:

(1) The filtration system lowers the levels of any of the toxic fumes or dust from the operation to less than half of the OEL. This shall be documented by an IH or CP through sampling for the contaminants.

➤ Note: Welding, carbon monoxide, ozone, and carbon dioxide are common contaminants that are not filtered out by most filtration devices.

(2) The unit and filtration are regularly maintained and the maintenance procedure and schedule is written and documented when maintenance is completed.

(3) The air is not recirculated into a confined space.

(4) The contaminant is not beryllium or chromium. Fumes or particulate from beryllium or chromium are not to be filtered and recirculated.

06.H.02 Ventilation systems shall be operated and maintained in such a manner to ensure the maintenance of a volume and velocity of exhaust air sufficient to gather contaminants and safely transport them to suitable points for removal.

06.H.03 Duration of operation.

a. Ventilation systems shall be operated continuously during operations when persons are exposed to airborne contaminants or explosive gases at or above acceptable safe limits as defined in Section 06.A.01 or as otherwise specified by this manual, referenced standards, or regulations.

b. Ventilation systems shall remain in operation for a period of time after the work process or equipment has ceased to ensure the removal of any contaminants in suspension or vaporizing into the air.

06.H.04 Local exhaust ventilation systems shall be periodically evaluated to ensure that proper contaminant capture, movement through the system and filtration or exhaust to the outside.
06.H.05 Dusts and refuse materials removed by exhaust systems or other methods shall be disposed of in a manner that will not create a hazard to employees or the public and in accordance with Federal, State, and local requirements.

06.H.06 Ventilation systems used to remove hazardous dusts, fumes, gases, or substances shall be evaluated annually to determine if the system requires cleaning. The cleaning of the ventilation system shall be part of the written housekeeping program section of the Project SOH Plan or APP.

06.1 Abrasive Blasting.

06.1.01 General. Silica sand shall NOT be used as an abrasive blasting media. Alternative abrasive blasting materials are available and listed in Table 6-3. Depending on the application, one of these alternative materials is suggested for use as an abrasive blasting media.

a. Abrasive blasting operations shall be evaluated to determine composition and toxicity of the abrasive and the dust or fume generated by the blasted material, including surface coatings. This determination shall be documented on the AHA (Activity Hazard Analysis) developed for the abrasive blasting activity.

b. Written operating procedures shall be developed and implemented for abrasive blasting operations, including pressurized pot procedures (filling, pressurizing, depressurizing, and maintenance and inspection). The procedures should be added as an appendix to the APP.

c. The concentration of respirable dust and fume in the breathing zone of individuals exposed to the blasting operation shall be maintained below any OEL for the material being blasted and the blasting agents or its byproducts.

d. No employee will be allowed to work in abrasive blasting operations unless he has met the medical surveillance and training and experience requirements, and has been provided the appropriate PPE.

e. All production and control systems used in a stationary abrasive-blasting process shall be designed or maintained to prevent escape of airborne dust or aerosols in the work environment and to ensure control of the abrasive agents.

f. Pressurized systems and components shall be inspected, tested, certified and maintained in accordance with the requirements of Section 20.

g. Engineering controls for noise and dust shall be used even if they cannot reduce the exposures to below OEL (significantly reduces noise and dust exposure to the employees).
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06.1.02 Blast Cleaning Enclosures and Rooms.

a. The ventilation in all blast enclosures shall be measured annually to confirm the flow is adequate and the system does not require cleaning or maintenance. Exhaust systems shall be part of a regular cleaning and maintenance program.

b. All air inlets and access openings shall be baffled to prevent the escape of abrasive agent and contaminant and the recommended continuous airflow into the air inlets is a minimum of 250 fpm (4.6 kph).

c. Negative pressure shall be maintained inside during blasting.

d. The rate of exhaust shall be sufficient to provide prompt clearance of the dust-laden air within the enclosure after cessation of the blasting.

e. If abrasive blasting is automated, the blast shall be turned off before the enclosure is opened. The exhaust system shall be run for a sufficient period of time to remove the dusty air within the enclosure to minimize the escape of dust into the workroom and prevent any health hazard.

f. In the room, a cleanup method other than broom sweeping or compressed air blowing shall be used to collect the abrasive agent after blasting (e.g., vacuum cleaning). If the blasting agent is removed manually, appropriate personal protective equipment, including respiratory protection shall be worn and not removed until outside the blasting room.

