March 8, 2002

MEMORANDUM TO: Martin J. Virgilio, Director
Office of Nuclear Material Safety
and Safeguards

FROM: Daniel M. Gillen, Chairman /RA/
Differing Professional View Panel

SUBJECT: PANEL REPORT: REVIEW OF THE DIFFERING PROFESSIONAL VIEW ON A COMMISSION PAPER ON "APPLICABILITY OF SECTION 11e.(2) OF THE ATOMIC ENERGY ACT TO MATERIAL AT THE SEQUOYAH FUELS CORPORATION URANIUM CONVERSION FACILITY" (DPV-NMSS-2001-01)

In response to your November 29, 2001, memorandum on this subject, I hereby forward to you the attached report of our ad hoc panel convened to review a Differing Professional View (DPV). The DPV addressed the recommendations presented in a Commission Paper on the applicability of Section 11e.(2) of the Atomic Energy Act, as amended**,** to a portion of the waste at the Sequoyah Fuels Corporation Uranium Conversion Facility.

Attachment: Ad Hoc Panel Report on DPV

cc: D. Sollenberger
A. Campbell
R. O'Connell

MEMORANDUM TO: Martin J. Virgilio, Director
Office of Nuclear Material Safety
and Safeguards

FROM: Daniel M. Gillen, Chairman /RA/
Differing Professional View Panel

SUBJECT: PANEL REPORT: REVIEW OF THE DIFFERING PROFESSIONAL VIEW ON A COMMISSION PAPER ON "APPLICABILITY OF SECTION 11e.(2) OF THE ATOMIC ENERGY ACT TO MATERIAL AT THE SEQUOYAH FUELS CORPORATION URANIUM CONVERSION FACILITY" (DPV-NMSS-2001-01)

In response to your November 29, 2001, memorandum on this subject, I hereby forward to you the attached report of our ad hoc panel convened to review a Differing Professional View (DPV). The DPV addressed the recommendations presented in a Commission Paper on the applicability of Section 11e.(2) of the Atomic Energy Act, as amended**,** to a portion of the waste at the Sequoyah Fuels Corporation Uranium Conversion Facility.

Attachment: Ad Hoc Panel Report on DPV

cc: D. Sollenberger
A. Campbell
R. O'Connell

OFC	PMDA						
NAME	DGillen						
DATE	03/08/02						

REPORT OF AN AD HOC PANEL
CONVENED TO REVIEW THE DIFFERING PROFESSIONAL VIEW ON
A COMMISSION PAPER ON "APPLICABILITY OF SECTION 11e.(2) OF
THE ATOMIC ENERGY ACT TO MATERIAL AT
THE SEQUOYAH FUELS CORPORATION
URANIUM CONVERSION FACILITY"

_____/s/_____
Daniel M. Gillen, Chairman

_____/s/_____
Andrew C. Campbell, Member

_____/s/_____
Dennis M. Sollenberger, Member

Date: March 8, 2002

Purposes

The purposes of this Ad Hoc Panel were as follows: 1) to review the Differing Professional View (DPV) on recommendations presented in the Draft Commission Paper on the "Applicability of Section 11e.(2) of the Atomic Energy Act (AEA) to Material at the Sequoyah Fuels Corporation (SFC) Uranium Conversion Facility," 2) to review the Draft Commission Paper with respect to the issues raised in the DPV, and 3) to report to the Director, NMSS on the merits of the positions taken in the DPV with regard to the recommendations of the Commission Paper.

Background

The SFC uranium conversion facility is one of the sites included in the Site Decommissioning Management Plan. In 1993, SFC submitted its "Preliminary Plan for Completion of Decommissioning," in which it stated that certain activities at the site included the concentration of uranium from yellow cake. SFC argued that the resulting wastes meet the definition of 11e.(2) byproduct material, and the site could be remediated under the Uranium Mill Tailings Radiation Control Act of 1978, as amended (UMTRCA).

In a memorandum to the Commission (July 6, 1993), the NRC Executive Director of Operations, stated that the Office of the General Counsel had provided an informal view that "the uranium contaminated decommissioning wastes at Sequoyah Fuels do not fit the definition of 11e.(2) byproduct material and thus fall outside the coverage of the Act."

In March 1999, SFC submitted a decommissioning plan to remediate the site and terminate the license in accordance with the 1997 License Termination Rule (LTR), in 10 CFR 20.1403, for license termination under restricted conditions.

In January 2001, SFC formally requested that the staff evaluate whether a portion of the SFC waste could be considered as 11e.(2) byproduct material. The Division of Waste Management Commission Paper prepared in response to that request discusses two options for responding to the request: (1) continue with the historical view that would disagree with the SFC arguments, and continue decommissioning the site under the LTR; or (2) agree with the SFC arguments and classify some SFC waste as Section 11e.(2) byproduct material. The staff concludes that both options are legally viable, and ultimately, after discussing the advantages and disadvantages, recommends that the SFC waste from the front-end of its Gore, Oklahoma operation be considered 11e.(2) byproduct material.

