

Fernald Recycled Uranium Constituents

Discussion Paper

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ORAUT RESPONSE TO FERNALD RECYCLED URANIUM CONSTITUENTS, SC&A CLARIFYING QUESTION 3

This document supersedes NIOSH's (National Institute for Occupational Safety and Health) response to Clarifying Question 3 in the Response Paper, *ORAUT Responses to Fernald SC&A Clarifying Questions* (ORAUT 2018).

SC&A CLARIFYING QUESTION 3

NIOSH (2011) indicates that for the period prior to 1973, Subgroup 6A (UO₃ from Hanford) was utilized in arriving at 10 ppb Pu, though it is not clear if this assumption is still being utilized. It is also not clear if the Subgroup 6A data was extrapolated backwards from post-1973 to the earlier period. If data is being back extrapolated, further discussion of the use of this later data as a substitute may be warranted.

NIOSH RESPONSE TO CLARIFYING QUESTION 3

NIOSH recently concluded that the lot code sequence number is not a reliable indicator of the date that materials were generated. There were several different techniques that Fernald used to assign lot code sequence numbers as found in the DOE (U.S. Department of Energy) Ohio Field Office Report (DOE 2000, p. A-6).

To verify this, NIOSH sorted the data in the "Fernald Recycled Uranium raw data – validated" spreadsheet (NIOSH 2011) by sequence number and eliminated any line with a sequence code greater than 132. Based on guidance in DOE (2000), sequence 132 should correspond to December 1972.

NIOSH then eliminated the rows that had an alphabetical source code because a 3-letter source code is generally associated with material that was generated offsite. For those materials, the lot sequence is not necessarily tied to a date of generation (DOE 2000, p. A-6, 3rd paragraph under "LOT-MARKING AND COLOR-CODING SYSTEM"), rather it is more often associated with the DOE Form 741 number. NIOSH validated this by reviewing shipping documents and comparing the dates on DOE Form 741 to the dates associated with the lot code sequence numbers. NIOSH did not find any evidence that these lot code sequence numbers represented generation dates.

Almost all of the remaining rows referred to UO₃ and carried the notation "UO3 from Tower Ash" in the "SORT_CLASS" field. Some of these Tower Ash lots contain the lot code sequence number of "001". This lot code sequence number should represent a generation date of January 1961. However, based on information in DOE (2000), the tower ash had not been sent to Fernald that early in time. This confirms NIOSH's belief that the lot code sequence number is not a reliable indicator of the date that materials were generated.

As early as 1976, it is indicated that Fernald personnel recognized the impact of receiving high-contaminant recycled uranium from other sites. This is illustrated in the 1977 report, *Refinery*

Processing of Paducah Scrap Materials, that describes how a group of those materials was handled (Cavendish 1977). It appears that “tower ash” and “feed plant ash” were the material types most likely to contain high concentrations of plutonium, neptunium, and technetium contaminants. DOE (2000) also discusses tower ash and feed plant ash received from the Oak Ridge and Portsmouth gaseous diffusion plants (GDP). NIOSH has not been able to identify any documentation on how those materials were handled. However, the Ohio Field Office Report contains the dates on which they arrived. According to Table E.2-4 (DOE 2000, p. E.2-8), the earliest arrivals of “feed plant ash,” or “tower ash” from the three GDPs were 1973 for Oak Ridge, 1976 for Paducah, and 1985 for Portsmouth. Cavendish (1977) also indicates that there was an established permissible limit of 1,500 dpm/g U for transuranics in uranium products to be shipped. A concentration of 10 ppb Pu would result in an activity of 1,350 dpm/g U.

In addition, in 1985, Fernald issued a letter to DOE entitled, *Joint Task Force on Recycled Material Processing*, (Spenceley 1985, PDF p. 15), which supports the conclusion that the average plutonium contaminant level did not exceed 10 ppb. In this letter, Fernald provides a summary of recycled feeds by year. According to the plutonium content provided to DOE, the average plutonium contaminant level did not exceed 10 ppb Pu in total or by material source prior to receipt of ash in 1980.

Based on the absence of feed plant ash and tower ash prior to 1973, NIOSH believes the assumption of 10 ppb Pu is an appropriate and claimant favorable assumption for use in dose reconstruction during the 1961-1972 period at Fernald.

REFERENCES

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