

CHAPTER 9

Primary Regulatory Processes

9-1. Introduction. This chapter will provide the project manager (PM) and project delivery team with an overview of the primary regulations and requirements that USACE and their contractors will follow while executing environmental restoration of sites contaminated with radioactive waste or radioactive waste that is commingled with either CERCLA hazardous substances or RCRA hazardous waste. Once the preliminary determination has been made that a response action is warranted, two important and related questions must be answered for every environmental remediation project:

- What regulatory authority governs this response action?
- What are the cleanup levels that must be achieved for the contaminants of concern for the remedy to be protective of human health and the environment?

a. To determine the cleanup criteria, it is essential to determine the regulations that apply to the site, as well as which Federal or state regulatory agency has the authority and responsibility for enforcing the regulations. This chapter will discuss the primary restoration programs that USACE follows when cleaning up radioactive waste or mixed waste contaminated sites. The responsibilities of the two major Federal agencies that regulate the environmental restoration activities will also be briefly discussed:

- The Nuclear Regulatory Commission (NRC) is responsible for decommissioning of licensed facilities under the Atomic Energy Act (AEA).
- The Environmental Protection Agency (EPA) has regulatory authority over sites under two separate environmental programs - CERCLA and RCRA.

In addition, there may be situations where more than one Federal regulatory agency or multiple offices from the same Federal agency may have responsibility for regulating different contaminants or activities at a site.

b. Characterization of the type of radioactive material or waste is a very important component of determining which regulatory authorities govern the management of radioactive material. The characterization process must examine the processing history of the waste as well as the type and quantity of radionuclides present. Chapter 1 of this manual contains definitions for the common types of radioactive wastes or materials that USACE may encounter. In some situations, radioactive waste is characterized by what isn't present instead of what is present (e.g., LLRW). The term "mixed waste" is defined in the Federal Facilities Compliance Act as waste that contains both RCRA hazardous waste and AEA regulated, source, byproduct or special nuclear material.

c. An excellent resource when dealing with radioactive contamination is the Multi-Agency Radiation Survey and Site Investigation Manual ([MARSSIM](#)), which was developed collaboratively by four Federal agencies having authority and control over radioactive materials (DOD, DOE, EPA, and NRC). Appendix C of MARSSIM provides an overview of the statutory authorities and regulations that are the responsibility of each Federal agency. It is interesting to note that the EPA, NRC, and DOE derive their respective authorities for promulgating regulations, standards, and orders from many of the same statutes.

d. A comprehensive explanation of all the regulations and administrative and procedural requirements that USACE must comply with will not be included in this chapter. However, a brief discussion will be provided on the primary environmental statutes and regulations that pertain to the restoration of the radioactively contaminated sites. The PM will need to coordinate with the appropriate disciplines of the project delivery team (e.g., Office of Counsel, health physicist, risk assessor, regulatory, etc.) to determine if there are unique or additional requirements (e.g., state regulations) applicable to the specific project.

9-2. Environmental Response Authorities for Radioactive Waste or Mixed Waste.

a. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)[[42 USC 9601](#) et seq.]. CERCLA, commonly referred to as “Superfund,” established a national program for responding to uncontrolled releases of hazardous substances into the environment from abandoned waste sites. CERCLA hazardous substances are defined as any substance designated or listed under the Clean Air Act, the Federal Water Pollution Control Act, the Toxic Substances Control Act, and the Resource Conservation and Recovery Act. CERCLA will be the primary restoration program that USACE will typically utilize to execute an environmental response action for sites that have been contaminated with radioactive waste or mixed waste. However, if USACE does work for others that operate under an NRC or agreement state license, the activities will be conducted under the NRC regulations. On NRC licensed sites where USACE is contemplating a FUSRAP cleanup under CERCLA, a Memorandum of Understanding (MOU) may be needed to minimize the potential for dual regulation. The current NRC-USACE MOU for FUSRAP sites is described in Section 9-3d.(1) below.

(1) Authority. CERCLA provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances, pollutants, and contaminants that may endanger public health or the environment. For non-governmental National Priorities List (NPL) sites, undergoing a CERCLA remediation, EPA is the lead enforcement agency. [Executive Order 12580](#), Superfund Implementation, dated 23 January 1987, as amended by [Executive Order 13016](#), dated 28 August 1996 delegated many of the authorities of the President established in CERCLA to DOD, as well as other Federal agencies. One such authority is that DOD is the lead Federal agency for response actions at both NPL and non-NPL DOD installations. This includes the authority to select remedies, subject to the

concurrence of EPA if it is an NPL site [CERCLA, [Section 120\(e\)](#)]. USACE also has lead agency authority to select remedies at FUSRAP sites, regardless of whether the site is DOD or not [[Pub. L. 106-60 section 611](#)]. CERCLA applies to radiological events at DOD and DOE facilities, but does not apply to releases from NRC-licensed facilities subject to the requirements of the Price Anderson Amendment (Section 170) of the AEA-essentially nuclear power plants.

(2) Applicability. Radionuclides are considered hazardous substances under CERCLA by virtue of their listing as Hazardous Air Pollutants (HAPs) under the Clean Air Act (CAA), where they are listed in Appendix B to the List of Hazardous Substances ([40 CFR 302.4](#)). It is important to understand that hazardous substances and hazardous waste have specific meanings and are not synonymous. All RCRA hazardous wastes are by definition CERCLA hazardous substances, but not all hazardous substances are hazardous wastes. It is important to note that CERCLA excludes radionuclides that are considered source, byproduct, or special nuclear materials from the definition of “release” if from a nuclear incident as defined by the AEA, if such release is subject to requirements with respect to financial protection established by the NRC (Price Anderson Amendment Act of 1988-[42 USC 2210 et seq.](#)) or any release of source, byproduct, or special nuclear material from any processing site designated under UMTRCA ([42 USC 7911 et seq.](#)).

(3) Implementing Regulations. CERCLA response efforts are guided by the National Oil and Hazardous Substances Pollution Contingency Plan commonly referred to as the NCP ([40 CFR 300](#)). The NCP are the regulations that EPA has promulgated to implement CERCLA. The NCP establishes the criteria, methods, and procedures that must be followed to investigate contamination and determine if a response action should be taken at a site to protect human health or the environment.

(4) Process. In section 120(c) of [CERCLA](#) (42 USC 9620), Congress required EPA to develop a list of all Federal facilities that ever stored, treated, disposed of, released or spilled, or are currently generating, treating, storing or disposing of hazardous wastes, or have released a hazardous substance in a reportable quantity. The list, which EPA maintains, is called the Federal Agency Hazardous Waste Compliance Docket. CERCLA establishes the requirements for actions on sites listed on the docket. Once a Federal facility is listed on the docket, a preliminary assessment (PA) must be conducted at the facility. If, after completing the PA and consulting the NCP requirements, further action is warranted, the facility must perform a site inspection (SI). After completion of the PA/SI, EPA may elect to score the site using the hazard ranking system (HRS). If the HRS is high enough (≥ 28.5), EPA will determine whether to make the site an NPL site. A NPL site must initiate a remedial investigation and feasibility study (RI/FS) no later than six months after inclusion on the NPL. Upon completion of the RI/FS, the Federal facility must enter into an Interagency Agreement with EPA within 180 days and commence on-site remedial action within 15 months. After the RI/FS has been completed, a proposed plan must be presented to the

public with an opportunity for comments to be received and considered by the agency, after which a record of decision (ROD) will be prepared and signed. Compliance with the NCP is required regardless of whether the Federal facility or site is on the NPL. This means the administrative and procedural requirements of the NCP must be followed. The site must have appropriate site investigation and characterization, analysis of remedial alternatives, and selection of a protective and cost-effective response action. The public must be allowed an opportunity to comment on any response action, even if there is no further action required. A further explanation of the CERCLA process is provided in Appendix F of [MARSSIM](#) and paragraph 1.3 of [EM 200-1-4](#). Districts are encouraged to coordinate early with regulators to identify a single regulatory framework to guide the environmental restoration process. To minimize potential duplication of efforts by states, tribes, and the EPA, it is important that the lead regulator be clearly identified and communicated to all parties for each site. States or tribes should generally be the lead regulator for environmental investigations and response at non-NPL sites. In certain circumstances, EPA may serve as lead regulator where the state or tribe requests it or when EPA chooses to exert its lead regulator role. In instances where EPA assumes lead regulatory agency authority, roles should be documented and all parties notified. If USACE is performing work for others that are under an NRC or agreement state license, the lead regulator role may be the NRC or the agreement state.

