

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS

Nils J. Diaz, Chairman
Edward McGaffigan, Jr.
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In the Matter of)
)
SEQUOYAH FUELS CORPORATION)
)
(Gore, Oklahoma Site))
_____)

Docket No. 40-8027-MLA-5

CLI-03-15

MEMORANDUM AND ORDER

This case arises from the application of Sequoyah Fuels Corporation (“SFC”) for a materials license amendment to possess byproduct material at its site near Gore, Oklahoma. In response to the Presiding Officer’s certified question, the Commission decides today that SFC’s front-end waste may be considered byproduct material under section 11e(2) of the Atomic Energy Act (“AEA”), a provision added to the AEA in 1978 as part of the Uranium Mill Tailings Radiation Control Act (“UMTRCA”).¹

I. BACKGROUND

We recently described the background of the Presiding Officer’s certified question to the Commission in some detail.² From 1970 until 1992, SFC’s Oklahoma facility produced uranium hexafluoride (UF₆) from yellowcake (a mixture of solid uranium oxides, primarily U₃O₈) and, for a portion of this time, the facility converted depleted uranium hexafluoride to uranium

¹ See 42 U.S.C. § 2014e(2).

² See *Sequoyah Fuels Corporation (Gore, Oklahoma Site)*, CLI-03-06, 57 NRC 547, 548-49 (2003).

tetrafluoride. Various phases of SFC's operations produced radioactive waste streams. In 2001, in conjunction with decommissioning planning, SFC requested that the NRC determine if some of the waste from SFC's yellowcake solvent extraction process could be classified as byproduct material under section 11e(2) of the AEA. The term "byproduct material" means

(1) any radioactive material (except special nuclear 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 or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content."³

Only the second part – AEA § 11e(2) – of the definition is at issue in this proceeding.

In 2002, the NRC Staff recommended that the Commission approve SFC's request to classify its waste as 11e(2) material.⁴ Subsequently, the Commission issued a Staff Requirements Memorandum ("SRM") responding to the Staff's recommendation. The Commission SRM concluded that most of the waste at the SFC site could be classified as 11e(2) byproduct material.

Following the Commission's SRM, SFC requested a materials license amendment to possess 11e(2) byproduct material. After publication of notice of the amendment request and opportunity for a hearing under 10 C.F.R. Part 2, Subpart L,⁵ the State of Oklahoma, among others, submitted hearing requests.

The Presiding Officer concluded that the viability of Oklahoma's claim rests on whether the SRM precludes Oklahoma from "insisting that the waste on the Licensee's site in question

³42 U.S.C. § 2014e(2); AEA § 11e.

⁴See SECY-02-0095, "Applicability of Section 11e.(2) of the Atomic Energy Act to Material at the Sequoyah Fuels Corporation Uranium Conversion Facility" (June 4, 2002).

⁵See 67 Fed. Reg. 69,048 (Nov. 14, 2002).

does not qualify as section 11e.(2) byproduct material.”⁶ Because Oklahoma’s position (in effect) challenges the Commission’s SRM, the Presiding Officer certified two preliminary questions to the Commission. The Presiding Officer asked the Commission to decide whether Oklahoma could raise the 11e(2) issue in this adjudication and, if so, whether the Presiding Officer or the Commission itself should originally consider the issue.

We agreed to decide the classification issue ourselves.⁷ We asked the parties to brief directly to us the question whether, in view of initial processing of yellowcake⁸ at the SFC uranium conversion facility, any portion of the SFC waste can be considered as 11e(2) byproduct material. The 11e(2) classification has implications for the type of decommissioning plan necessary to remediate the Gore site and terminate SFC’s license.⁹

In briefs addressing the certified question, SFC and the NRC Staff argue that SFC’s preliminary solvent extraction process is merely a continuation of uranium milling; thus, they maintain, the waste materials generated in this step are 11e(2) byproduct material. Oklahoma

⁶See LBP-03-07, 56 NRC 287, 288 (2003).

⁷See CLI-03-06, 57 NRC 547.