06.1.03 Blasting without Enclosures.

a. If abrasive blasting must be performed inside a building without enclosures, respiratory protection shall be provided for all employees in the area. Portable engineering control devices shall be used at the location to collect the entire used abrasive agent as it is applied.

b. When airborne abrasive-blasting dust becomes sufficiently heavy in an area to cause a temporary safety hazard by reduced visibility, or discomfort to the unprotected employees not engaged in abrasive blasting, such operations in the affected area shall be discontinued until the airborne dust is removed by exhaust ventilation and the settled dust has been removed from the horizontal surfaces in the area. If such operations have to continue, appropriate respiratory protection shall be provided to those employees remaining in the area.

c. Abrasive materials shall not be allowed to accumulate on aisles and walkways to create a slipping hazard.
d. If wet abrasive blasting is employed to reduce dust exposures, the aerosols produced and the dried residues that become airborne might be potential hazards and shall be considered.

06.1.04 Confined spaces. Abrasive blasting work conducted in a confined space shall be performed in accordance with Section 34. If the space is mechanically ventilated, means shall be provided to collect dust before release to the open atmosphere.

06.1.05 Blasting Outdoors.

a. Work completed outside has been shown to create exposures to health hazards for the worker and other trades in the area. Air and noise samples shall be taken to document the level of exposure to the worker and the workers in the area, unless similar operations documented no exposure. Blasters shall be protected in a manner equivalent to Section 05 and/or 29 CFR 1910.94(a)(5), whichever is more stringent.

b. Engineering controls and work practices, such as wet blasting methods, shall be used to prevent the dust cloud from spreading to other work areas. Check with Local and State requirements which may add restrictions to outdoor abrasive blasting. If the surface to be blasted is painted or contains high levels of silica and/or heavy metals, such as lead, chromium, or cadmium, an enclosure may be required to prevent disbursement of the hazard.

c. Hearing protection and respiratory protection shall be available to all employees in the area unless noise and air sampling documents the workers are not exposed to the blasting agent or contaminants from the blasted surface.

06.1.06 Personal Protective Equipment (PPE).

a. Selection and use of PPE shall be in accordance with Section 05. If reusable coveralls are used, they shall be vacuumed before all breaks and removed at the end of the shift. Clothes shall not be taken home to be cleaned by the worker or family, but shall be laundered by the employer.

b. Air-supplied helmets, blast helmets/hoods, dust respirators, ear muffs, safety boots or toe guards, durable coveralls, closeable at wrists, ankles, and other openings, and safety glasses should be an individual issue item, identified with and used by only one employee. Such equipment may be reissued to another employee only after complete cleaning, repair, and decontamination.

c. Means shall be provided to clean and store air-supplied respiratory equipment after each shift of use. Storage shall be in a clean enclosure such as locker, footlocker, plastic container or zip-lock type bag. Employees shall be trained to maintain issued equipment in clean and good working condition.
d. Replacement of prescription or plano safety glasses shall be made if multiple pitting or etching is visible in the center of the lenses.

e. Replacement of faceplates in air-supplied helmets and blast helmets/hoods shall take place when a side-on light source produces obscuring visible reflections and glare from the etched spots and pit holes in the faceplate. Mylar coating, or similar transparent plastic material, is recommended to protect the glass or plastic faceplate.

f. Length of air hose may not be altered from the manufacturer’s specifications.

g. Daily checks shall be performed by the wearer of PPE to maintain it in good working condition. Rips, tears, and openings of PPE that expose skin to abrasive agents shall be mended or replaced. Functional tests for leaks, proper respiration, and good connections shall be performed on the complete air-supply system.

h. Air supply - portable.

(1) The breathable air supplied to the blast helmet or hood shall be drawn from an oil and carbon monoxide free air compressor. The compressor used for blasting cannot be used for breathing air. Breathable air-supply system should be equipped, if possible, with audible alarm at the helmet or hood to warn the user of low air pressure.