(5) Cleanup Criteria. The CERCLA process [Section 121(d) of CERCLA ([42 USC 9621](#))] requires that a “degree of cleanup” be determined for the remedial action. In determining what remedial action is necessary and appropriate, the lead agency must consider the nine criteria established by CERCLA, Section 121, and implemented in [40 CFR 300.430.\(e\)](#). All CERCLA response actions must determine the applicable or relevant and appropriate requirements (ARARs) for remediation of the site. Once they are identified, the substantive elements of those ARARs must be determined, including all the conditions and alternatives to their application. The NCP does provide relief from strict compliance with the ARARs if certain conditions exist or can be met through a formal process to waive the ARAR [[40 CFR 300.430\(f\)\(1\)\(ii\)\(C\)](#)]. The ARAR analysis must determine if a requirement is a promulgated and legally enforceable Federal environmental law or regulation, or state environmental or facility locating law or regulation. The requirement must contain substantive criteria pertaining to the hazardous substances or pollutants or contaminants or the circumstances of their release at the site.

(a) The requirement is applicable if it specifically addresses the contamination or release at the site [[40 CFR 300.5](#)]. Another way to evaluate this is to pose the question; if the CERCLA permit waiver for on-site activities did not exist, would the regulator be able to impose the standard through a permit or other regulatory approval process? The ARAR analysis process should include a legal analysis by the District Office of Counsel to determine whether the requirement specifically addresses a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance found at a CERCLA site. The District is cautioned against accepting or developing a “laundry list” of statutes or regulations

that do not meet the CERCLA definition of an “Applicable” or “Relevant and Appropriate” requirement.

(b) The requirement may also be an ARAR if it is relevant and appropriate to the contaminants or the circumstances of their release, even if not applicable. Fundamentally, the law or regulation must address situations sufficiently similar to the circumstances of the release or the remedial action, and be well suited to the site. There are a number of factors that must be considered in making the determination whether a requirement is relevant and appropriate for the site [[40 CFR 300.400\(g\)\(2\)](#)]. It is very important to note that CERCLA and the NCP are very definitive that only state standards that are promulgated, are identified by the state in a timely manner, and are more stringent than Federal requirements may be ARARs for a CERCLA response action. In accordance with DERP and the NCP, USACE must formally request that the lead regulatory agency and support agency identify their potential ARARs for a particular site. The District should request the regulator agency provide the citation and explanation as to why they have identified a specific requirement as a potential ARAR for the site.

(6) Response Actions. CERCLA authorized two kinds of response actions to be taken where hazardous substances have been released or there is a potential for a release into the environment: removal actions (short-term) and remedial action (long-term).

(a) Removal Action. The removal action is intended to address actual or threatened releases in a prompt manner to protect human health and the environment. The removal action is to abate, prevent, minimize, stabilize, mitigate, or eliminate the threat to human health or the environment. Typically, the removal action is used to eliminate an imminent hazard to human health or the environment. Removal actions shall, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerned. Removal actions, unlike remedial actions, are not required to comply (or waive) all ARARs except to the extent practicable considering the site conditions. It is important to remember that removal actions don't necessarily always require removal of the contamination and may be erecting a fence to protect the public or providing an alternate drinking water source to the public. EPA has categorized removal actions, under CERCLA and the NCP, in three ways:

- Emergency removal actions (within hours of discovery)
- Time-critical removal actions (initiated within 6 months)
- Non-time critical removal actions (planning and evaluation takes 6 months or longer)

The NCP requires public involvement in the removal process, through the administrative record process, public notices, and other mechanisms. Removal actions can take place at any time during the entire CERCLA process. An engineering evaluation and cost analysis

(EE/CA), which serves as a decision document, is required for non-time critical removal actions.

(b) Remedial Action. The remedial action process is used under CERCLA to address actual or threatened releases of hazardous substances that are serious, but not immediately life threatening or dangerous to the environment. Remedial actions are typically conducted after several years of investigation, evaluation of alternatives, and selection of a permanent final remedy. The NCP provides the implementing regulations for conducting the preliminary assessment (PA) and site inspection (SI) to determine if further site investigation and characterization is necessary. The remedial investigation (RI) is the CERCLA phase that can be considered the site characterization phase, in which the nature and extent of contamination is determined and potential risks and exposure pathways are evaluated to determine if there are unacceptable risks to human health and environment. The next phase is the feasibility study (FS), which may be conducted concurrently with the RI. The FS is the process to evaluate potential remedial alternatives to clean up the site. An important aspect of the RI/FS process is to identify the potential ARARs for determining the cleanup standards that must be achieved, as well as what impacts the ARARs may have on the possible remedy alternatives. The nine criteria are used in the remedy selection process and it is important to note that the selected remedy must be protective of human health and the environment and comply with ARARs. This manual will not provide a comprehensive explanation of the individual tasks that must be accomplished in preparing the PA, SI, RI, FS, proposed plan, and ROD. EPA provides a guidance document on the necessary steps in performing a RI/FS on a CERCLA site ([EPA/540/G-89/004](#)).

(7) Important Aspects of the CERCLA Process.

(a) Lead Agency Authority. The NCP provides a definition for “lead agency” in [40 CFR 300.5](#) that is very important when executing a CERCLA response action. In the case of a release of hazardous substance, pollutant, or contaminant, where the release is on or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of DOD or DOE, then DOD or DOE will be the lead agency (as appropriate). The Federal agency maintains its lead agency responsibilities whether the remedy is selected by the Federal agency for non-NPL sites, or by EPA and the Federal agency (NPL sites), or by EPA alone under CERCLA section 120 (NPL site where there is non-concurrence). USACE acts as lead agency for several programs that are under their “jurisdiction, custody, or control.” This includes the FUSRAP and FUDS programs where USACE has been officially designated as the lead agency for the selection of the remedy. USACE may act as lead agency at the request of the Commanders for installation restoration program (IRP) sites and Base Realignment and Closure (BRAC) facilities.

(b) Permit Waiver for On-site Activities. CERCLA [Section 121(e)] and the NCP are very specific that no Federal, state or local permit shall be required for the portion of any

removal or remedial action that is conducted entirely on-site, where such response action is selected and carried out in compliance with the CERCLA process. CERCLA response actions do not need to comply with administrative requirements such as administrative reviews, certifications, permitting, manifesting, reporting, and record keeping. However, substantive requirements, which are non-administrative, relating to numerical cleanup levels, required technology, emission control limitations, and other standards, must be complied with. The permit waiver does not preclude the response action from complying with an ARAR numerical standard that applies to the planned action.

(c) Use of “To Be Considered” (TBC) Documents. In the process of evaluating remedial alternatives, a lead Federal agency may consider other governmental documents that do not rise to the level of an ARAR. The NCP [§300.400(g)(3)] does make provisions for the use of advisories, criteria, or guidance developed by EPA (e.g., OSWER Directives), other Federal agencies or states that may be useful in developing CERCLA remedies. The designation and use of TBCs is a discretionary matter for the lead agency, and it should be carefully used, so as not to elevate to enforceability those guidance or policy statements that are not useful to support a decision on a remedy. Generally, TBCs should only be used when ARARs do not exist for a site, and only if they are not inconsistent with the nine criteria mandated by CERCLA for the remedy selection process.

(d) Removal Action as a Final Remedy. The general perception established by the NCP and understood by the public and the regulators is that the removal action is an interim measure taken to eliminate an immediate or potential hazard to human health or the environment. The removal action, to the extent practicable, is to contribute to the efficient performance of any anticipated long-term remedial action with respect to the release of hazardous substances. Unlike remedial actions, which must comply with (or invoke or justify a waiver) all ARARs, removal actions comply with ARARs only “to the extent practicable considering the exigencies of the situation.” The removal action has a number of procedural requirements that do not correspond to the level of detail that is required of a remedial action. A few of the major items are as follows:

- Public participation is more limited and compressed during a removal action.
- The removal action does not perform a comprehensive site characterization to determine nature and extent of contamination in all media and all potential pathways of exposure.
 - Human and ecological risk assessment is generally abbreviated.
 - Removal action does not generally provide a screening and detailed evaluation of remedies.