⁸“Initial processing” at SFC includes the steps from solvent extraction of the feedstock to formation of uranium trioxide, UO₃.

⁹The standards for decommissioning inactive mill tailings sites (*i.e.*, 11e(2) sites) allow, in effect, “restricted use” decommissioning of the stabilized tailings disposal cell under government ownership. See 10 C.F.R. Part 40, Appendix A. Until December 11, 2002, when the NRC Staff issued SFC’s requested license amendment, the SFC license contained a condition for “unrestricted use” decommissioning of the entire site, as Oklahoma prefers. The unrestricted use standard will govern if Oklahoma successfully contests the SFC license amendment. See 10 C.F.R. § 20.1402.

Separate adjudicatory proceedings are underway with respect to SFC’s proposed site decommissioning plan, its ground water corrective action plan, and its ground water monitoring plan under Part 40, Appendix A. See Docket Numbers 40-8027-MLA-6, 40-8027-MLA-7, and 40-8027-MLA-8, respectively. Oklahoma has already established standing with respect to the site decommissioning plan that SFC proposed earlier for the Gore, Oklahoma, facility under the 10 C.F.R. Part 20 regulations. See CLI-01-02, 53 NRC 9 (2001).

argues, among other things,¹⁰ that SFC was never licensed or operated as a uranium mill and that classifying SFC's waste as 11e(2) byproduct material is contrary to UMTRCA.¹¹ We agree with the NRC Staff and SFC, for the reasons stated below.

II. DISCUSSION

To answer the Presiding Officer's certified question, we must examine the relevant portion of the section 11e(2) definition; *i.e.*, we must ask whether SFC produced wastes by the concentration of uranium from "ore processed primarily for its source material content." We find that section 11e(2) covers the SFC material. Section 11e(2) provides that the waste output of the processing of uranium ore is byproduct material. While nominally part of the fuel production phase of the nuclear fuel cycle, SFC's front-end process is functionally the same as uranium milling -- *i.e.*, it uses solvent extraction to refine uranium ore. Hence, the waste from that process can legitimately be characterized as 11e(2) material.

Before examining in further detail how the SFC material fits into the nuclear fuel cycle and into the section 11e(2) definition, we turn first to the legislative history of UMTRCA.

A. History of UMTRCA

Classification of the SFC wastes is best understood in the context of UMTRCA and its legislative history. UMTRCA had two general goals -- to remediate contamination at inactive mill sites and to provide for NRC regulation of mill tailings at active sites.¹² To accomplish these

¹⁰Because Oklahoma's other arguments are not relevant to the certified question, we leave them for the Presiding Officer's consideration.

¹¹See 42 U.S.C. §§ 7901 *et seq.*

¹²Mill tailings are potentially hazardous because they are a source of uranium daughter isotopes, especially radon, a radioactive gas with a short half-life. The tailings pile can release radon into the atmosphere, where it and its radioactive daughter isotopes can be inhaled. See Uranium Mill Tailings Radiation Control Act of 1978; Hearings on H.R. 11698, H.R. 12229, H.R. 12938, H.R. 12535, H.R. 13049, and H.R. 13650 ("UMTRCA Hearings") before the Subcomm.

goals, it was necessary to broaden the definition of “byproduct material” within NRC authority. NRC’s then Chairman Joseph M. Hendrie explained to Congress that the NRC lacked the requisite authority over mill tailings:

[The NRC] at the time did not have direct regulatory control over uranium mill tailings. The tailings themselves were not source material and did not fall into any other category of NRC-licensable material. The NRC exercised some control over tailings, but only indirectly as part of the Commission’s licensing of ongoing milling operations. Once operations ceased, however, the NRC had no further jurisdiction over tailings. This resulted in dozens of abandoned or “orphaned” mill tailings piles.¹³

Because prior to UMTRCA mill tailings were unregulated, Congress expanded the 11e definition to bring this additional waste within the definition of byproduct material. The new 11e(2) definition labeled mill tailings -- earlier regarded as waste materials -- as byproduct material. NRC Chairman Hendrie testified in favor of the broadened definition, as it would make mill tailings licensable under the AEA.¹⁴ The change also prevented dual regulation by the NRC and the Environmental Protection Agency by removing mill tailings from coverage under the Resource Conservation and Recovery Act.¹⁵

