CHAPTER 8

Radioactive Waste

8-1. Classification.

a. The NRC regulates only source, byproduct, and special nuclear materials. Waste classification starts with determining if the material is NRC regulated.

b. Licensable source material is defined as: (1) uranium or thorium in any physical or chemical form, or (2) ores containing one twentieth of one percent (0.05%) by weight of uranium or thorium or any combination thereof. Source material in any chemical mixture, compound, solution or alloy in which the source material is less than one twentieth of one percent (0.05%) by weight is considered an unimportant quantity of source material. Source material does not include special nuclear material.

c. Special nuclear material is plutonium, uranium-233, material enriched in uranium-233 or uranium-235, or anything else the NRC determines is special nuclear material but does not include source material.

d. Byproduct material is defined in a number of regulations. Byproduct material is 1) any radioactive material yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and 2) the tailings and wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including waste from uranium solution extraction processes. Byproduct material does not include source material or underground ore bodies depleted by solution extraction.

8-2. Waste Definitions.

a. Congress defines high-level radioactive waste as the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and other highly radioactive material that the NRC, consistent with existing law, determines by rule requires permanent isolation. The latter includes spent nuclear fuel. Low-level radioactive waste is radioactive material that is not high-level radioactive waste, spent nuclear fuel, or 11e.(2) byproduct material from uranium or thorium mining/milling operations; and NRC, consistent with existing law, classifies as low-level radioactive waste [42 USC 10101]. Additionally, NRC has ruled that it does not regulate uranium and thorium mining and milling wastes/tailings generated before 1978.

(1) The importance of these definitions and regulatory authorities to USACE is in the available methods for disposal of each type of waste. There is no present disposal option for high-level radioactive waste, or for transuranic waste not owned by DOE. Low-level radioactive waste is subject to regulation by the various state radioactive waste compact authorities as well as the NRC. Low level radioactive waste may be disposed of only in a compact authorized radioactive waste repository: one in Barnwell, South Carolina, or the other in Richland, Washington, or, with the permission of the compact, at Envirocare of Utah. DOE transuranic waste may be disposed of only at the Waste Isolation Pilot Plant in New Mexico.

(2) If the waste is not high-level or low-level radioactive waste, or transuranic waste, there may be other options for disposal.

b. Depending on the pedigree of the waste, the radionuclides involved, the concentrations of the radioactive materials and any hazardous waste constituents in the waste, other disposal options may include properly permitted or licensed RCRA landfills, hazardous waste disposal facilities, uranium mills, and uranium or thorium tailings ponds. Each individual disposal facility has its own waste acceptance criteria and the selection is a very complex decision that should be delegated to radioactive waste experts within USACE. The health physicists at the HTRW-CX have experience with many types of waste disposal and can assist any District. The Kansas City District has a number of pre-placed disposal contracts available for use by all USACE Districts and some outside agencies. While Districts are not obligated to use the Kansas City contracts, a good rule of thumb is that, for waste quantities under 3000 cubic yards, the use of the pre-placed contracts will usually be less expensive than the costs of the bidding process for other disposal sites and resulting disposal fees.

c. Another consideration is radioactive waste owned by DOD. The DOD Executive Agent for radioactive waste has been designated as the lead for disposal of these materials. All disposal of DOD-owned radioactive materials or waste must be coordinated with the Executive Agent through the HTRW-CX to comply with NRC and DOD licenses and authorizations. Radioactive wastes generated by Civil Works activities, such as FUSRAP, may not be considered DOD wastes.

d. Radioactive waste disposal regulations are very complex and some of the regulatory methods and procedures have not yet been set. It is also important to coordinate any characterization of waste and selection of disposal options with the HTRW CX to ensure that an action at one site is not setting a precedent that will affect disposal options at other USACE projects.

8-3. Waste Disposal Facility Criteria. Each waste disposal facility has its own waste acceptance criteria and lists what characteristics must be evaluated and what limits they allow on each contaminant. The common data that must be supplied on all materials for disposal include the following:

- Waste generator
- Location of waste generator
- Physical state of the waste
- Medium contaminated
- Radionuclide or radionuclides present
- Activity and concentration of each radionuclide
- Total weight and total volume of the waste
- Co-mingled hazardous substances
- Quantity and concentration of hazardous substances