The NCP does require an engineering evaluation and cost analysis (EE/CA) for non-time critical removal actions but it does not share some of the important features (freezing ARARs, site closeout, etc.) of the ROD for a remedial action. Therefore, a removal action is

not the response action of choice for a final remedy. However, where circumstances dictate such an approach, e.g., time is of the essence, substantive CERCLA criteria for removal actions are met, and removal of the hazardous substance to unrestricted use levels does not compromise safety and is not significantly more costly or time consuming than cleanup to less conservative levels, a removal action to final remedy levels may be appropriate. If a removal action is being planned as a final remedy, it would be important to obtain approval from the USACE chain of command. Upon approval, the public and regulators should be provided early notification of the intention for the removal action to be a final remedy. The removal action should identify and comply with all ARARs that pertain to the response action as well as not take advantage of ARAR waivers as a subsequent remedial action would not be anticipated. The removal action should include a comprehensive site investigation to determine the nature and extent of contamination (e.g. soil, ground water, etc.) to ensure that the selected action protects human health and the environment. The removal action should be followed by a no further action record of decision to achieve site closeout. Removal actions taken by EPA, under the Superfund program, have a money (\$2 million) and time (12 months) limitation. If the site is not on the NPL, DOD is not necessarily limited by these restrictions as they apply to the use of Superfund money, but based on the previous factors, complex and expensive response actions should still be performed as remedial actions, with the remedial investigation, feasibility study, proposed plan, and record of decision in accordance with the NCP.

b. Resource Conservation and Recovery Act (RCRA)[[42 USC 6901](#) et seq.].

(1) Authority. RCRA is the primary Federal statute regulating the generation, transportation, treatment, storage, and disposal of solid and hazardous waste. RCRA was enacted by Congress to require proper management of waste generated at existing facilities. RCRA has kept in stride with current waste management issues and problems by way of Congressional amendments, the most notable being the Hazardous and Solid Waste Amendments (HSWA). Under provisions of HSWA, Congress established the authority for corrective action requirements at permitted or interim status hazardous waste management facilities. Mixed waste, as defined in Chapter 1, contains radioactive and hazardous waste. A dual regulatory framework exists for mixed waste, with the EPA or the RCRA-authorized states regulating the hazardous waste and the NRC or NRC agreement states, or possibly DOE, regulating the radioactive waste.

(2) Applicability.

(a) The RCRA Corrective Action program provides EPA (or authorized state) with the authority to require a current owner or operator of a hazardous waste management facility to take corrective action at a facility seeking a permit where there has been a release of a hazardous waste or constituent at the facility, regardless of when waste was disposed of at the facility, and to require work beyond the facility boundary where necessary to protect human

health and the environment. It is important to note that under the RCRA regulations, source, special nuclear material, and byproduct material (as defined by the AEA) are expressly excluded from the definition of solid waste, and, thus from regulation under RCRA as a hazardous waste.

(b) Over the past two decades, EPA, the NRC and state agencies have identified a number of naturally occurring materials that, because of human activity, may present a radiation hazard to people and the environment. This material is called technologically enhanced naturally occurring radioactive material (TENORM). TENORM is generally defined by the National Academy of Science as “any naturally occurring material not subject to regulation under the Atomic Energy Act whose radionuclide concentrations or potential for human exposure has been increased above levels encountered in the natural state by human activities.” RCRA does not generally exempt this material from regulation, except it exempts solid waste, including TENORM produced from the extraction, beneficiation, and processing of ores and minerals (Bevill exclusion) and oilfield wastes from regulation as hazardous wastes. Some states consider pre-1978 ore processing residuals to be TENORM and subject to RCRA, however, USACE holds that these residuals meet the statutory definition of source material and are, therefore, exempt from RCRA. If the uranium and/or thorium content of the residuals exceeds 0.05% by weight, the residuals would become regulatable source material.

(3) Implementing Regulations. Unlike CERCLA, which imposes remediation requirements by establishing cleanup criteria with ARARs, the RCRA remediation process has never been codified federally. Comprehensive corrective action regulations, also known as “the Subpart S Initiative” were proposed on 27 July 90, 55 FR 30798, but were never finalized. The objective of the proposal was to establish Federal corrective action standards against which state programs could be assessed when determining whether to authorize them to manage the RCRA corrective program for their state. However, EPA has since authorized the majority of states for corrective action, even without the regulations. RCRA allows states to develop and administer hazardous waste programs that are at least as stringent as the Federal RCRA law.

(4) Closure. The cleanup standard for RCRA closure requires the owner or operator of an RCRA interim status or permitted treatment, storage or disposal facility (TSDF) to close in a manner that:

- Minimizes the need for further maintenance.
- Controls, minimizes, or eliminates post-closure release or migration of hazardous waste and other hazardous constituents into the soil, air, or water (ground water or surface).
- Protects human health and the environment to the extent necessary.

One method of obtaining RCRA closure of the TSD unit or facility is achieved by leaving the wastes in place, which is referred to as closure-in-place. The second method is to remove the hazardous waste and decontaminate any releases or spills to equipment, structures, or the soil. This method is referred to as closure by removal or decontamination (also known as “clean closure”) and would not leave any contamination.

(5) Corrective Action. RCRA requires correction action for releases of hazardous waste or hazardous waste constituents from a solid waste management unit (SWMU) at TSDFs with a permit and those seeking a RCRA permit or approval of final closure. For example, a military installation may have a permit to store hazardous waste and would be subject to a corrective action if hazardous waste was spilled or released from the storage area. Note that only one regulatory authority, either Federal or state, shall possess RCRA corrective action authority. The goal of corrective action is to control or eliminate risks to human health and the environment. Risk-based decision-making is used to ensure protection of human health and the environment. RCRA corrective actions tend to be governed by media cleanup standards, which are similar to CERCLA ARARs. Media cleanup standards are the concentrations of a hazardous constituent that a remedy must achieve in a specific medium (e.g., soil, water). A cleanup standard may be based on promulgated Federal or state standards or developed through a site-specific risk assessment.

(6) Risk-Based Clean Closure.

(a) This closure method is a blend of the RCRA closure and the corrective action programs. A treatment, storage or disposal (TSD) unit can be considered clean-closed if it meets the risk-based standards appropriate under CERCLA cleanup or a RCRA corrective action. This method draws upon the removal and decontamination aspects of RCRA closure. EPA still requires the removal of the hazardous wastes and liners under this method, but it would not require that all contamination be removed. Limited amounts of hazardous constituents may remain in the media, provided the contaminants are below concentrations that would present a risk to human health or the environment. The second part to this process is the use of risk-based standards to determine your cleanup levels, which determine the level of decontamination that must be achieved for closure.

(b) The permittee/respondent may propose media cleanup standards. The standards must be based on promulgated Federal and state standards, risk derived standards, all data and information gathered during the corrective action process (e.g., interim measures, RCRA facility investigation, etc.) or other applicable guidance documents. If no other guidance exists for a given contaminant and media, the permittee/respondent shall propose and justify a media cleanup standard. The final media cleanup standards are determined by the implementing agency when the remedy is selected and documented in the Statement of Basis/Response to Comments or permit modification. It would be advisable to always propose media standards to the regulators instead of relying on the implementing agency to

set the media standards for the corrective action. (Refer to MARISSIM, Appendix F, for explanation of CERCLA and RCRA process).

c. Atomic Energy Act of 1954, as amended (AEA) [[42 USC 2011](#) et seq.]. This Act is the fundamental U.S. law on the civilian and military uses of source, byproduct, and special nuclear material. The Act requires that civilian uses of nuclear materials and facilities be licensed, and it empowers the NRC (AEC's co-successor) to establish by rule or order, and to enforce, such standards to govern these uses as in order to promote the common defense and security and protect health and safety of the public. Commission action under the Act must conform to the Act's procedural requirements, which provide an opportunity for hearings and Federal judicial review in many instances. The NRC regulatory responsibility pertains to the commercial operations involving radioactive material that are not associated with nuclear weapons development or research, or military uses of nuclear power. Their responsibility extends primarily to the commercial power industry, medical industry, and other commercial applications of radioactive material.