At the same time, Chairman Hendrie did not want to extend NRC’s authority to areas outside the nuclear fuel cycle, such as wastes from phosphate ore processing.¹⁶ Thus, he urged Congress to modify its definition of byproduct material. In his testimony before Congress, Chairman Hendrie faulted the byproduct material definition included in H.R. 13382,

¹²(...continued)
on Energy and Power of the House Comm. On Interstate and Foreign Commerce, 95th Cong. at 227 (1978) (statement of Victor Gilinsky, NRC Commissioner).

¹³*International Uranium (USA) Corp.* (Request for Materials License Amendment), CLI-00-01, 51 NRC 9, 16 (2000).

¹⁴See UMTRCA Hearings at 341 (statement of Joseph M. Hendrie, Chairman, NRC).

¹⁵See *id.* at 342-43.

¹⁶See *id.* at 342. These wastes contain small amounts of uranium.

one of the House bills that preceded enactment of UMTRCA, and proposed that the definition of byproduct material be expanded to include tailings produced by extraction of uranium or thorium from *any ore processed primarily for its source material content*.¹⁷ The italicized phrase was to replace the phrase, “source material as defined in Section 11z.(2).”¹⁸ The definition thus “focused upon whether the process generating the wastes was uranium milling within the course of the nuclear fuel cycle”¹⁹ and sought, in effect, to expand “the types of materials that properly could be classified as byproduct material.”²⁰ Chairman Hendrie’s proposed broad definition of byproduct material received Congressional approval and appeared in the final version of UMTRCA.

We turn now to the stages of the nuclear fuel cycle, SFC’s role in it, and the relationship of the section 11e(2) definition to the fuel cycle. As we explain below, we find the SFC material -- *i.e.*, the residue of SFC’s front-end processing of uranium ore -- to fit within the section 11e(2) definition of byproduct material.

B. The Nuclear Fuel Cycle and SFC’s Role

The nuclear fuel cycle consists of uranium recovery (mining and milling); fuel production (conversion of uranium concentrates to uranium hexafluoride, uranium enrichment, and nuclear fuel fabrication); use in nuclear reactors; reprocessing irradiated fuel; and management and

¹⁷See UMTRCA Hearings at 343.

¹⁸See *id.* at 345. Source material includes uranium that has not been enriched in the ²³⁵U isotope and ores that contain by weight 0.05% or more of uranium or thorium. See 10 C.F.R. § 40.4.

¹⁹*International Uranium*, CLI-00-1, 51 NRC at 18.

²⁰*Id.* at 16.

disposal of high-level radioactive wastes.²¹ Only uranium milling and conversion are relevant here.

So-called nuclear fuel facilities are divided into three groups: those that convert yellowcake into uranium hexafluoride; those that enrich the uranium hexafluoride in the fissionable ²³⁵U isotope; and those that fabricate enriched uranium into nuclear reactor fuel. SFC has been licensed to possess source material and to convert it to uranium hexafluoride.²²

When it was an active facility, SFC produced uranium hexafluoride from uranium ore concentrate, predominantly yellowcake. SFC initially dissolved the yellowcake feedstock in an aqueous solution of nitric acid, forming uranyl nitrate, and purified it in a solvent extraction process. After purification, SFC concentrated the uranyl nitrate and thermally denitrated it to uranium trioxide, UO₃. In the next several process steps, SFC converted the uranium trioxide to uranium hexafluoride, the final product.²³

Because the solvent extraction process is similar to a process used at conventional uranium mills, SFC and the NRC Staff maintain that SFC's front-end processes -- from yellowcake to uranium trioxide -- are a continuation of the milling process. Thus, they say, wastes from the solvent extraction process are 11e(2) byproduct material. As UMTRCA's definition of byproduct material is process-oriented, the location of the milling, according to SFC and the NRC Staff, is inconsequential. The NRC Staff points out that UMTRCA does not

²¹See *Georgia Power Co. (Alvin W. Vogtle Nuclear Plant, Units 1 and 2)*, LBP-77-2, 5 NRC 261, 289 (1977). At this time, reprocessing spent fuel does not occur in the United States.