(2) Hearing protection. Suitable hearing protection, capable of attenuating employee noise exposure as discussed in Section 05.C, shall be worn inside the blast helmet or hood unless hearing protection is an integral part of such helmet or hood.

(3) Heat stress. Cooling of breathable air, supplied to the blast helmets/hoods, should be considered depending on season and employee exposure to heat sources.


06.J. General. Employer’s APP or Project SOH plans shall include control of heat and/or cold stress hazards, as appropriate for the season and work location. Heat/Cold Stress sections in the APP or Project SOH plans, shall take into consideration the influence of environmental conditions, workload, and personal factors.

06.J.01 Heat Stress: The APP or Project SOH Plan and individual AHAs shall address heat stress under the following working conditions:

a. CONUS and OCONUS locations when hot/dry or hot/humid environments are forecasted;

b. Work in conducted in semi-permeable or impermeable clothing and/or heavy clothing such as arc-rated suits;
c. Work in confined work environment with minimal air movement;

d. Work when heat index is greater than 75°F (24°C) or dry temperature is 75°F with 55% humidity or Wet-Bulb-Glove Temperature (WBGT) exceeds the action level for various exertion levels in Table 2 of the TLV and Action Limit for Heat Stress Exposure in the current ACGIH TLV/BEI booklet;

e. Work around heat-producing equipment, furnaces, boilers, asphalt pots, engines, compressors, etc.

06.J.02 Heat Stress Monitoring Plan (HSMP). The written HSMP shall be incorporated into the APP or Project SOH Plan and shall cover the following topics relative to the on-site conditions expected:

a. Training on heat-related illnesses and how it can be prevented and the control measures to be taken;

b. Method used to monitor for heat stress, including standards being utilized and the responsible party for monitoring heat stress;

c. Signs and symptoms of heat-related illnesses and first aid procedures for each condition;

d. Exacerbation of heat related injury and illness based on various types of clothing, including general work clothing, semi-permeable and non-permeable clothing, arc flash clothing, and other protective clothing which reduces the evaporation rate;

e. The dangers of using drugs and alcohol in hot work environments.

06.J.03 In hot environments as defined above, the following shall be required:

a. Potable drinking water shall be available to employees and employees are encouraged to frequently drink small amounts, (e.g., 1/2 cup every 15-20 minutes). The water shall be kept reasonably cool 50-60°F (10-15°C) to encourage consumption. > See Section 02.C.

b. Tool box training which addresses the requirements in the HSMP, anticipated weather conditions for the day, any heat-related incidents, etc.

c. When possible, work should be scheduled for cooler periods during the day.

d. Implement a buddy system. Workers should not only monitor themselves, but also be alert to changes and the symptoms of their co-workers.
e. Workers who have not previously worked in a hot environment or have had a previous heat-related injury, or are known to be on medication, shall acclimatize with a regimen of increasing exposure each day of work.

f. Provide recovery areas where possible, such as air-conditioned enclosures, or shaded areas, with intermittent breaks and water breaks.

g. If a worker is required to wear semi-impermeable or impermeable clothing, then physiological monitoring shall include:

(1) Heart rate monitoring with a standard of a sustained heart rate in excess of 180 beats per minute (bpm) minus the age of the worker in years, recovery heart rate at one minute after a peak work effort is greater than 120 bpm, or

(2) Monitoring of the core body temperature with a standard of greater than 100.4°F (38.0°C) for unacclimatized workers, and 101.3°F (38.5°C) for acclimated workers.

(3) Workers exceeding the above standards are required to have work/rest regimens and fluid replacement schedules.

h. If a worker is wearing permeable clothing:

(1) Environmental monitoring or physiological monitoring shall be conducted and work/rest regimens established.

(2) Monitoring shall be conducted when temperature exceeds 75°F (24°C) and 55% humidity.

(3) Use of a WBGT instrument is preferred, however, if a WBGT instrument is not available, and the WBGT cannot be obtained from local weather stations, then Figure 6-1, the Approximate WBGT Temperature Chart, should be used to approximate the WBGT.