(1) DOE (AEC's co-successor) authority under the AEA extends to source material, special nuclear material, and byproduct material under the control or jurisdiction of the Secretary of Energy, and a limited number of specified programs, including nuclear weapons production and research related to national security interests. DOE is also the lead Federal agency in the remediation of legacy contamination at Federal facilities that were and remain engaged in those types of activities.

(2) EPA has the general responsibility for ensuring that all other Federal agencies remediate hazardous substances to levels that are protective for the public and the environment. EPA is provided the authority to issue applicable environmental radiation standards to protect human health and the environment from radioactive materials in the general environment outside the boundaries of the facilities under the control of the NRC.

d. Defense Environmental Restoration Program (DERP)[[10 USC 2701](#) et seq.]. Congress created the Defense Environmental Restoration Account (DERA) when it enacted Section 211 of Superfund Amendments and Reauthorization Act (SARA) -also known as DERP. Although DERA is not limited to sites on the EPA NPL, per the statute, hazardous substance response activities funded by the DERA must be carried out subject to, and in a manner consistent with, Section 120 of CERCLA. DOD environmental managers should be aware of the significance of that limitation, particularly when EPA or state regulators insist the cleanup be conducted pursuant to RCRA corrective action or state requirements other than CERCLA. If regulators demand cleanup efforts that are inconsistent with CERCLA Section 120, DERA funds will not be available to support those activities. District legal counsel should be a part of the project delivery team when addressing which cleanup authority should be followed. DERP does not apply to Civil Works facilities in accordance with DOD policy.

(1) It is important to note that the DERP statute [[10 USC 2705](#)] requires that EPA and appropriate state and local authorities must receive prompt notice from DOD under the following conditions:

- Discovery of releases or threatened releases of hazardous substances at a facility.
- The extent of the threat to public health and the environment that may be associated with any such release or threatened release.
- Proposal made by the Secretary to carry out response actions with respect to any such release or threatened release.
- The initiation of any response action with respect to such release or threatened release and the commencement of each distinct phase of such activities.

(2) The DERP statute requires that EPA and state and local authorities shall have an adequate time to comment on notices and proposals for response actions (removal or remedial) and that investigations and cleanup actions be consistent with CERCLA and the NCP. The DERP statute also requires that the program be carried out in consultation with EPA ([10 USC 2701](#)).

e. Army Reactor Program. The Army Reactor Program has designated USACE as responsible for nuclear reactor engineering, design, construction, and decommissioning design and implementation. USACE is also responsible for assisting, when requested, in compliance and environmental restoration projects for deactivated reactors. The Department of Army, under the provisions of the AEA (Section 110), self regulates under the Army Reactor program. The Army's reactor policy is to "follow to the maximum extent possible, the regulations of the U.S. Nuclear Regulatory Commission and the recommendations of the National Council of Radiation Protection and Measurements" ([AR 50-7](#)). The Army Reactor Program is designed to ensure that Army reactors are designed, constructed, operated, maintained, and decommissioned per U.S. national standards. When NRC regulations and Army Reactor regulations prescribe the same or similar requirements, the NRC regulations will be followed with notifications through command channels. If an Army reactor is also NRC licensed, then the NRC regulations will be followed with documentation provided to the Army Reactor Office.

9-3. Roles and Responsibilities for Regulating Radioactive Material.

a. Federal Agencies.

(1) EPA's radiation protection responsibilities originate from both the AEA and several environmental statutes. Under Reorganization Plan No. 3, which became law on 2 December 1970, EPA was made responsible for establishing applicable environmental standards for the protection of the general environment from radioactive material. EPA was provided the research, monitoring, promulgating regulations, and enforcement authorities for

media-specific chemical and radioactive pollutants. However, the transfer of radiation protection responsibilities to EPA was more limited than other pollutants because the Atomic Energy Commission (AEC) retained the responsibility for implementing and enforcement of radiation standards. Under the AEA, these standards were defined as “limits on radiation exposures or levels, or concentrations or quantities of radioactive material in the general environment outside the boundaries of the facilities that were regulated by the AEC” (later became the NRC).

(a) It is important to note that over the 30 years of existence, EPA has gained or asserted enforcement authority for some radioactive materials under several environmental statutes that Congress passed subsequent to the AEA. Through enactment of new statutes (e.g., Clean Air Act, Safe Drinking Water Act, CERCLA), EPA has been given additional responsibility to regulate certain activities or aspects of radioactive materials. EPA has established multiple offices within their agency that may be responsible for implementing regulations, depending on the environmental media and statute. When USACE is executing a radioactive or mixed waste restoration project, it is important to understand which EPA offices are administering the different implementing regulations.

(b) A comprehensive explanation of the statutory authorities of EPA and the individual offices responsibilities may be found in Appendix C of MARSSIM. An additional publication that discusses EPA’s authorities and responsibilities for the past three decades is [EPA 402-B-00-001](#).

(2) The NRC is an independent regulatory agency, created by the Energy Reorganization Act of 1974. Congress abolished the AEC and made the NRC responsible for ensuring the protection of the public’s health and safety in association with the operation of commercial nuclear power plants and fuel cycle plants, medical, industrial, and research applications of nuclear materials. Their authority includes protecting the public’s health and safety as well as the environment with the storage, transportation, and disposal of nuclear materials and waste.

(a) NRC issued regulations establishing standards for the decommissioning of facilities regulated under NRC licenses. These standards are mainly codified at [10 CFR Part 20, Subpart E](#), and provide radiological criteria for termination of licenses. They apply to facilities decommissioned under [10 CFR Part 30](#), governing the licensing of byproduct materials, [Part 40](#), governing the licensing of source material, and [Part 70](#), governing the licensing of special nuclear material. The criteria are excluded from application to uranium and thorium recovery facilities subject to [10 CFR Part 40, Appendix A.](#) The decommissioning standards establish criteria for license termination with unrestricted use, license termination under restricted conditions, and allow the submission of alternate criteria for license termination. A facility is considered to be acceptable for unrestricted use if residual radioactivity exceeding background results in a total effective dose equivalent

(TEDE) of 25 millirem (mrem) per year, including ground water sources of drinking water, and must further reduce residual radioactivity to ALARA levels. The requirement for an ALARA analysis is provided in 10 CFR Section [20.1402](#) and [20.1403](#), but this new section provides that this analysis must also consider detriments from decontamination and waste disposal, such as deaths from transportation accidents. A facility will be considered acceptable for restricted use if the levels of residual radioactivity are ALARA, there are legally enforceable institutional controls that will assure the TEDE will not exceed 25 mrem per year and will not impose undue burdens on the local community, and, if the institutional controls fail, the TEDE is ALARA but not more than 100 mrem per year.

(b) Projects not regulated directly by NRC, may be subject to CERCLA or RCRA. The NRC regulations may not be “applicable” but under CERCLA, they may be “relevant and appropriate” and used to develop clean-up levels. The NRC standard titled, “Radiological Criteria for License Termination,” 10 CFR Part 20, Subpart E, may be relevant and appropriate for sites that were previously licensed or handled a licensable type of radioactive material. It may also be an ARAR if it is well suited to the particular site in accordance with Section 121 of CERCLA and the NCP. This regulation uses a dose assessment to establish criteria for license termination and release of the property. For unrestricted release of property, the acceptable total effective dose equivalent (TEDE) is 25 mrem/year above background and as low as is reasonably achievable (ALARA).

(c) NRC allows a party to propose alternate criteria for decommissioning if it is protective of public health and the environment, and the dose from all man-made sources combined, except medical, would be no more than 100 mrem per year. The alternative must include institutional controls as described in Section 1403, and achieve ALARA levels using the analysis described above. A licensee must submit a plan, demonstrate public participation in the development of the plan, and obtain approval from the Commission based on NRC staff recommendations.