²²SFC also converted depleted uranium hexafluoride to uranium tetrafluoride, a process not relevant to the certified question.

²³See *Sequoyah Fuels Corp., Reclamation Plan Sequoyah Facility*, Appendix D at 4-7 (Jan. 2003).

address location at all.²⁴ SFC reasons that its front-end wastes literally satisfy all three prongs of the section 11e(2) definition because: (1) they are produced by extraction or concentration of uranium; (2) the feedstock material is ore; and (3) the primary purpose of processing the ore is to recover source material. SFC states that UMTRCA is not limited to previously unregulated materials (*i.e.*, tailings that would still be “orphaned” without UMTRCA), and that Congress, by not identifying which types of facilities conducted milling, left it to the Commission to make that determination.²⁵

Oklahoma, on the other hand, finds SFC’s interpretation flawed. According to Oklahoma, SFC did not mill uranium ore to produce yellowcake; rather, it conducted a multi-staged conversion sequence to form chemically distinct products. Oklahoma maintains that using solvent extraction as one of the steps does not mean that SFC conducted a milling operation and does not justify decommissioning the entire facility as a uranium mill.²⁶ Rather, the front-end steps are requirements of the complete UF₆ conversion process. Oklahoma also states that the radiological characteristics of the SFC wastes are different from conventional uranium mill tailings. Further, Oklahoma asserts that the SFC facility was never licensed or operated as a uranium mill -- it was always considered a uranium conversion facility and has been regulated under a source materials license. Oklahoma believes that, to justify

²⁴See *generally* “NRC Staff’s Position on Classification of a Portion of Sequoyah Fuels Corporation’s Waste as § 11e.(2) Byproduct Material” (July 3, 2003).

²⁵See *generally* “Sequoyah Fuels Corporation’s Brief on Whether Any Portion of the SFC Waste Can Be Considered as 11E.(2) Byproduct Material” (July 3, 2003).

²⁶See *generally* “State of Oklahoma’s Brief in Opposition to Reclassification of Sequoyah Fuels Corporation’s Waste as Mill Tailings” (July 8, 2003).

classification of SFC's wastes as mill tailings, SFC has resorted to "tortured interpretations of individual words in UMTRCA" that are contrary to the unambiguous intent of Congress.²⁷

The key question here is whether yellowcake may be considered "ore" under section 11e(2).²⁸ Uranium milling involves treatment (physical and/or chemical) of ore. A traditional mill starts with mined uranium ore and refines it into yellowcake. A uranium conversion fuel facility starts with yellowcake and processes it into uranium hexafluoride. Because the NRC has broadly defined "ore" to include "any . . . matter from which source material is extracted,"²⁹ ore actually has a place in both the (traditional) milling and the conversion segments of the fuel cycle. Until recently, the NRC had considered the yellowcake arriving at SFC's front door to be refined *source material*, for by that point the yellowcake -- at least formally -- had left the uranium recovery portion of the fuel cycle and started on the chemical pathway to uranium hexafluoride.³⁰ But "yellowcake" is an indefinite term. At the SFC facility, the yellowcake functioned precisely as ore during its treatment with acid and subsequent solvent extraction -- *i.e.*, it was a mixture of uranium compounds and impurities being transformed (or "milled") into a more usable form. Neither UMTRCA nor its legislative history explicitly addressed what

²⁷*Id.* at 17.

²⁸The SFC material indisputably fits the other two elements of the section 11e(2) definition. SFC generated the wastes in question "by the extraction or concentration of uranium." And the Commission has previously determined that the phrase "'processed primarily for its source material content' most logically refers to the actual act of *processing* for uranium or thorium within the course of the nuclear fuel cycle, and does not bear upon any other underlying or 'hidden' issues that might be driving the overall transaction." *International Uranium*, CLI-00-1, 51 NRC at 15 (emphasis in original). The only remaining element of the section 11e(2) definition is the term "ore."

