

## **NEWMOA Hazardous Waste Conference Calls September 12, 2017**

**Topic: Mixed waste (i.e., low level radioactive waste and hazardous waste or LLMW) from nuclear power plants and hospitals – reconciling RCRA and NRC’s “As Low as Reasonably Achievable (ALARA)” standards for storage**

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**Participants:** CT DEEP (3 people); ME DEP (1 person); Mass DEP (4 people); NH DES (6 people); NYS DEC (8 people); EPA Region 2 (1 person); NEWMOA (1 person)

Call leader: NYS DEC

Note-taker: Mass DEP

### **Summary of NYS DEC Review of the Issue**

Bill Yeman, NYS DEC provided the following detailed overview of the history of EPA’s Mixed Waste Rule.

“Mixed waste” means a waste that contains both RCRA hazardous waste and “source, byproduct, or special nuclear material.” A common example would be solvent-based scintillation cocktails. Scintillation cocktails are fluids used in the laboratory to count the amount of radioactivity in laboratory samples for diagnostic tests, environmental monitoring and other industrial and medical applications. Xylene and toluene in the scintillation fluid serve as suspension media or carriers to suspend the radioactive sample and a photon-emitting chemical (e.g., p-terphenyl) in the fluid so that counting can occur. In addition, the toluene and xylene dissolve the radionuclide and act as a medium for a reaction to take place between p-terphenyl and the radionuclide in the sample.

The reconciling of RCRA and Nuclear Regulatory Commission’s (NRC’s) “As Low As

Reasonably Achievable (ALARA)” standards for storage was done mainly with 5/16/2001 “Mixed Waste Rule.” There’s an interesting “back story” on how it was that the U.S. wound up where it is today with mixed wastes being subject to both RCRA and Atomic Energy Act (AEA) regulations.

ALARA standards, per pp. 27245 and 27227 of the 5/16/2001 Mixed Waste Rule, are NRCs standards that seek to reduce radiological exposures and govern NRC low level waste (LLW) management. When Congress enacted RCRA in 1976, they had two provisions in 1004 and 1006 of the RCRA statute which appeared to be saying that RCRA does not apply at all to “source, byproduct, or special nuclear material”. These read pretty much like the Bevill & Bensten exclusions: very broad carve-outs that powerful members of Congress had inserted to shield certain entities within their Congressional district from the full brunt of RCRA. "Bevill Wastes" are fossil fuel combustion wastes; mining and mineral processing wastes; and Cement Kiln Dust wastes. "Bensten Wastes" are oil, gas, and geothermal exploration, development and production wastes. Those all have exemptions in EPA's hazardous waste regulations. In 1980 EPA promulgated a very simple exclusion 261.4(a)(4) for the following materials: Source, special nuclear or byproduct material as defined by the Atomic Energy Act of 1954, as amended.

Special nuclear material" (SNM) is plutonium, uranium-233, or uranium enriched in the isotopes uranium-233 or uranium-235. Source material is Uranium or thorium, or any combination thereof, in any physical or chemical form, or ores that contain 0.05 percent or more of (1) uranium, (2) thorium, or (3) any combination thereof. Those two – source and special nuclear – are pretty specific materials, but “byproduct material” is not nearly as well defined and wound up being interpreted as covering a host of waste radioactive material.

By 1985-86 EPA realized the hazardous constituents’ component in mixed wastes were simply not being addressed by AEA regulations, such as where there was ground water contamination containing non-radioactive components like lead. EPA saw the remedy as making the non-radioactive components subject to RCRA, but by then the “byproduct” stream in the 261.4(a)(4) exclusion had become entrenched as covering both the radionuclide component and the non-radioactive hazardous constituent component. So, to change that, EPA had to first narrow the meaning of “byproduct” by having the Department of Energy (DOE) issue a clarification that “byproduct material” included “only the actual radionuclides”, i.e., just the radioactive portion (which, by the way, was a nearly complete about face from DOE’s *proposal* of 11/1/85). Then, as an added hedge against appearing to be contrary to Congress’ intent Section 1006, EPA and NRC compared the RCRA regulations with NRCs and determined that these weren’t “inconsistent” after all. (Being inconsistent was one of the prohibitions 1004 and 1006 in the RCRA statute.) The upshot of all this was that after 1986-87 the radioactive component in mixed waste was subject to AEA regulations – as it always was – but the hazardous waste component was now subject to RCRA-C. For more information, refer to the 11/1/1985 Federal Register (FR) proposal and EPA’s 7/3/1986 FR and the 5/1/1987 FR from DOE.