Mr. Fliegel and Mr. Lusher reviewed the Draft Commission Paper and prepared a DPV. They believe that in reaching its recommendation, the Draft Commission Paper does not adequately discuss the complex issues involved. They consider that the significance of this decision is whether NRC adheres to and appropriately follows legislation and regulations governing the remediation of mill tailings sites and the disposition of 11e.(2) byproduct material. They do not believe there is a significant safety issue involved. They believe that the staff recommendation in the Draft Commission Paper arbitrarily reinterprets the fundamental definition of 11e.(2) byproduct material and will create more problems for the NRC in future site decommissioning activities under both the LTR and UMTRCA.

Discussion

Areas of Agreement in the DPV and Draft Commission Paper

Prior to discussing the areas of differing views, it is important to summarize some key areas of agreement on this issue. The Draft Commission Paper and the DPV both consider the two options for disposal of the Sequoyah wastes to be technically feasible and provide equivalent health and safety protection. In addition, the Draft Commission Paper and the DPV both acknowledge that if the wastes are 11e.(2) material, the Department of Energy (DOE) would be required to take custody of the disposal area for long term care under the general license in 10 CFR 40.28.

The Draft Commission Paper and the DPV both acknowledge that approximately 20 to 25% of the wastes are not from the solvent extraction (SX) process and would have to be addressed separately, including getting prior DOE approval for the material to be disposed of in any SFC 11e.(2) disposal cell. However, the Commission Paper should state specifically that the termination of the Sequoyah license ultimately is based on DOE agreeing to take title to source material wastes and provide perpetual care either as a LLW disposal cell under Section 151b of the AEA or as an 11e.(2) disposal cell with LLW disposed of in it under UMTRCA.

The panel agrees with the points discussed above, but suggests that the information provided in the Draft Commission Paper needs to be made clearer on the circumstances of DOE acceptance related to each option.

Areas of Differing Views in the DPV and Draft Commission Paper

The fundamental area of disagreement between the Draft Commission Paper and the DPV is whether the material at the SFC facility can be classified as 11e.(2) byproduct material. The DPV addresses three questions about this issue: 1) does the material fit the definition of 11e.(2) byproduct material? 2) does the material fall within the intent of Congress when it enacted UMTRCA? and 3) are the radiological characteristics of the material similar to typical 11e.(2) byproduct material? This report considers these questions relevant to the issue, and discusses each of them in the context of what is discussed in the Draft Commission Paper and the merits of information provided by the DPV.

1. Definition of 11e.(2) Byproduct Material

A key area of concern in the DPV by Fliegel and Lusher is the definition of byproduct material in section 11e.(2) of the AEA as amended. They contend that the waste SFC is proposing to be treated as 11e.(2) byproduct material does not fall within previously accepted definitions (see Figure 1). Therefore, they disagree with the staff preferred option in the draft Commission Paper to accept the SFC proposal. They note that the 1993 EDO memorandum stated that, "The uranium contaminated decommissioning wastes at Sequoyah Fuels do not fit the definition of 11e.(2) byproduct material and thus fall outside the coverage of the Act."

The 11e.(2) byproduct material definition in the statute is as follows: "...the tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content." Fliegel and Lusher agree that the material is "waste," but contend that in order for it to be considered 11e.(2) byproduct material two issues need to be considered: 1) whether the material was produced by the "extraction or concentration of uranium" and 2)

whether the yellow cake material that was processed at Sequoyah was an "ore." The panel agrees that these are the key considerations in assessing this material against the 11e.(2) definition.

Extraction/concentration: The licensee argues (and the staff agrees by its recommended option) that the process of further refinement of the yellow cake is "concentration" of the uranium. They further argue that because this chemical process is similar to what is done at a uranium mill, the SFC waste meets this part of the definition. The DPV makes the following counter points:

- The material that was processed was an impure grade of yellow cake that was being purified in preparation for the process of converting it to UF6. It was not an ore or alternate feed material being processed in a milling operation.

- Extraction and concentration at a mill from ore or other source material is different from converting yellow cake to a chemical form suitable for the conversion to UF6. The former was done as an integral part of the mining and milling process prior to shipment to SFC, whereas the latter was done as an integral part of the UF6 conversion process at SFC.

- If the purification of yellow cake is considered part of the milling process for the purposes of defining 11e.(2) byproduct material, then any waste from any process involving the purification and conversion of products containing uranium or thorium also could qualify. This would expand the definition to include other U/Th processing or conversion facilities.

In 1970, many of the milling facilities only dried the yellow cake with low temperature dryers, resulting in a product that would require additional processing to meet the chemistry requirements for the conversion process selected by Sequoyah. As the Panel understands it, the conversion process requires a specific chemical form of uranium that is not the product of the milling facilities. Therefore, although concentration occurs, the goal at the front end of this conversion facility is primarily achieving the specific chemical form needed to match the particular requirements of the UF6 conversion process.