²⁹NRC Regulatory Issues Summary 2000-23, "Recent Changes to Uranium Recovery Policy" (Nov. 30, 2000) ("RIS").

³⁰Oklahoma notes that one federal court has stated that "[t]he final product of the milling process for uranium ore is uranium-rich 'yellowcake,' U₃O₈." *American Mining Congress v. Thomas*, 772 F.2d 617, 621 (10th Cir. 1985). We find this statement unpersuasive, for the divisions of the nuclear fuel cycle were not at issue in the cited case.

constitutes milling. Indeed, the statute used the term “processing,” not “milling;” thus, Congress left this subject open for interpretation.

Because of the similarity of the SFC front-end process to purification processes at conventional uranium mills, we find that labeling the SFC process as “milling” comports with both the letter of the section 11e(2) definition and with physical and chemical reality. We see no reason to perpetuate the traditional -- and somewhat artificial -- divisions of the nuclear fuel cycle or to rely solely on the name given to a facility to determine where an activity fits in the cycle. As the NRC Staff has argued, location of the activity (*i.e.*, at a conventional “mill” or a conversion facility) simply doesn’t matter under UMTRCA. The Commission agrees that “the section 11e(2) definition focuses on the *process* that generated the radioactive wastes -- the removal of uranium or thorium as part of the nuclear fuel cycle.”³¹ The definition is thus adaptable to situations other than conventional uranium milling. Indeed, the only federal court to address the byproduct material definition directly stated that the definition “adopted by Congress was designed to extend the NRC’s regulatory authority over *all* wastes resulting from the extraction or concentration of source materials in the course of the nuclear fuel cycle.”³²

It is true, as Oklahoma points out, that the goal of SFC’s front-end processing was to achieve a specific chemical form of uranium needed to match the requirements of the hexafluoride conversion process. But so long as the processing identified in section 11e(2) actually took place, the NRC need not examine the motivation or ultimate goals behind the process.³³ The Commission need not draw a line between milling and conversion at SFC’s

³¹*International Uranium*, CLI-00-01, 51 NRC at 18, *citing Kerr-McGee Chemical Corp. v. NRC*, 903 F.2d 1, 7 (D.C. Cir. 1990) (emphasis in original).

³²*Kerr-McGee Chemical Corp.* at 7 (emphasis in original).

³³*See generally, International Uranium*, CLI-00-01, 51 NRC 9. We have also stated that purely economic factors should not determine how radioactive material is defined. *See id.* at (continued...)

front door, for we recognize that purification of uranium ore has a role in two overlapping stages of the uranium fuel cycle.

That the wastes arising from processing at SFC have different concentrations of the radioactive constituents than the wastes typically produced at uranium mills does not alter the Commission's view. These differences are expected because the feed material has different characteristics. The 11e(2) definition focuses on the nature of the processing, not the characteristics of the wastes. Thus, the differences in concentrations do not bear on the classification issue we consider here.³⁴

We are mindful that our initial approval of the NRC Staff's recommendation to reclassify SFC's front-end wastes as 11e(2) byproduct material was quite recent (just last year). Previously, the NRC had considered SFC's waste to be source material. But our view of the nuclear fuel cycle must be flexible enough to accommodate practical reality. The fact is, there is no meaningful safety-related distinction between what SFC does at the front end of its conversion process and what ordinary uranium mills do. Both work with uranium ore to refine it into more useful forms. As the SFC situation illustrates, ore is both a product (of mining and traditional milling) and a feedstock (for further processing into UF₆). Thus, because SFC extracted and concentrated uranium ore for its source material content, SFC's waste qualifies as section 11e(2) byproduct material under the specific terms of that provision.

³³(...continued)

20. Further, the Commission has rejected "ultimate business motivations as irrelevant to the section 11e(2) definition." *Id.* at 24, note 8. "UMTRCA does not require the NRC to ensure that no other incentives lie behind the licensee's interest in processing material for uranium." *Id.* at 18.

