

CHAPTER 4

Health and Safety

4-1. Introduction. This Chapter provides an introduction to the health and safety requirements unique to radioactive and mixed waste site remediation. HTRW health and safety requirements are described more fully in [ER 385-1-92](#), [ER 385-1-80](#), [EM 385-1-80](#), and [EM 385-1-1](#).

4-2. Responsibilities.

a. USACE has the primary responsibility for ensuring the health and safety of USACE personnel on-site and ensuring that all contractors on-site follow USACE accepted health and safety procedures. USACE and the contractor share the responsibility of ensuring that work performed on-site does not endanger the public on-site or off-site, in addition to protecting the environment. All personnel on-site are responsible for maintaining exposures to radiation as low as is reasonably achievable (ALARA). All personnel on-site are required to read and comply with the Site Safety and Health Plan (SSHP).

b. Many sites are under control of other agencies prior to USACE involvement. Where other agencies have the lead, that agency's safety and health program and plan will be followed by USACE and contractor personnel until responsibility for site safety has been turned over to USACE. The USACE PM may then elect to retain the existing safety and health program and plan, if it is in compliance with Federal, state, and local, as well as USACE, regulations, or elect to construct a USACE safety and health plan.

c. Some sites may be owned or operated by commercial parties. The operator or owner may have existing safety and health programs and plans, and may be regulated by other Federal agencies. USACE has a Memorandum of Understanding with the Nuclear Regulatory Commission (NRC) concerning USACE work at sites regulated by the NRC. Here again, the USACE PM may elect to retain the existing safety and health program and plan, if it is in compliance with Federal, state, and local, as well as USACE, regulations, or elect to construct a USACE safety and health plan. USACE may have no regulatory authority over the private owner and, therefore, no authority to impose an adequate health and safety plan. If the private owner objects, and USACE believes health, safety, and environmental protections to be inadequate, Federal and state agencies with jurisdiction must be notified.

4-3. Programs and Plans.

a. Contractors. All contractors shall have a written SHP (Safety and Health Plan) that addresses all aspects of HTRW worker health and safety.

b. Site Safety and Health Plan (SSHP). For each HTRW site, contractors shall have a written SSHP that addresses all expected hazards, and the methods proposed to mitigate those hazards that may be encountered on the site. The SSHP shall address all items discussed in [ER 385-1-92](#), Appendix C. If portions of the contractor's SHP are referenced in the SSHP, those portions of the SHP shall be attached as appendices to the SSHP.

4-4. Radiation Protection Items Addressed in the SSHP. In addition to addressing the health and safety items for HTW sites, the SSHP must address the following items that are unique to radiation sites. These items shall be integrated with the rest of the SSHP to ensure coordination of all health and safety issues on-site.

a. USACE Personnel.

(1) USACE will provide the work plan, scope of work, site safety and health plan, etc., which will be reviewed by qualified health physics personnel who are trained in accordance with [ER 385-1-92](#).

(2) USACE will provide site representatives who are trained according to [EM 385-1-80](#).

b. Contractor Personnel.

(1) The contractor will provide a certified health physicist, responsible for the review and implementation of all documents and procedures related to radiation protection.

(2) The contractor will provide a sufficient number of radiation protection technicians (sometimes referred to as HP techs) who are trained as required (meeting health physics personnel requirements) in [EM 385-1-80](#) to perform surveys, monitoring, and safety oversight on-site.

c. Contractor Dosimetry Responsibility.

(1) The contractor has two options concerning dosimetry.

(a) One alternative is that the contractor will monitor personnel exposures, provide appropriate external dosimetry to all personnel exposed to external sources of radiation (gamma or neutron radiation), and provide a method for dose determination for personnel who may become internally contaminated with radioactive materials.

(b) The other alternative is that the contractor will provide measurements and documentation that external or internal contamination could not result in doses to the individuals that exceed 10% of the annual TEDE.

(2) Common methods for meeting dosimetry requirements include providing thermoluminescent dosimeters or film badges to all personnel who enter the exclusion zone, and monitoring the air in the exclusion zone and documenting that the airborne concentrations of radionuclides are below 10% of the derived air concentrations listed in [10 CFR 20](#), Appendix B.

(3) Should a bioassay program be required, personnel should receive a baseline bioassay prior to entering the exclusion zone, periodic bioassays as determined by a health physicist, and a termination bioassay at the end of the project. Bioassay methods depend on the radionuclide and chemical form of concern and may include fecal sample analysis, urinalysis, organ counting, or whole body counting.

d. USACE Dosimetry Responsibility. USACE will provide appropriate dosimetry for USACE personnel. Dosimeters will be furnished and analyzed by the U.S. Army Ionizing Radiation Dosimetry Program at Redstone Arsenal in Alabama. Should bioassays be required for USACE personnel, these will be coordinated through the U.S. Army Center for Health Promotion and Preventive Medicine, at Aberdeen Proving Ground, Maryland.

e. Equipment.

(1) The contractor will provide surveying equipment capable of detecting the type and intensities of radiation expected on-site and to the limits of precision required in Data Quality Objectives (DQO) for personnel protection and cleanup of the site as specified in the work or safety plans.

(2) The contractor will provide monitoring equipment capable of accurately measuring the external radiation dose expected on-site.

f. Procedures. The contractor shall provide procedures that ensure that doses to on-site personnel and the general public are kept ALARA. These procedures will include, as appropriate:

(1) Limiting the time individuals are exposed to external radiation.

(2) Maintaining as much distance as reasonably possible between personnel and the sources of external radiation.

(3) Providing shielding, when necessary, to lower exposure to ionizing radiation.

(4) Surveying procedures to stop the spread of contamination from the exclusion zone.

(5) Monitoring procedures to ensure that contamination is not released from the site.

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(6) Decontamination procedures to ensure that site worker doses are maintained ALARA and to minimize the amount of contaminated waste generated.

g. Emergency Contacts. The emergency contacts listed in the SSHP must include the appropriate NRC region or agreement state contact if licensable radioactive materials are involved, the appropriate EPA region or state contact, and the Radiation Protection Officer for the USACE District and Division. For work on a military installation, the installation Radiation Safety Officer shall also be included.