(4) If Figure 6-1 is used, direct radiant sun exposure, air velocity, temperature, and humidity and adjustment factors for various work clothing should be taken into consideration.

i. Employees exposed to solar radiation with the potential for sunburn, should be encouraged to use sun screen with a sun protection factor (SPF) of 30 or greater, and should wear hats, long sleeve shirts, sunglasses, and other protective attire.

j. Workers who experience heat stress shall seek medical attention. Workers who have more than one heat-related episode within a month shall have a doctor’s written release prior to returning to exposures in a potential heat stress environment.
06.J.04 Cold Stress Management Plan (CSMP). A CSMP shall be incorporated into the APP or Project SOH Plan for the following work activities:

a. Extended work duration in refrigerated rooms;

b. Work in cold environments taking into consideration heat loss from wind speeds (e.g., when air temperature or wind chill could drop below 40°F (4.4°C));

c. Extended bare-hand work in cold weather;

d. Working with hands or parts of the body in cold water for periods greater than 10-12 minutes or potential cold water emersion;

e. Working in snow or ice.

06.J.05 The CSMP shall address:

a. Training on the signs, symptoms, and first aid for hypothermia, frostbite, and trench foot;

b. Control and prevention measures to include PPE, engineering and administrative controls, eating, drinking, and safe work practices;

c. Conditions and limitations in which bare hand work can be performed;

d. Frequency. Air temperature and wind speed shall be taken should be taken at least every 4 hours when the temperature drops below 20°F (-6°C) and wind speed exceeds 5 mph (8 kmph) or broadcasted wind chill factors may be used if the reading is within 10 miles of the location.
06.J.06 In cold environments the following guidelines shall be followed to prevent cold-related injury.

a. Warming shelters should be made available nearby when the wind chill drops below 10°F (-12°C).

b. A change of clothing shall be available if there is an opportunity for a worker to become wet.

c. When the wind chill drops below 0°F (-17°C), the following work practices shall apply.

   (1) Workers shall use the buddy system to watch for signs and symptoms of cold related injuries or illnesses.

   (2) The work rate shall be moderated to prevent sweating.

   (3) Heat shelters shall be provided.

   (4) New workers shall be given time to acclimate.
d. Workers exposed to -15°F (-26°C) shall use the work/warm-up schedule specified in the ACGIH TLVs/BEIs booklet.

e. If any extremity or body part is immersed in water where the air temperature is below 40°F (4°C), the employee shall be required to change any clothing that became wet and to dry off in a warm area.

f. Environmental monitoring. As the wind chill drops below 20°F (-7°C), the air temperature and wind speed (wind chill index) shall be monitored a minimum of every 4 hours or as warranted.

g. When the wind chill falls below 0°F (-17°C), the air temperature and wind speed shall be monitored every 2 hours or more frequently if it drops below this level.

06.K Cumulative Trauma Disorder Prevention.

06.K.01 Work activities that require employees to conduct lifting, handling, or carrying; rapid and frequent application of high grasping forces; repetitive hand/arm manipulations; tasks that include continuous, intermittent, impulsive, or impact hand-arm vibration or whole body vibration; and other physical activities that stress the body’s capabilities shall be evaluated by a competent person to ensure the activities are designed to match the capabilities of the employees.

06.K.02 When work activities that stress the body’s capabilities are identified, the employer shall identify it as a hazard in the APP or Project SOH Plan. The plan shall incorporate processes that recognize cumulative trauma hazards, isolate causative factors, inform and train employees, provide and implement PPE and engineering controls, if appropriate.

06.K.03 Control measures to minimize hand-arm vibration (HAV) shall include: use of anti-vibration tools and/or gloves; implementation of work practices that keep the employee’s hands and body warm/minimize vibration coupling between employee and the vibration tool; application of specialized medical surveillance to identify personnel susceptible to vibration, and adherence to TLV guidelines as specified by ACGIH in "Threshold Limit Values and Biological Exposure Indices". For USACE only, the evaluation shall include:

a. Acceleration measurements made according to ANSI S2.70 or acceleration data from the manufacturer (ISO 8662) or an online HAV database that has collected tool specific data via ISO 5349. If using manufacturer’s data, a safety factor of 2.0 should be incorporated and if using an online database, a safety factor of 1.25 is warranted.

b. Using an estimate or measurement for each individual piece of equipment used by an operator, a time weighted average of the vibration exposure shall be determined. Detailed description of the proper method of completing the vibration evaluations is found in ANSI S2.70.
c. If the estimate or monitored HAV exposure is greater than 2.5 m/s², then controls shall be implemented in the following order: changing the process to use lower vibrating equipment; using anti-vibration handles, mounts, tension chains; limited tool usage; providing training or techniques such as tool speed and proper shut off times; and the use of anti-vibration gloves that meet ANSI S2.73.

