

covered under regulations issued by various levels of government (Federal, State, local) and may vary among jurisdictions (*i.e.*, from State to State).

- *Waste Generation, Treatment, and Disposal:* For individual waste types or categories of waste, we request current waste generation rates and storage, treatment, and disposal practices. Data on types of waste generated, RCRA codes, radionuclide concentrations, storage and treatment techniques, and disposal practices for these waste types or categories of waste, and data on waste volumes before and after treatment would be very useful and informative. In terms of waste concentrations, information that portrays the amount of waste within different concentration ranges would be most useful.

- *Cost Data:* The costs associated with the management and disposal of the waste in question: This could include storage costs, costs of sampling and analysis for compliance with regulatory requirements, the costs for meeting treatment standards, pre-treatment and treatment costs (by method), packaging and transport costs, disposal costs, and reporting and recordkeeping costs.

D. Background Information Regarding Other LARW

1. Pre-UMTRCA Byproduct Material (and FUSRAP)

The processing of ores to extract uranium or thorium (milling) generates large volumes of waste material (tailings). These tailings resemble fine, sandy soil and are generally relatively low in activity because the primary source of radioactivity has been reduced. However, because of the large volumes generated, if they are not properly controlled, these materials can present a long-term hazard to human health and the environment. In addition, the milling process can introduce chemical hazards into the waste. The Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) was passed to address management of tailings (11e.(2) byproduct material) and remediation of milling and tailings storage sites. These responsibilities were divided between DOE (for inactive sites) and NRC (for active sites). EPA was directed by UMTRCA to establish radiation protection standards to be implemented by DOE and NRC. These standards are found at 40 CFR part 192 ("Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings").

The Formerly Utilized Sites Remedial Action Program (FUSRAP) was established as a program under the

former Atomic Energy Commission in 1974. The original objective of this program was to identify, investigate, and take appropriate cleanup action at contaminated sites associated with the nation's early atomic weapons program. During the 1940s through the 1960s, the Manhattan Engineer District and later, the Atomic Energy Commission (AEC) used a variety of sites across the United States to process and store uranium and thorium ores for nuclear weapons. In the 1970s, the AEC evaluated these old weapons production sites to determine the risks to human health and the environment, taking into account new health and environmental standards. In 1975, this program was transferred to the newly formed (from the AEC) Energy Research and Development Administration, and subsequently in 1977 to its successor, DOE. Of the 400 sites that were revisited, 46 required some type of cleanup. DOE initiated cleanups in 1979 and completed cleanup of roughly half of the 46 sites by 1997. DOE managed tailings from FUSRAP cleanups in a manner consistent with its responsibilities under UMTRCA, although the FUSRAP sites were not among those identified by UMTRCA. Late in 1997, Congress transferred responsibility for FUSRAP to the U.S. Army Corps of Engineers. At the request of USACE, NRC considered its jurisdiction over pre-UMTRCA byproduct tailings generated by FUSRAP cleanups. NRC determined that its jurisdiction, as defined by UMTRCA, did not extend to tailings generated prior to passage of UMTRCA if the generating process had not been licensed by NRC (or its predecessor, the AEC).

2. TENORM

Numerous activities produce TENORM wastes, including mining (coal, metals, rare earths, and uranium), fertilizer production, oil and gas production, incorporation into consumer products, and treatment of ground water for drinking water among others. TENORM can be found in all 50 States. Total amounts of TENORM wastes produced in the United States annually may be in excess of 1 billion tons. In many cases, the levels of radiation are relatively low and dispersed in large volumes of waste. This causes a dilemma because of the high cost of disposing of radioactive waste in comparison with (in many cases) the relatively low value of the product from which the TENORM is separated. There are few disposal locations that can accept radioactive waste from licensed activities, and not many more that can take certain types

of TENORM. Large quantities of TENORM wastes are currently undisposed and may be found at many of the thousands of pre-1970s abandoned mine sites and processing facilities around the nation. Of particular concern are the isotopes of uranium and thorium. Radium-226, a daughter of the decay of uranium-238, is troublesome because of its long half life (about 1600 years) and its relatively high radiotoxicity. Additional detailed information on TENORM may be found on our Web site at <http://www.epa.gov/radiation/tenorm/>. EPA has developed information on the categories of TENORM over the last fifteen years from our own independent studies, various rulemakings, data provided by States, and studies performed by industry.

3. Low-Activity LLRW/Source Material Exempted by NRC

Under the AEA, source material is uranium or thorium in any physical or chemical form. NRC has traditionally regulated source material if it contains one-twentieth of one percent (0.05%) or more by weight of uranium, thorium, or any combination of these two. Some mining and mineral extraction processes may also result in the production of uranium, or thorium, at concentrations under the NRC's threshold for regulation and hence, not be regulated under the AEA. Such low-activity source material may result from refining ores mined for other precious metals, rare earths, or phosphate processing. This low-activity source material may be regulated with regard to its chemical characteristics, rather than any radiological hazard associated with the commingled uranium or thorium. NRC has determined that ores containing less than 0.05% uranium or thorium by weight are not considered source material (10 CFR 40.4) and may be labeled as NORM or TENORM. AEA does not provide authority to regulate NORM or TENORM.

As described in section II.D.4.a, NRC classifies commercially generated LLRW in 10 CFR 61.55 as Class A, B, C, or Greater-Than-Class C (GTCC). All LLRW classes must meet minimum waste characterization requirements specified in § 61.56(a). Among these requirements, waste must be a solid with minimal free standing liquid, not explosive, pyrophoric, or capable of generating toxic gases; any hazardous, biological, pathogenic, or infectious waste must be treated to reduce to the maximum extent practicable these non-radiological hazards. Tables 1 and 2 of § 61.55 are used to determine waste class based on radionuclide content. Class A waste contains the lowest