(3) The DOE is responsible for developing and implementing a national energy policy and for developing new energy sources for domestic and commercial sources. DOE is also responsible for management of the U.S. nuclear weapons program and production facilities and obtains its basic authorities from the AEA of 1954. The DOE nuclear weapons program responsibilities encompass the Stockpile Stewardship Program (now handled by the National Nuclear Security Administration within DOE), management of low and high-level radioactive wastes generated by past nuclear weapons and research programs, and for constructing and maintaining a repository for civilian radioactive wastes generated by commercial nuclear reactors. DOE develops its own standards under the authority of the AEA by issuing DOE orders, and is responsible for enforcing their standards as well as EPA regulations at DOE facilities.

(a) DOE provides for the framework for DOE environmental management in [DOE Order 450.1](#) by establishing environmental protection requirements, authorities, and responsibilities for their operations. DOE complies with applicable Federal, state and local environmental protection laws and regulations, executive orders, and DOE policy and guidance.

(b) DOE restricts off-site management of radioactive mixed waste through [DOE Order 5400.5](#). All radioactive wastes and mixed waste must be disposed of at a DOE facility, unless DOE grants a specific exemption for that waste. If granted an exemption, mixed waste can be treated off-site at a licensed commercial TSD facility that has the required RCRA permit and a NRC or state license for the radionuclides being shipped.

(c) Specific requirements on the management of radioactive waste material are contained in [DOE Order 435.1](#). The DOE order is meant to ensure that all DOE radioactive waste is managed in a manner that is protective of work and public health and safety, and the environment.

(d) Much of the DOE 5400 series orders have been codified at [10 CFR 835](#).

b. State Involvement. Under CERCLA, EPA does not authorize states to administer the program. However, states may promulgate their own “mini” CERCLA-type laws. It should be recognized that these are strictly state laws and do not preempt the authorities of EPA or other Federal agencies under CERCLA. CERCLA does include many provisions for consulting with and comment by state officials regarding response actions. In particular, Section 121(f) provides a list of CERCLA response phases in which the state is required to be given an opportunity for meaningful involvement. Section 120(a)(4) provides that, for current Federal facilities not listed on the NPL, state laws regarding removal and remedial actions are applicable to response actions conducted at such facilities. There are provisions in Section 121 regarding state ARARs, and relief from state laws that exceed ARARs or are not applied consistently to Federal and other facilities. Section 121(e) provides that Federal, state, and local permits are not required for response actions conducted on the CERCLA site, but that the substantive requirements that would otherwise be applicable shall be met in providing for removal or remedial actions. The NCP provides that this permit waiver applies to NPL sites, and also to other response actions led by Federal agencies. The authority to select the lead agency remedy is not subject to state concurrence or non-concurrence under any law, regulation, or executive order. The precise determination of state authority will depend on a particular factual circumstance and must be reviewed by agency counsel on a fact-specific basis. The state is expected to have a meaningful opportunity for consultation with the lead agency throughout the response process, and state laws must be identified and considered and their substantive standards and requirements complied with, but their approval or permits that might otherwise be required are not necessary before a lead Federal agency proceeds with necessary response actions.

c. LLRW Compacts. In 1980, Congress passed the Low-Level Radioactive Waste Policy Act to encourage states to develop low-level radioactive waste disposal facilities or to enter into regional compacts among several states to develop facilities to serve the member states. There are currently ten regional compacts, and additional states that remain unaffiliated. Each compact assigns a host state the first tenure, typically 20 years, for disposing of LLRW. Compacts may also enter into agreements with other compacts to dispose of their waste. At the time the Act was passed, there were three operational LLRW disposal sites in the country, Richland, Washington, Beatty, Nevada, and Barnwell, South Carolina. Since that time, the Beatty facility has closed and one new facility was opened in Utah. The Utah facility, which is not affiliated with the Compact system, accepts Class A LLRW nationwide, subject to the waste meeting its waste acceptance criteria under its operating licenses. The Richland facility accepts waste only from its own compact (the Northwest compact) and the Rocky Mountain compact. The Barnwell facility is the only facility accepting Class A, B, and C waste from outside the compact to which it belongs. However, under state law, the Barnwell facility is in a 6-year process to ramp down the amount of waste that may be accepted from outside the Atlantic Compact states. After 30 June 2008, the Barnwell facility may only accept LLRW from the Atlantic Compact states. This is a significant concern for future disposal of higher activity LLRW (Class A, B, or C) from decommissioning or CERCLA response actions.

(1) Compacts may prohibit the disposal of LLRW from outside the member states in certain circumstances, or charge increasing surcharges from states that have neither developed their own disposal facility nor entered into a compact that develops a disposal facility, subject to emergency authority in the NRC to grant access to a licensed compact facility if necessary to eliminate an immediate and serious threat to the public health and safety or the common defense and security [[42 USC 2021e](#) and [2021f](#).] The statute specifically allows a compact facility to refuse to accept for disposal material identified under the FUSRAP or may accept the material for disposal subject to meeting their waste acceptance criteria under their NRC/Agreement State license. The Act does state that the Federal government is responsible for disposal of LLRW generated by DOE, decommissioning Navy vessels, or waste generated by atomic weapons research, testing, or production.

(2) Compacts may state that, for waste to be sent out of their compact, the DOD must have permission. This issue must be coordinated with the District and HTRW-CX Office of Counsel to determine if there is a statutory requirement to obtain permission for the LLRW to be sent to a disposal facility outside the Compact where the LLRW is generated. The customer may request that USACE obtain this permission, even though it is determined to not be applicable.

d. Significant Memorandums of Understanding (MOUs).

(1) The NRC and USACE signed an agreement on 5 July 2001 to temporarily suspend NRC licenses on FUSRAP sites that were to be remediated to unrestricted levels, and to minimize dual regulation and duplication of regulatory requirements at NRC-licensed facilities. At the written request of USACE, NRC will initiate action for the suspension of the NRC license or portions of the license for a FUSRAP site to be remediated by USACE under CERCLA authority. USACE takes temporary control and responsibility for radiation control and for ensuring public health and safety during the CERCLA response action. Upon completion of the response action, NRC will reinstate the license for the facility. For activities where a potential dual regulation could exist, the two agencies agree to cooperate, share information, and coordinate activities in their respective programs. USACE, as provided for in section 121(e) of CERCLA and [40 CFR 300.400\(3\)](#), is not required to obtain an NRC license for its on-site remediation activities conducted under its CERCLA authority. The NRC may observe, as it deems warranted, remediation activities being conducted by USACE and may issue comments or questions arising from their observations of the USACE response action. USACE agrees to remediate the licensed site to meet at least the requirements of CERCLA and of 10 CFR [20.1402](#). The ARARs in the final executed ROD will include 10 CFR 20.1402 or a more stringent requirement.

(2) The NRC and EPA signed an agreement on 9 October 2002 on the radiological decommissioning and decontamination of NRC-licensed sites. The MOU will defer EPA's authority under CERCLA for most of the NRC licensed sites that are being decommissioned under NRC authority. The MOU includes provisions for NRC and EPA to consult about certain sites when, at the time of license termination 1) ground water contamination exceeds EPA-permitted levels (MCLs), 2) NRC contemplates restricted release or use of alternate criteria at the site, and 3) residual radioactive soil concentrations exceed levels defined in Table 1 of the MOU for residential or industrial and commercial future land use.

9-4. Other Major Environmental Statutes and Regulations.

a. Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) [[42 USC 7911 et seq.](#)]. In the 1940's, the U.S. government began to purchase uranium for the atomic weapons program. Large quantities of uranium milling tailings, the waste byproduct of the extraction of uranium from ore ("yellowcake production"), were generated in the processing of the ore to obtain the uranium metal. The mill tailings (sand-like material) were stored in surface impoundments (piles) predominantly in the western United States where the ore was mined. Historically, uranium mill tailings were not covered under the AEA since they were not considered to be hazardous. Testing of the mill tailings indicated they were highly contaminated with radionuclides (Ra-226) and inorganics (arsenic, molybdenum, and selenium). The mill tailings were not regulated until the passage of the Uranium Mill Tailings Radiation Control Act (UMTRCA) in 1978. Section 275 of the [AEA](#), as amended

by Section 206 of UMTRCA, directed EPA to set generally applicable health and environmental standards to govern the stabilization, restoration, disposal, and control of effluents and emissions at both active and inactive mill tailings sites. Title I of the Act covers inactive uranium mill tailing sites, depository sites, and vicinity properties. It directs EPA, DOE, and NRC to do the following:

- EPA must set standards that provide protection that is as consistent with the requirements of RCRA as possible. The standards must include ground water protection limits.
- DOE must implement EPA's standards for the tailings piles and nearby properties and provide perpetual care for some properties.
- NRC must review completed site cleanups for compliance with EPA standards and licenses issued for the site to the state or DOE for perpetual care.
- Title II of the Act covers the operating uranium processing sites licensed by the NRC. EPA was directed to promulgate disposal standards in compliance with Subtitle C of the Solid Waste Disposal Act, as amended, to be implemented by NRC or the Agreement States.
- UMTRCA applies to residual radioactivity at NRC-licensed uranium mill sites and at specifically listed inactive mill sites (22 sites designated by Congress and 2 sites by DOE).