06. Indoor Air Quality (IAQ) Management.

06.01 Investigations. Supervisors shall report employee concerns or complaints of IAQ problems to the facility manager/owner or other designated representative. That individual will be responsible for investigating and resolving the IAQ complaint in a timely manner and reporting back to the supervisor. For leased facilities, procedures for resolving IAQ issues should ultimately be investigated and resolved by the lessor. An IH or other qualified and competent person shall initiate an IAQ investigation using appropriate guidelines published by ACGIH; AIHA; ANSI; American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE); EPA; OSHA; NIOSH; or other Federal, DOD, State, local, and host nation requirements. At a minimum the following shall be investigated:

a. Ensure building activities, such as painting, roof repairs, carpet installation and repair and other activities likely to involve usage of chemicals or solvents, are conducted after normal working hours where possible or in a manner that will prevent exposure to occupants.

b. Evaluate condition of the air-handling system for proper operation, make-up air supply, blocked dampers or diffusers, cleanliness of ducts and filters, and standing water or wet areas.

c. Educate employees and supervisors concerning measures they can take to help maintain acceptable IAQ in their work areas. Employees shall be instructed not to make unauthorized modifications to the heating, ventilation, and air conditioning (HVAC) systems (i.e., blocking off vents, removing ceiling tiles).

06.02 Environmental tobacco smoke (ETS). Employees shall be protected from involuntary exposure to ETS in working and public living environments.

a. Smoking, to include the use of smokeless cigarettes or cigars, shall be prohibited inside all DoD vehicles, aircraft, vessels, and work buildings.

b. Designated smoking areas only in outdoor locations that are not commonly used or accessed by nonsmokers shall be provided. In accordance with Executive Order 13058, all outside smoking areas shall be a minimum of 25 ft (7.6 m) from building entrances. Before establishing outside smoking area, local ordinances shall be reviewed and most stringent shall apply. Receptacles shall be provided in designated smoking areas for the containment of cigarette butts and other smoking by-products.
c. Designated smoking areas shall be located away from supplied-air intakes and building entryways/egresses to prevent ETS from entering occupied buildings and structures.

06.L.03 Mold Evaluation. Because mold can contribute to health problems ranging from minor irritation to serious debilitation if found in high quantities or improper locations, a mold assessment shall be performed when need is indicated.

a. Assessments/remediation shall be overseen by a competent mold inspector with a minimum of 5 years experience in evaluation of indoor air problems and an understanding both the properties of mold behaviors and building design or construction. This person shall be an IH, microbiologist, or a qualified indoor air specialist or mold inspector who has been certified by an independent IAQ certifying agency and/or who can demonstrate training and experience in the IAQ investigative field. Some states, local authorities and host nations also require this person to be licensed.

b. A visual assessment of potential mold hazards shall be performed, based on criteria in the, U.S. Army Public Health Command TG 278, Industrial Hygiene Preventive Medicine Mold Assessment Guide, the EPA Indoor Air Quality Checklists, and guidance from AIHA. Bulk and/or air samples are generally not necessary to evaluate mold hazardous environments.

c. A mold assessment shall be written and shall contain the following:

(1) Description of the area assessed including size (footprint), ventilation, and occupancy;

(2) Name and qualifications of the individual completing the assessment;

(3) Any sample results taken, including location of the sample result, date and time of the sample, temperature and humidity at the time of the sample; and laboratory procedure used to analyze the sample;

(4) Drawing of the area showing location of samples, location of visible mold or mildew and the type of substrate it is growing on, ventilation sources in the room, and other information thought to be important;

(5) Potential sources of the moisture which has caused the mold growth;