Therefore, mixed wastes became subject to RCRA too, not just AEA regulations. But this presented some hardships because in many cases there was simply no disposal options for such wastes and so sites were forced to store them beyond the times that RCRA allows. EPA came out

with an enforcement discretion policy for some of these mixed wastes – if the site had a RCRA storage permit – and for some others promulgated its 5/16/2001 Low-Level Mixed waste rule. Low-level Mixed waste is radioactive waste which contains source, special nuclear, or byproduct material, but which is not wastes like spent nuclear fuel or transuranic waste. (transuranic means chemical elements with atomic numbers greater than 92, the atomic number of uranium). EPA had two exemptions in that LLMW rule – one for storage and treatment, and the other for transportation and disposal. But the storage and treatment exemptions are just for generators who had an NRC (or NRC Agreement State) license. The transportation and disposal exemption components are broader, including not only LLMW but also certain “NARMs”, which stands for Naturally Occurring and/or Accelerator-produced Radioactive Material. NARMs are radioactive materials that are naturally occurring or produced by an accelerator. NRC-licensed sites can use both exemptions, but DOE-regulated facilities are not eligible for the storage and treatment exemption, but are eligible for the transportation and disposal exemption. NRC-regulated sites are commercial types, such as hospitals, nuclear power plants, “fuel cycle facilities, pharmaceutical companies, medical and research laboratories, universities and academic institutions, and some industrial facilities.”<sup>27225</sup> DOE-regulated sites are defense-related. EPA explains their rationale for the Mixed Waste rule:

With this rule we are responding to the concerns of mixed waste generators regarding the burden and duplication of dual regulation, as well as concerns about reducing the radiation exposures of workers managing mixed wastes. In addition, mixed waste generators have expressed concerns about limited LLMW treatment and disposal options which can put them in violation of RCRA.

Specifically, a violation of the LDRs, which generally prohibits the storage of hazardous wastes that are also subject to RCRA land disposal restrictions unless the storage is solely for the purpose of the accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment or disposal. EPA expresses confidence that NRC regulations are adequate:

Given NRC waste management, we do not believe that the addition of RCRA Subtitle C regulation is necessary to protect human health or the environment. Through this rule, we are providing regulatory relief intended to facilitate the disposal of certain LLMW (such as legacy waste requiring long-term storage due to lack of treatment technology and disposal capacity), that has been stored on-site by NRC licensees as mixed waste subject to both RCRA permitting and NRC licensing requirements.

Some noteworthy miscellaneous facts and features of this 5/16/2001 mixed waste rule are:

- Rule allows LLMW generated under a single NRC license – not necessarily all located on one site – is eligible for this rule’s storage and treatment conditional exemption. <sup>27226</sup>
- There’s no exemption if it goes to a *different* NRC licensee: “Mixed waste generated at a facility with a different license number and shipped to your facility for storage or treatment requires a RCRA permit and is ineligible for this exemption.” <sup>27225</sup>
- “Prior to storage and/or treatment, all relevant regulations related to hazardous waste generators in 40 CFR part 262 apply. [But] In most cases, where exempted wastes are immediately placed in storage, subpart [N] would apply” <sup>27225</sup>

EPA allows drying as a form of treatment, but it must be done in a container or tank per p. 27231 The big one – decay-in-storage, which is used for short-lived radionuclides to simply disappear because their short half-life – is allowable, but “After the decay-in-storage process is completed, the waste becomes subject to RCRA Subtitle C requirements.” 27236