Though not "applicable" to FUSRAP sites that are undergoing a CERCLA response action, these regulations may be considered "relevant and appropriate" to on-site actions involving uranium or thorium mill tailings at some of the FUSRAP sites.

(1) [40 CFR 192](#). EPA promulgated these regulations in January 1983 to address the inactive tailing sites that qualified for remedial action under Title I of UMTRCA. The regulations were written to control the risks from four principal environmental pathways:

- Diffusion of radon-222, the decay product of radium-226, from tailings into indoor air.
- Direct exposure to gamma radiation that results from many of the decay products in tailings (lead-214, bismuth-214, thallium-210).
- Dispersal of small radioactive particles into the air by wind erosion of un-stabilized tailing piles.
- Waterborne transport of radioactive and toxic (heavy metals) material by erosion, wind or leaching to the surface and ground water.

(a) Subpart A of 40 CFR 192 contains design requirements for the control of disposal areas for tailings, resulting from processing or extraction of uranium, that are located at the processing site or adjacent properties. The control mechanism must be effective for a minimum of 200 years and up to 1000 years to the extent reasonably achievable. Releases

from radon-222 to the atmosphere must not exceed 20 pCi/m². This regulation also contains ground water protection requirements for disposal sites.

(b) Subpart B of §192 contains cleanup standards for land and buildings and adjacent properties contaminated with residual radioactivity from processing ore for uranium. The soil cleanup levels are for residual radioactive materials from a processing site not to exceed a concentration of radium-226, averaged over any area of 100 square meters, of 5 pCi/g above background averaged over the first 15 centimeters of soil below the surface, and 15 pCi/g above background over 15 centimeter layers of soil below the first 15 centimeters of soil. This regulation does not apply to sites owned or controlled by a Federal agency after 1978 or to a site that is currently NRC licensed or had a NRC license in 1978 or thereafter. The standard includes requirements for occupied or habitable buildings and requires that the remedial action achieve an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 Working Level (WL), which is defined in the regulations. In addition, the gamma radiation level shall not exceed background by more than 20 microrentgens per hour. Ground water below the processing site and nearby areas with residual radioactive materials shall be monitored to ensure that the levels of constituents specified in Subpart A are not exceeded.

(c) Subpart C of §192 addresses the implementation of Subparts A and B and contains requirements for applying site-specific supplemental standards in lieu of strict compliance with Subparts A and B in limited circumstances. Any general standard may be changed if there is a clear and present risk of injury to workers or the public, despite reasonable protective measures, from compliance with the general standards. The standards for land, ground water, or surface control may be changed if remedial actions taken to meet standards would produce health and environmental harm that is long-term and grossly disproportionate to health and environmental benefits that may reasonably be anticipated. The standards may be changed if the estimated cost of remedial action to satisfy soil cleanup levels at a "vicinity" site is unreasonably high relative to the long-term benefits, and the residual radioactive materials do not pose a clear present or future hazard. In situations where radionuclides, other than radium-226 and its decay products, are present in sufficient quantity and concentration to constitute a significant radiation hazard, the remedial action shall reduce other residual radioactivity to levels that are as low as is reasonably achievable and conform to the standards of subparts A and B to the maximum extent possible. Supplemental standards for ground water must preserve all current and reasonably projected future uses of the water. UMTRCA requires that both the general standards and the implementation of them be developed on the basis of an analysis of the reasonableness of the benefits compared to the economic and environmental costs.

(d) Subpart D to §192 contains criteria for restoration of licensed uranium byproduct processing and disposal areas. Standards for closure of byproduct disposal areas are provided. The disposal area shall include a radon barrier to limit releases of radon-222 to 20

pCi/m² per second averaged over the entire impoundment for a design life of 1000 years, to the extent reasonably achievable, but no less than 200 years. This standard does not apply areas that require cleanup to the land standard (5/15 pCi/g) for radium-226.

(e) Subpart E to §192 contains criteria for restoration of licensed thorium byproduct processing and disposal areas. The standards govern facilities licensed for thorium processing and their byproduct disposal sites, and generally use the same standards as uranium processing and disposal areas, which require a permanent radon barrier to limit release of radon-220 and radium-228.

(2) [10 CFR 40](#), Appendix A.

(a) The NRC has established criteria in 10 CFR 40, Appendix A, for the operation of active licensed uranium and thorium mills and the disposition of tailings or wastes produced by the extraction or concentration of source material (uranium and thorium) from ores processed primarily for their source material content. This regulation is of interest primarily for situations where USACE would be performing a CERCLA remediation and it was determined to be “relevant and appropriate” for a milling site or mill tailings site that was inactive prior to the enactment of UMTRCA where byproduct materials were managed and radionuclides other than radium in soil are present, and where building surfaces are contaminated. This criterion uses a benchmark dose derived using site conditions and the assumption that 5 pCi/g radium above background is present in the top 15 centimeters and is present at 15 pCi/g above background in the subsurface. The benchmark dose is then back calculated to derive concentrations of the radionuclides to which the criterion is being applied. Normally, radionuclides that this criterion will be relevant and appropriate for will be total uranium and thorium-230.

(b) This regulation covers more activities than the EPA UMTRCA standards, but they conform to the EPA UMTRCA standards for comparable activities. It is important to note that the NRC considers milling wastes to include equipment and piping that was used for processing the ore. Byproduct material is disposed of in uranium mill tailings impoundments, subject to meeting NRC regulations. The NRC regulation provides more radiological criteria on the decommissioning of licensed uranium and thorium mills. The NRC regulation uses the existing 5/15 pCi/g soil radium standard to derive a dose criterion (benchmark approach) for the cleanup of byproduct material other than radium in soil for surface activity on structures and land. The NRC standard provides a regulatory basis for determining the extent to which lands and structures at uranium and thorium mills must be remediated before decommissioning of a site can be considered complete and the license terminated.

b. Clean Air Act (CAA) [[42 USC 7401](#) et seq.]. The CAA standards called “National Emissions Standards for Hazardous Air Pollutants” (NESHAPs) limit the allowable level of air emissions of radionuclides, other than radon-222 and radon-220, from facilities owned or

operated by DOE and from Federal facilities not owned or operated by DOE or licensed by the NRC. EPA has promulgated implementing regulations for the control of hazardous air pollutants (HAP) from major and area sources in 40 CFR 61. CERCLA response actions often times identify NESHAPs as a potential ARAR when close examination of the applicability of the regulation reveals that it does not pertain to the activity. It is important to note that EPA has proposed a NESHAP regulation for the category entitled "Site Remediation" (67 FR 49398) on 30 July 2002 for the control of HAP emissions to the ambient air. However, a final rule would still have to be promulgated before NESHAPS are established for remediation activities. The potential NESHAP subparts that may apply under limited scenarios are as follows:

- Subpart H - National Emission Standards for Emissions of Radionuclides Other Than Radon From DOE Facilities (does not apply to §§191 or 192 facilities).
- Subpart I - National Emission Standards for Radionuclide Emissions From Federal Facilities Other Than NRC Licensees and Not Covered by Subpart H (does not apply to §191, Subpart B or §192 mill tailing piles).
- Subpart Q - National Emission Standards for Radon Emissions From Department of Energy Facilities (does not apply to Title I facilities of UMTRCA but does apply to a specific list of DOE facilities).
- Subpart T - National Emission Standards for Radon Emissions From the Disposal of Uranium Mill Tailings.