(6) Recommendations for controlling the problem and remediating the mold.

d. Causes of mold (i.e., water leakages, seepages, drainage, HVAC/ insulation repaired, etc.) shall be addressed before completing mold remediation.
06.L.04 Mold Remediation. If the assessment reveals mold remediation is required, then USAPHC TG 277, Army Facilities Management Information Document on Mold Remediation Issues, and any local, state, or host nation guidelines or regulations shall be used.

a. A Mold Remediation Plan shall be written by a competent mold expert and shall include: location and extent of the mold, description of conditions found (i.e. wet or dry), type of materials or 'substrate' that the mold is growing on, whether the substrate will be cleaned or removed, source or problem which created the mold, repair of building structure or component that is the source, and whether the mold contaminated area will be isolated from the remainder of the building and or its occupants. The plan shall also include the steps involved in remediation, identified hazards, recommended controls, equipment and materials (i.e., fungicide used for removal), inspection requirements and worker and occupant training requirements.

b. Mold remediation should not be performed by the same entity that performed the mold assessment.

c. Employees in the immediate area of the mold contamination shall be informed of the remediation, results of any testing, and symptoms of the hazard. The employees shall not be in the area during the remediation.

d. Post-remediation air sampling shall be done in the immediate area and in any areas in the mold spore or vegetative air-pathway and compared to outside air samples. Mold in areas above drop ceilings with combined air plenums shall have air samples taken within the plenum as well as in air-serviced areas. Air samples should be taken in the immediate area of remediation and analyzed by a laboratory in the AIHA Environmental Microbiology Laboratory Accreditation Program.

06.M Control of Chromium (VI) Exposure.

06.M.01 General. All activities which could generate chromium (VI) fumes, mists, or dusts shall be evaluated by an IH to determine potential personnel exposure over the OSHA Chromium (VI) standards. Typical operations where chromium exposures are high include: cutting or breaking up of cement surfaces made from Portland cement with a high chromium content, painting or paint removal operations, welding using rods or wire with a chromium coating, heating or welding on stainless steel, and handling or applying anti-corrosive substances or coatings.

a. The evaluation shall include a risk assessment of the type and frequency of exposure and breathing zone air samples and swipe sampling on surfaces in the work and surrounding area as described in 29 CFR 1910.1026.
b. The evaluation shall be added as an appendix to the APP or the Project SOH Plan. Individual sample results shall be provided to the employee and add to their official occupational health record and a summary of the sample results should be posted in the work area.

06.M.02 To prevent exposure to chromium (VI), the use of paints with chromium pigments, Portland cement with greater than 20 ppm chromium, or chromium/arsenic treated lumber shall be avoided when possible. Should chromium (VI) containing products be required, a justification and similar non-chromium (VI) product evaluation shall be conducted and submitted for review by the GDA or the USACE SOHO.

06.M.03 If chromium containing compounds are used and the objective determination is inconclusive, before air sampling confirms the level of exposure, the employer shall comply with the requirements of 1910.1026, 1915.1026, or 1926.1126, whichever is applicable. At a minimum, employers shall provide appropriate PPE, respirators, decontamination facilities, and a lunch room/area clean from chromium dust and/or fume.

06.M.04 If air sampling confirms chromium (VI) exposure over the OEL, and there is no adequate substitute or work practice change (i.e., use of argon instead of carbon dioxide when arc welding), then the employer shall provide appropriate engineering controls, i.e., local HEPA filtered ventilation systems, medical surveillance, housekeeping, and air sampling as required by the applicable chromium (VI) standard. If adequate engineering controls are not feasible or appropriate due to the length of the task, then PPE shall be provided.

06.M.05 In areas where chromium (VI) is generated or used, there shall be a housekeeping and decontamination program instituted.

a. Employees shall clean all surfaces a minimum of once a day or at the end of the shift that the chromium (VI) dust or fume was generated.

b. At a minimum all exhaust and ventilation systems shall be cleaned and filters changed annually.

c. At a minimum, workers shall remove outer work clothing before eating, drinking, or smoking.

06.N Crystalline Silica.