**CT DEEP:** CT has not adopted the MW exemption at 40 CFR Part 266, Subpart N. It previously exercised enforcement discretion based on EPA policy at facilities with LLMW (power plants, research universities, and pharmaceutical facilities). EPA changed its policy and CT DEEP can no longer use the same enforcement discretion. CT DEEP is evaluating ways to allow generators to store LLMW for more than 90 days without adopting EPA’s Mixed Waste rule. One company was limited to a 90-day accumulation limit as an LQG but needed to store its MW for up to a year in a lead-lined room. CT came to impasse, considered requiring the company to ship the MW off-site before it reached background levels, but instead referred the case to EPA, which passed on enforcing against the company for accumulating for > 90 days. In the last few years, the MW has become less pressing as some facilities that once generated MW in CT have either closed or moved out-of-state. Other facilities have started using isotopes with very short half-lives, which makes the >90-day issue moot.

**ME DEP:** ME has not adopted the MW rule yet. Its most notable facility is the Portsmouth Naval Shipyard, which has interim status that allows for >90 days storage. ME recently inherited the interim status facility, which has not yet been renewed yet. Portsmouth plans to dispose of its MW waste soon but they are not sure where it will be going; not being disposed in ME.

**MassDEP:** MA adopted 40 CFR part 266 Subpart N. MW storage is licensed by the MA Department of Public Health until it decays to background levels, at which time it must be transferred to the generator’s hazardous waste accumulation area within three days. MassDEP was involved with decommissioning of the Rowe Yankee nuclear power plant. A limited amount of demolition material was managed as LLMW, but most of the waste generated was non-hazardous solid waste. MassDEP also inspected an environmental lab that had an NRC license. They were neutralizing a LLMW, and then shipping it off-site once a year. No enforcement. The lab has since stopped doing treatment; now shipping waste off-site.

**NH DES:** NH has not adopted the Mixed Waste Rule; no recent cases. In 1994 when NH became authorized for Corrective Action, NH issued an MOU that covered coordination between NH DES and NH DPH. MOU has been in place for 23 years. NH DES has had some issues with MW at a UNH lab (xylene scintillation fluid). UNH requested and received several accumulation limit extensions until the MW is solely a HW. NH would use accumulation extension approach again in the future. The extension is supposed to be for 30 days only, and one-time, but the MOU says if more stringent rules are in compliance (i.e., NH DPH rule) they take precedent. EPA has gone along with this approach.

**NY DES:** NY has a number of facilities that generate MW. NDL, a NY-based broker collects radio-tagged samples, holds them for “as low as (is) reasonably achievable” (ALARA) and ships them to South Carolina. The nuclear power plant at Indian Point generates MW that includes freon materials used as coolants and solvents. Indian Point has a licensed LLMW storage area; some wastes have been in storage there for 12 years. Columbia University has one of the original nuclear piles in concrete; but it is subject to NRC but not RCRA.

A discussion followed on where LLMW can be shipped, and these four facilities were identified as the only disposal facilities in the US:

- **EnergySolutions Barnwell Operations, located in Barnwell, South Carolina**  
Currently, Barnwell accepts waste from the Atlantic compact states (Connecticut, New Jersey, and South Carolina). Barnwell is licensed by the State of South Carolina to dispose of Class A, B, and C waste.
- **U.S. Ecology, located in Richland, Washington**  
Richland accepts waste from the Northwest and Rocky Mountain compacts. Richland is licensed by the State of Washington to dispose of Class A, B, and C waste.
- **EnergySolutions Clive Operations, located in Clive, Utah**  
Clive accepts waste from all regions of the United States. Clive is licensed by the State of Utah for Class A waste only.
- **Waste Control Specialists (WCS), LLC, located near Andrews, Texas**  
WCS accepts waste from the Texas Compact generators and outside generators with permission from the Compact. WCS is licensed by the State of Texas to dispose of Class A, B, and C waste.

**EPA Region 2:** No MW rule experiences to report.