(1) These regulations require that emissions of radionuclides to the ambient air shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem. Also, for non-DOE Federal facilities, emissions of iodine shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 3 mrem/year. The owner or operator of facilities covered by these regulations must submit an annual report regarding emissions to EPA by 31 March of the following year.

(2) Title V of the CAA requires operating permits for all major sources (40 CFR 70). Some decommissioning activities, such as hazardous and mixed waste treatment, storage, and disposal units, may require Title V permits because of radionuclide emissions. Additionally, some activities (including treatment of mixed waste) may emit enough other regulated pollutants (e.g., volatile organic compounds and lead) to qualify as a major source. A Title V permit would not be required on a CERCLA response action because of the permit waiver [CERCLA, Section 121(e)]. Because Title V is a procedural requirement (administrative) and not a substantive requirement, the CERCLA response action would not need to comply for on-site activities.

c. Safe Drinking Water Act (SDWA) [[42 USC 300f](#) et seq.]. The SDWA requires EPA to promulgate and enforce primary standards for contaminants in public water systems,

including radionuclides. The 1986 amendments required EPA to develop maximum contaminant level goals (MCLGs) and maximum contaminant levels (MCLs). In 1991, EPA proposed a revision to raise the MCLs for combined radium-226 and radium-228 from 5 pCi/L to individual MCLs of 20 pCi/L for each isotope. After further evaluation, EPA decided to retain the current combined radium-226/228 level of 5 pCi/L based on risk to humans (65 FR 76708). Under the 1996 amendments to the SDWA, EPA is required to ensure that any revision to a drinking water regulation maintains or provides for greater protection of the health of persons. The EPA rule (promulgated 7 December 2000) becomes effective in December 2003 and establishes the uranium MCL at 30 µg/L. The gross alpha (excluding uranium and radon but including radium-226) remained at the current level of 15 pCi/L. The beta particle and photon radioactivity MCL was also retained at the level of less than or equal to 4 mrem/year to the total body or any given internal organ.

(1) When determining cleanup criteria for contaminated ground water, MCLs established under the SDWA may be considered ARARs that must be attained by the selected remedy, if the affected ground water is a current or potential drinking water source. CERCLA, Section 121(d)(2)(A) and (B), provides that standards developed under the SDWA and the Clean Water Act may be relevant and appropriate, depending on the designated or potential use of the water, the purposes for the criteria, and the latest information. Radioactive substances' MCLs are applicable to community water systems, which are defined by EPA as 15 service connections used by year round residents or regularly serves at least 25 year-round residents. For non-community water systems, the radioactive substances' MCLs may still be considered relevant and appropriate if the water is an actual or potential source of drinking water.

(2) In addition to MCLs, maximum contaminant level goals (MCLGs) established under the SDWA are sometimes designated as ARARs for the response action. Because the SDWA has a MCLG of zero for all radionuclides, it is important to note the NCP states MCLGs can only be considered ARARs when non-zero concentrations are established.

(3) Some states have laws or regulations that establish a universal non-degradation standard for ground water. This has the effect of establishing background as the standard to be achieved if the law or regulation is considered an ARAR for the ground water remedy. In practice, satisfying a non-degradation standard is frequently not technically practicable or achievable. If information is developed that demonstrates technical impracticability, then a waiver of the ARAR under the NCP provisions would be possible.

(4) For radioactive or mixed waste remediation, where the NRC decommissioning standard is an ARAR, then ground water must also be considered in the all-pathways analysis of dose. The ground water exposure could lead to more restrictive cleanup levels than the MCLs, or additional restrictions may be necessary to control exposure. On some sites there may be no ground water pathway, so the exposure from ground water would not be included.

If there are no ARARs for contaminated ground water at a site, then the risk assessment process should be used to develop cleanup levels.

d. Clean Water Act (CWA) [[33 USC 1251](#) et seq.]. The Federal Water Pollution Control Act commonly known as the Clean Water Act (CWA) is the principal law governing the restoration and protection of the nation's streams, lakes, and estuaries. The CWA's principal objectives are to prohibit discharges of pollutants into U.S. navigable waters, except in compliance with a permit, and achieve an interim goal of protecting water quality for fish, wildlife, and recreational uses. The CWA established several regulatory programs, standards, and plans for the prevention, reduction, and elimination of pollution in the nation's water, which include the following:

- National Pollutant Discharge Elimination System (NPDES) Program that establishes an effluent permit system for point source discharges into navigable waters. The NPDES storm water program is designed to prevent discharge of contaminated stormwater into navigable waters. The NRC regulates discharges of materials subject to the AEA.
- National and Local Pretreatment Standards that require new and existing industrial users to users to pre-treat their wastewater prior to discharging to a Publicly Owned Treatment Works (POTW) to prevent pollutants from overloading a POTW or interfering with the operation of the treatment facility.
- Dredge or Fill Discharge Permit Program that establishes a permit system administered by USACE to control the placement of dredge or fill material in waters of the United States, including wetlands.
- Sewage Sludge Use and Disposal Program that protects human health and the environment when POTW sludge is managed or disposed of.

(1) The NPDES requires all discharges to the waters of the United States to comply with certain pollutant discharge criteria. The term "pollutant" includes "radioactive materials, except those regulated by the AEA." Radioactive material that is covered by the AEA includes source, byproduct, and special nuclear material. The NPDES regulations specifically prohibit radiological discharges: "No permit may be issued for the discharge of any radiological, chemical, or biological warfare agent or high-level radioactive waste."

(2) EPA has the authority under the CWA to regulate radioactive materials not specifically addressed under the Atomic Energy Act. In particular, the CWA provided EPA the authority to limit liquid discharges of TENORM into surface waters from mines or mills used for the production of uranium, radium, and vanadium.

e. National Environmental Policy Act (NEPA) [[42 USC 4321](#) et seq.]. NEPA was enacted on 1 January 1970 to ensure that Federal agency decision-making takes environmental factors into consideration. NEPA is generally only applicable to Federal agencies and Federal actions unless a state, local, or private entity is involved with Federal

funding or actions. Close coordination with the District Office of Counsel is essential when determining whether NEPA is a requirement for the response action planned to address a radioactively contaminated site. Unlike other environmental laws, NEPA is a procedural requirement and does not contain specific enforcement provisions; EPA does not have enforcement authority under NEPA. NEPA requires the preparation of Environmental Assessments (EA) or Environmental Impact Statements (EIS), or both, for any project that will have a major impact on the environment. This would potentially include decommissioning activities under the jurisdiction of DOE, NRC, and DOD (e.g., Army Reactor Program).

(1) Individual actions, such as decommissioning facilities, are to be evaluated to determine the level of NEPA review needed. The NEPA process begins with a determination of whether the “proposed action” is subject to NEPA compliance. If the determination is made that the action cannot be categorically excluded from the EA, or EIS, the first step is to prepare the EA. The EA helps to determine if an agency needs to prepare an EIS or if the agency can make a finding of no significant impact (FONSI).

(2) It is important to note that on 23 January 1995, the Department of Justice (DOJ) made a decision that a Federal agency is not required to independently implement NEPA at CERCLA cleanup sites. The DOJ decision stated that the CERCLA process incorporates many of the NEPA values of public participation and collection of environmental and human health impacts that result from proposed Federal action. It is Army policy that response actions implemented in accordance with CERCLA or RCRA are not legally subject to NEPA and do not require separate NEPA analysis [32 CFR 651.5]. However, the CERCLA and RCRA response actions should incorporate the procedural requirements of NEPA, which include full and open public participation, analysis of all reasonable alternative remedies, evaluation of the significant impacts of the studied alternatives, and consideration of public comments when selecting the remedy.

f. Toxic Substances Control Act (TSCA) [[15 USC 2601](#) et seq.].

(1) Contaminated sites that have polychlorinated biphenyls (PCBs) commingled with radionuclides can create a situation of dual regulation. TSCA does not preempt other more stringent Federal statutes and regulations (e.g., AEA), but it still needs to be considered. EPA has established regulations for the cleanup of PCB contamination that must be considered in conjunction with the applicable radioactive standards. Cleanup criteria for PCB remediation waste are found in [40 CFR 761.61](#). The concentrations of PCBs must be within a limited range and the appropriate controls must be in place to protect the public and environment from exposure or release. However, a CERCLA response action must meet the threshold criteria of being protective of human health and the environment and comply with ARARs, and the radioactive waste may not be appropriate for on-site disposal. PCBs commingled with radioactive material will typically require the off-site disposal at a facility

that is licensed and permitted to accept the remediation waste. For example, EPA has promulgated an exemption for low-level mixed waste for storage and treatment ([40 CFR 266](#)). The waste is not considered RCRA hazardous waste, if it meets the conditions of the exemption. The low-level mixed waste must be disposed of into a licensed low-level radioactive waste disposal facility, but it must meet the LDRs because it is being placed in a land disposal facility.