06.N.01 Occupational Standards.

a. Employee airborne exposure to crystalline silica shall not exceed the 8-hour time weighted average (TWA) OEL.

b. Mandatory requirements.
(1) Employee exposure shall be eliminated through the implementation of feasible engineering controls.

(2) After all such controls are implemented and they do not control to the OEL, each employer must rotate its employees to the extent possible in order to reduce exposure.

(3) When all engineering or administrative controls have been implemented, and the level of respirable silica still exceeds OEL, respirators may be used in accordance with mandatory requirements of Section 5 E. and 29 CFR 1910.134.

(4) Employees shall be trained on the hazards of silica, the controls required to control the potential exposure, any sampling results and work practices to lower their exposure.

06.N.02 Monitoring.

a. Each employer who has workplaces where silica is occupationally produced, reacted, released, transported, stored, handled, or used shall inspect each workplace and work operation to determine if any employee may be exposed to silica at or above the OEL. This evaluation shall be documented in the AHA for the job/task to be completed or PHA for government worker.

b. Air monitoring and analysis. Sampling and analytical methods shall be in accordance with those specified in Section 06.A.

06.N.03 Medical Surveillance. Each employer shall institute a medical surveillance program for all employees who are exposed to airborne concentrations of silica above the OEL for more than 30 days a year. The employer shall provide each employee a medical examination performed by or under the supervision of a licensed physician and shall provide the examination during the employee’s normal working hours without cost to the employee. The content of the medical exam shall be determined by the physician based on the exposure records of the employee and guidance provided by NIOSH Standard DHS pub. No 92-102 Aug 1992 or OSHA Instruction CPL 2-2.7 Oct 30, 1972.

a. Medical examinations shall also be made available:

(1) At least annually for each employee exposed to airborne concentrations of silica above the OEL for more than 30 days during the last year; and

(2) Upon notification by the employee that he/she has developed signs or symptoms commonly associated with chronic exposure to silica.

b. Where medical examinations are performed, the employer shall provide the examining physician with the following information:

(1) The reason for the medical examination requested;
(2) A description of the affected employee’s duties as they relate to the employee’s exposure;

(3) A description of any PPE used or to be used;

(4) The results of the employee’s exposure measurements, if available; and

(5) Upon request of the physician, information concerning previous medical examination of the affected employee.

c. Physician’s written opinion. The employer shall obtain and furnish the employee with a written opinion from the examining physician containing the following:

(1) The signs or symptoms of silica exposure manifested by the employee, if any;

(2) A report on the findings of any medical tests completed.

(3) The physician’s opinion as to whether the employee has any detected medical condition that would place the employee at increased risk of material impairment to the employee’s health from exposure to silica or would directly or indirectly aggravate any detected medical condition;

(4) Any recommended limitation upon the employee’s exposure to silica or the use of PPE; and

(5) A statement that the employee has been informed by the physician of any medical condition that requires further examination or treatment.

06_N.04 Training. Each employee who may be potentially exposed to silica shall be instructed at the beginning of his/her employment or assignment of potential silica exposure in the following:

a. Relevant symptoms; appropriate emergency procedures; and proper conditions and precautions for safe use or exposure;

b. To advise the employer of the development of the signs and symptoms of prolonged exposure to silica;

c. Specific nature of operations that could result in exposure to silica above the OEL, as well as safe work practices for the release of the silica and the types and function of engineering controls;

d. Proper housekeeping practices;

e. The purpose, proper use, and limitations of respirators;
f. A description of, and explain the purposes for, the medical surveillance program; and

g. The increased risk of impaired health due to the combination of smoking and silica dust exposure.

06.N.05 Respiratory Protection.

a. When the exposure to silica cannot be lowered below the OEL by engineering and administrative controls, an employer shall use respiratory protection.

b. Properly fitted particulate-filter respirators may be used for short, intermittent, or occasional dust exposures such as cleanup, dumping of dust collectors, or unloading shipments of sand at a receiving point when it is not feasible to control the dust by enclosure, exhaust ventilation, wetting, or other means.

06.N.06 Protective Clothing. Where exposure to airborne silica or other substances is above the OEL, work clothing shall be HEPA vacuumed before removal unless it is wet. Clothes shall not be cleaned by blowing or shaking.