³⁴It does indicate, however, that the NRC Staff will have to consider the specific characteristics of the wastes in imposing regulatory requirements to assure protection of public health and safety.

The intent of UMTRCA supports today's decision. UMTRCA nowhere says that it covers only traditional mills.³⁵ Nor does it say that source material cannot also be 11e(2) material.³⁶ It is true, as Oklahoma stresses, that UMTRCA's chief purpose was to protect the public health and safety by closing a regulatory "gap" -- unregulated mill tailings at defunct uranium mills -- and that particular gap does not exist here. But this is not decisive.³⁷ UMTRCA's byproduct material definition was, *by design*, broadly phrased, and it readily encompasses the SFC material.³⁸ Both the Commission and the federal courts have previously held that the section 11e(2) definition is not confined to the sites that originally concerned Congress.³⁹

Congress wrote section 11e(2) with room to construe it pragmatically. The language in section 11e(2) about processing ore for its source material content was specifically intended to broaden the definition of byproduct material to facilitate control of wastes that resulted from processing *within the nuclear fuel cycle* and which ultimately may be left orphaned.⁴⁰ Like conventional mill tailings at sites lacking funds for decommissioning, the SFC wastes are a legacy problem. The reclassification of SFC's waste harmonizes with the AEA, for the

³⁵*In situ* leach facilities, *e.g.*, are covered under 10 C.F.R., Part 40, Appendix A.

³⁶Indeed, uranium mills, like conversion facilities, operate under source material licenses. Ore that has received minimal processing -- such as crushing and sorting by size -- is source material. The resultant tailings are 11e(2) material, but they also retain their character as "ore" if they receive additional processing to recover uranium.

³⁷See *New York v. Federal Energy Regulatory Commission*, 535 U.S. 1, 21, 122 S. Ct. 1012, 1024 (2002) (Where Congress used broad language in the Federal Power Act of 1935, evidence of a specific "cataly[st]" for enactment of the statute "does not define the outer limits of the statute's coverage.")

³⁸See *PGA Tour, Inc. v. Martin*, 532 U.S. 661, 689, 121 S. Ct. 1879, 1897 (2002) ("[T]he fact that a statute can be applied in situations not expressly anticipated by Congress does not demonstrate ambiguity. It demonstrates breadth.") (Citation and internal quotation marks omitted).

³⁹See *International Uranium*, CLI-00-01, 51 NRC 9, and *Kerr-McGee Chemical Corp.*

⁴⁰See *International Uranium*, CLI-00-01, 51 NRC at 16-19.

reclassification serves a practical purpose and protects the public health and safety. Absent reclassification, the Commission has significant concerns about funding to stabilize and decommission the SFC site in light of the dire financial status of the licensee. The reclassification simplifies SFC's decommissioning task and makes it more likely that decommissioning will take place reasonably soon because UMTRCA *mandates* a long-term government custodian, either the State of Oklahoma or the U.S. Department of Energy, for stabilized inactive 11e(2) mill tailings piles.⁴¹

Accordingly, we decide today that SFC's front-end waste may be considered byproduct material under section 11e(2) of the AEA. The Commission appreciates Oklahoma's articulate and thought-provoking contribution of its views and concerns regarding reclassification of SFC's waste.

⁴¹ See 42 U.S.C. § 2111; UMTRCA § 202. By contrast, we note that under § 151 of the Nuclear Waste Policy Act the Department of Energy has *discretion* whether to accept title to and custody of AEA wastes other than 11e(2) byproduct material. See 42 U.S.C. § 10171.

III. CONCLUSION

For the foregoing reasons, the Commission (1) *answers* the Presiding Officer's certified question and states that SFC's front-end waste can be considered as AEA § 11e(2) byproduct material; and (2) *remands* this matter to the Presiding Officer for action consistent with this decision.

IT IS SO ORDERED.

For the Commission

/RA/

Annette L. Vietti-Cook
Secretary of the Commission

Dated at Rockville, Maryland,
this 13th day of November, 2003