



July 21, 2023

Mr. James Smith
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Ms. Rachel Miller
Oklahoma Department of Environmental Quality
707 North Robinson
Oklahoma City, OK 73101

Re: Docket No. 07000925; License No. SNM-928
Cimarron Environmental Response Trust
Bounding Conditions for Fissile Exempt Material

Dear Recipients:

Solely as Trustee for the Cimarron Environmental Response Trust (CERT), Environmental Properties Management LLC (EPM) submits herein information related to a June 30, 2023, presentation on criticality and material control and accounting as addressed in the draft *Facility Decommissioning Plan – Rev 3* (the D-Plan).

The D-Plan provides for the storage of drummed waste that complies with the fissile exempt criteria stipulated in 10 CFR 71.15(c). The D-Plan states that drums of fissile exempt waste will be stored in a single area until enough drummed waste has been accumulated to complete a full shipment (defined herein as a full truckload of drummed waste). However, the D-Plan does not include engineering controls to prevent a greater volume of waste than a single full shipment to be accumulated in the storage area.

The NRC questioned if there were bounding conditions associated with the development of the fissile exempt criteria, and if so, could sufficient waste be accumulated in the storage area in a configuration that would invalidate the fissile material exemption.

This letter is intended to provide information on the bounding conditions related to the fissile exempt criteria to circumvent a potential request for additional information (RAI), hopefully expediting the license amendment process.

The bounding conditions associated with the determination of the fissile exemption criteria are addressed in several locations within NUREG/CR-7239, *Review of Exemptions and General Licenses for Fissile Material in 10 CFR 71*, which are detailed in the following paragraphs.

Section 2.3 – Exemptions from Classification as Fissile Material

Section 2.3 states, “... *the fissile mass or mass concentration must be sufficiently low, based on conservative assumptions, to assure a subcritical arrangement for transport of individual or multiple packages. The exemption criteria are based on worst-case or optimal conditions, including: **unlimited accumulation**; optimum moderation by water, presence of low-neutron-absorbing moderators ... **spherical geometry**, and pure fissile content ...*”. [emphasis added]

Section 2.3 makes it clear that accumulating more than a full truckload, regardless of its configuration, would not invalidate the fissile exemption.

Section 4.1 – Exemptions from Classification as Fissile Material (same section title as 2.3)

Section 4.1 states, “*For purposes of ensuring criticality safety, the exemptions consider that the material can be released from any packaging during transport, **may reconfigure into a worst-case geometric arrangement, may combine with material from other transport vehicles, and may be subject to the fire and water immersion conditions assumed as part of the criticality safety assessment for package designs approved to transport fissile material.***” [emphasis added]

Section 4.1 makes it clear that even if a shipment of fissile exempt material was reconfigured, and combined with material from other shipments, the fissile exemption would still apply.

Section 4.1.3 – 10 CFR 71.15(c) Low Concentrations of Solid Fissile Material Comingled with Solid Nonfissile Material

Section 4.1.3 cites the requirement that there be at least 2,000 grams of solid nonfissile material for every gram of fissile material and that there is no more than 180 grams of fissile material distributed within 360 kilograms of contiguous nonfissile material (and a criterion related to deuterium which is not applicable to the Cimarron decommissioning project).

It then states, “*The intent of this fissile material exemption is to allow large volumes of waste material containing low concentrations of solid fissile material, comingled with a large amount of solid nonfissile material. ... The quantity of fissile material in this provision is not limited, but it must be comingled such that no more than 180 g is distributed within 360 kg (360,000 g) of solid nonfissile material. The intent is to have package contents that have an **essentially homogeneous mixture** of fissile and nonfissile material. According to the provision, the fissile material must be distributed within contiguous nonfissile material, which will ensure the fissile material will not form any heterogeneous arrangements within the waste matrix during normal conditions of transport and hypothetical accident conditions.*” [emphasis added]

Section 4.1.3 makes it clear that to retain fissile exempt status, the fissile material (U-235 at the Cimarron Site) must be “essentially” homogeneously mixed with the non-fissile material (spent resin mixed with absorbent). A ribbon blender was selected as the equipment to mix spent resin with the inorganic absorbent because it produces a very homogenous mixture.

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Section 5.1.5 – Soils Contaminated with Fissile Material

Section 5.1.5 provides an example of uranium in a soil matrix, in which the soil is homogeneously contaminated with uranium at a maximum U-235 enrichment of 3%. Although the D-Plan provides for the accumulation of uranium in a solid resin (versus soil), this example closely resembles the same conditions that are anticipated as uranium is extracted from groundwater at the Cimarron site. It also fairly closely duplicates the process of demonstrating compliance with the fissile exemption criteria of 10 CFR 71.15(c).

Conclusion

The accumulation of fissile exempt material in any conceivable quantity and configuration would not invalidate the material's status as fissile exempt material. Consequently, EPM believes there is no need for engineering controls that prevent the accumulation of drummed waste that has been demonstrated to comply with the fissile exempt criteria promulgated in 10 CFR 71.15(c). It is the intention of the D-Plan to store palleted drums of resin/absorbent waste until there is enough in storage to transport full truckloads of waste to a licensed disposal facility.

There is no operational or economic benefit to accumulating significantly more than a full truckload of waste without shipping it for disposal. However, constraints on transportation such as what occurred recently during the COVID pandemic could make it impractical or impossible to schedule a timely shipment. Should such a situation occur, accumulation of more than one truckload of drummed fissile exempt waste should not be a concern from a criticality standpoint.

EPM requests that NRC staff review this information and NUREG/CR-7239 and provide feedback concerning our assertion that no additional administrative requirements or engineering controls are needed beyond what is already provided for in the D-Plan.

If you have any questions or desire clarification, please email me at jlux@envpm.com or call me at (405) 641-5152.

Sincerely,



Jeff Lux

Project Manager

cc: (electronic copies only)

Jeremy Munson, Logan Crevelt, NRC

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