06.N.07 Housekeeping.

a. To prevent the dispersal of silica dust, all exposed surfaces shall be maintained free of accumulation of silica dust.

b. Dry sweeping and the use of compressed air for the cleaning of floors and other surfaces shall be prohibited. If vacuuming is used the exhaust air shall be HEPA filtered to prevent generation of airborne respirable silica concentrations. Gentle wash down of surfaces is preferred.

c. Emphasis shall be placed upon preventive maintenance and repair of equipment, proper storage of dust producing materials, and collection of dusts containing silica. Sanitation shall meet the requirements of 29 CFR 1910.141.

06.N.08 Personal Hygiene Facilities and Practices. All food, beverages, tobacco products, nonfood chewing products, and unapplied cosmetics shall be discouraged in work areas.

06.N.09 Engineering Controls.

a. Dust suppression. Moisture, mists, fogs, etc., shall be added where such addition can substantially reduce the exposure to airborne respirable silica dust.
b. Ventilation. Where a local exhaust ventilation and collection system is used in a building, it shall be designed and maintained to prevent the accumulation or recirculation of airborne silica dust into the workplace. The system shall be inspected periodically. Adequate measures shall be taken to ensure that any discharge will not produce health hazards to the outside environment.

c. Additional control measures. When mobile equipment is operated in areas of potential silica exposure, engineering controls shall be provided to protect the operator from such exposure.

06.N.10 Itinerant Work. When employees are exposed to airborne silica at temporary work sites away from the primary worksite, emphasis shall be placed on respiratory protection, protective clothing, portable engineering controls, and provisions for personal hygiene and sanitation. Training of employees shall be provided to protect them as well as others from airborne silica dust exposure.
STUDY QUESTIONS

1. Operations, materials, and equipment involving potential exposure to hazardous or toxic agents or environments shall be evaluated by a qualified _____ to formulate a hazard control program.
   a. Industrial Hygienist or Competent Person
   b. Competent Person or Project Manager
   c. Industrial hygienist or Program Manager
   d. All of the above

2. A written hazard communication program shall address the following in project specific detail:
   a. Hazardous or toxic agent inventory and labeling
   b. MSDS or SDS management
   c. Employee information and training
   d. All of the above.

3. When eyes or body of any person may be exposed to hazardous or toxic agents, suitable facilities for quick drenching or flushing of the eyes and body shall be provided in the work area for immediate emergency use, and shall be:
   a. within ten feet away.
   b. accessible within the project site.
   c. within ten seconds of the hazardous material.
   d. within walking distance

4. Every hazardous or toxic agent being transported for disposal shall be transported with a copy of the substance’s _______ whenever applicable.
   a. Manufacturers handling procedures
   b. Substance control procedures
   c. MSDS (SDS)
   d. Chemical information

5. Protection against hazards from insects may include all of the following except:
   a. burning off surrounding ground cover
   b. clothing treated with DEET or Permethrin
   c. drainage or spraying of breeding areas
   d. smudge pots and aerosols
6. Areas in which lasers are used shall be:
   a. 200 feet from all permanent structures.
   b. posted with standard laser warning signs.
   c. off limits to all Government personnel.
   d. none of the above.

7. Airborne contaminants created by portable equipment (such as drills, saws, and grinding machines) in concentrations exceeding acceptable safe limits shall be _______ at the source.
   a. completely eliminated
   b. be reduced
   c. effectively controlled
   d. none of the above

8. Silica sand shall not be used as an abrasive blasting media. All of the following are suggested abrasive blasting alternate materials, EXCEPT:
   a. baking soda.
   b. corn cob granules.
   c. nut shells
   d. recycled plastic.

9. In hot environments, all of the following guidelines shall be followed to prevent heat related injury, EXCEPT:
   a. Implement a buddy system. Workers should not only monitor themselves, but also be alert to changes and the symptoms of their co-workers.
   b. Sports drinks such as Gatorade shall be provided to all employees.
   c. Individuals not acclimatized to the heat shall be allowed additional breaks, with period and number as determined by the SSHO.
   d. Provide recovery areas where possible, such as air-conditioned enclosures, or shaded areas, with intermittent breaks and water breaks.