(2) Mixed waste can further complicate the regulatory requirements for the disposal of material having low concentrations of PCBs that may not even be regulated under TSCA. PCBs are not a RCRA hazardous waste; however, mixed waste must meet the Land Disposal Restrictions (LDRs) before it can be land disposed. For certain types of RCRA hazardous wastes, there is a requirement to comply with the universal treatment standards for the underlying hazardous constituents, which does include a treatment standard for PCBs. There may be a RCRA treatment standard for PCBs, even though waste is not a RCRA hazardous waste and complies with TSCA. EPA recognized the disparity between TSCA and RCRA and has put into practice a temporary deferral for specific RCRA hazardous wastes (metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) that contain less than 1000 ppm of PCBs. As this requirement is less stringent than previous promulgated RCRA regulation, this must be adopted in the RCRA authorized states to be effective.

9-5. Summary of Radiation Standards. In the development of cleanup criteria, it is important to understand the regulations that govern the response action. The regulatory authority must be established to determine what the potential standard or numerical limit is for the media of concern. Table 9-1 provides a summary of the regulations that might apply to an environmental restoration, processing, or disposal operation.

Table 9-1
Major Radiation Standards Summary Table

Regulation	Agency	Standard/Numerical Limit
General Public (10 CFR 20.1301)	NRC	Total Effective Dose Equivalent (TEDE): 100 mrem/year
Uranium mill tailings (40 CFR 192 & 10 CFR 40 App. A)	EPA & NRC	Ra-226/228: 5 pCi/g (surface) 15 pCi/g(subsurface) Rn-222 20 pCi/m ² -sec NRC standard includes benchmark dose for other radionuclides
High-level waste operations (10 CFR 60)	NRC	100 mrem/year
Low-level waste disposal (10 CFR 61)	NRC	Annual effective dose to public 25 mrem to the whole body 75 mrem to the thyroid, and 25 mrem to any other organ
Effluent emissions 10 CFR 20	NRC	Radionuclide specific activities, in Appendix B => 50 mrem/year
Drinking water (40 CFR 141)	EPA	Radium: 5 pCi/L Gross Alpha 15 pCi/L (excludes Rn & U) Beta/photon: 4 mrem/year Uranium: 30 µg/L
Uranium fuel cycle (40 CFR 190)	EPA	25/75/25 mrem/year
Air emissions (National Emission Standards for Hazardous Air Pollutants) (40 CFR 61, H)	EPA	10 mrem/year to nearest off-site receptor
Superfund (CERCLA) cleanup (40 CFR 300)	EPA	Protective of human health & environment, Complies with ARARs
Decommissioning (10 CFR 20 , Subpart E)	NRC	Unrestricted Use: 25 mrem/yr TEDE plus ALARA Restricted Use: Up to 100 mrem/yr or 500 mrem/yr if institutional controls fail.
Occupational standards OSHA 29 CFR 1910.1096 ; NRC 10 CFR 20 ; DOE 10 CFR 835	OSHA, NRC, DOE	5,000 mrem/year & ALARA

9-6. Miscellaneous Criteria.

a. **Building Cleanup Criteria.** The cleanup criteria for building surfaces and structural materials that are contaminated with residual radioactivity is contingent on the regulatory authority that governs the response action. Decommissioning and decontamination of NRC licensed facilities is done in accordance with 10 CFR 20 Subpart E and the appropriate regulation for the type of licensed activity (e.g., Part 30 - Byproduct material, Part 40 - Source material, Part 70 - Special nuclear material). It is important to note that, under a CERCLA response action, the decommissioning and decontamination standards may not be applicable if the facility is not currently or never had an NRC license. However, the standards may still be relevant and appropriate. CERCLA response actions (e.g., FUSRAP) need to assess any actual or potential release or migration of contamination from the building to the environment. When soil or groundwater, outside of or underneath the building structure, become contaminated, cleanup criteria for these environmental media should also be developed in accordance with the CERCLA process.

(1) The NRC has developed generic screening models for building release. This guidance is being compiled and will be issued in one volume of [NUREG-1757](#). When the use of generic screening is appropriate, a computer code developed by NRC, known as [DandD](#), Version 1.0, may be used to generate concentration based cleanup levels for each contaminant of concern. NRC also acknowledges that D and D may not be the only appropriate computer model and has recognized that the [RESRAD-BUILD](#), by Argonne National Laboratory, may be a better model for certain applications. NRC does recommend an uncertainty analysis be done if other models are used. The actual cleanup level derived from dose modeling is not altered when an ALARA analysis is conducted. However, if a remedial action required by the ALARA analysis is not performed, the final status survey must demonstrate that the level of residual contamination is less than the cleanup level by the percentage that would have been reduced if the action were taken. For example, it is almost always ALARA to scrub and wash the walls and floor of a building to remove loose radioactive contamination. If this action is taken, then the final status survey need only document that the cleanup level was met.

(2) At inactive uranium or thorium milling sites, where [40 CFR 192](#) is an ARAR, and where any occupied or habitable building is currently present, a reasonable attempt must be made to control the annual average radon decay concentration (including background) to not exceed 0.02 Working Level, and the gamma radiation shall not exceed the background by more than 20 microrentgens per hour. It is important to fully characterize a building site to ensure all the sources of radon (e.g., soil underneath floor) are understood. The decision document should address the actions that will be taken if the cleanup criteria for the building are not met after removal of the contaminated soil. Supplemental standards may need to be considered if the contamination is under the floor of the building.

b. Below Regulatory Concern (BRC). The NRC, in June 1990, attempted to establish regulations and procedures by which small quantities of low-level radioactive materials could be largely exempted from regulatory controls. The agency proposed that if radioactive materials did not expose individuals to more than 1 millirem per year or a population group to more than 1000 person-rem per year, they could be eligible for the exemption from full-scale regulation. It was intended that the BRC policy would apply to consumer products, landfills, and other sources of very low levels of radiation. However, the public and Congress objected to this proposed rulemaking and the NRC decided to defer any action on the BRC issue. Currently, there is no regulatory level (dose or activity concentration) for radionuclides that exempts them from regulatory control. There are promulgated NRC regulations that allow certain exemptions from licensing for byproduct material ([10 CFR 30.14](#)) that doesn't exceed the listed concentrations found in §30.70 - Schedule A. Source material (uranium or thorium) also has exemptions from licensing for persons or activities that are under the control of DOE or NRC contracts (§ 40.11); for material being transported by a contract carrier (§40.12); for material that is considered an unimportant quantity of source material (<0.05%) as described in §40.13; or by special request to the NRC (§40.14). Special nuclear material (enriched uranium, plutonium) are exempt from licensing if the material is under the control of the DOE or is under the control of DOD in accordance with Section 91 of the AEA for national defense (§70.14).

c. State Regulations for the Control of NORM. The status of state regulations for the control of NORM/TENORM contamination, as of 2000, can be summarized as follows (Reference: The NORM Report, Volume II, Number 2):

States with NORM regulations	Arkansas , Georgia , Louisiana , Mississippi , New Mexico , Ohio , Oregon , South Carolina , Texas , Washington ,
States with radiation regulations that regulators believe address NORM	Arizona , Delaware , Idaho , Kansas , Maine , Maryland , Massachusetts , Michigan , Minnesota , Nebraska , New Hampshire , New Jersey , New York , Pennsylvania , Tennessee , Utah , Virginia , Wisconsin
States with no NORM regulations	Alabama , Alaska , California , Colorado , Connecticut , Florida , Hawaii , Illinois *, Indiana , Iowa , Kentucky , Missouri , Montana , Nevada , North Carolina , North Dakota , Oklahoma , Rhode Island , South Dakota , Vermont , West Virginia , Wyoming