Ore: In the Draft Commission Paper, the staff indicates that yellow cake could be classified as an "ore" in the context of the uranium processing that took place at the front-end of the Gore facility. Although the staff notes in the discussion of options that this interpretation is at odds with previous practice and regulatory guidance, it is arguing that, because neither "ore" nor "milling process" are specifically defined in the legislation and regulations, the SFC proposal is not legally precluded. The DPV makes the following points:

- Historically, the NRC has defined "ore" as material (natural ores or alternate feed materials) from which natural uranium and/or thorium is initially extracted or concentrated at a uranium or thorium mining and/or milling operation. This definition has not been applied to the further refinement of yellow cake at conversion facilities separate from a mill.

- "Ore" is not defined in the AEA or NRC regulations. Staff proposed in 1992 to define "ore" as a " . . . natural or native material that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill." Subsequently, the Commission has used this definition to permit alternate feed materials to be processed at "licensed uranium or thorium mills."

- The yellow cake processed at SFC would not fit these definitions. If it became acceptable to define it as “ore” or alternate feed material, then any process utilizing a purification step for material containing uranium or thorium could be defined as such.

The Draft Commission Paper proposes that the front end of the Sequoyah facility can be considered as a continuation of the milling started at a facility licensed as a mill (see Figure 1). Under this view, the “ore” would be the original ore brought to the mill that supplied the yellow cake to the Sequoyah facility. The DPV argues, that if this were the case, any process at any nuclear fuel cycle facility that results in an increase in the concentration of uranium (or thorium) would have its wastes qualify as 11e.(2) byproduct material, as the uranium or thorium would have started out as ore at some uranium or thorium mill.

The Panel considers that the Draft Commission Paper has not fully addressed the historical background associated with the NRC definition of “ore” for classifying wastes as 11e.(2) byproduct material.

2. Intent of UMTRCA

In further responding to the Draft Commission Paper recommendation that the Sequoyah wastes be considered 11e.(2) material, the DPV discusses UMTRCA and its intended purpose with regard to byproduct material regulation. The DPV points out that prior to the enactment of UMTRCA, uranium mill tailings were not regulated under the AEA, because the tailings usually contained less than 0.05 percent uranium and thorium and thus were exempt, under 10 CFR 40.13(a), as unimportant quantities of source material. Uranium mill tailings did contain sufficient quantities of radium, left from the processing of the uranium ore, to present a potential radiological hazard. UMTRCA was enacted to close a regulatory gap by creating the legislative framework to control the radiological hazard of previously unregulated radioactive material, which it defined in adding Section 11e.(2) to the AEA. The DPV authors note that, in contrast to uranium mill tailings, the wastes at the Sequoyah facility were always under NRC regulatory authority as source material. Thus, UMTRCA does not provide additional protection to the public with respect to the Sequoyah facility wastes nor to source material wastes at other NRC regulated facilities. The DPV concludes that there is no evidence that Congress sought to include such material, that was already under NRC regulatory jurisdiction, in the definition in AEA Section 11e.(2).

In 1993, the view of OGC was that, “ . . . hexafluoride conversion plants were never considered as uranium mills and were not contemplated as such in the Uranium Mill Tailings Radiation Control Act of 1978” (UMTRCA).

The Draft Commission Paper does not present a position on the intent of UMTRCA. The panel believes that the intent of UMTRCA is an additional factor that should be included in the Paper for the Commission’s full consideration of this issue.

3. Radiological Characteristics of Sequoyah Wastes

The Draft Commission Paper does not address the waste characteristics at the Sequoyah facility. The DPV raises this as an issue, and discusses the radiological characteristics of the wastes and how they differ from the typical 11e.(2) wastes at current Title I sites and the generic analysis in the Final Generic Impact Statement on Uranium Milling, September 1980, NUREG-0706 (GEIS). The DPV uses the data in Sequoyah’s submittal of January 5, 2001.

The issues raised in the DPV were as follows:

- The DPV concludes that the radiological characteristics of the Sequoyah wastes are significantly different from current Title I wastes and the radiological impacts considered in the GEIS.

- The radiological content of the Sequoyah wastes (in particular the sludge which was discussed in the DPV) equate to 1.7% source material content for uranium only. This is higher grade material than was processed to generate the original yellow cake that was sent to Sequoyah.

- The DPV points out that the mix of radionuclides in the Sequoyah wastes are significantly different than those analyzed in the GEIS or by EPA in issuing its uranium milling standards, and that this difference would need to be addressed in any design of a decommissioning plan for this site. Design issues could include groundwater protection, limiting water infiltration, and the ingrowth of radium from the high thorium concentration of the wastes during the 1000 year design life of the facility. Radon emanation, which was the focus of UMTRCA, does not appear to be the major radiological risk to be managed from these wastes.

Although the definition of 11e.(2) does not consider waste characteristics, the panel believes that the DPV issues on the waste differences and possible disposal design differences are important considerations. The Final Commission Paper should acknowledge the waste differences and discuss the impact on disposal design so that the Commission can fully consider the impacts of any decision it makes.

Consequences of the Policy Decision

The DPV raises the issue that reclassifying the Sequoyah wastes as 11e.(2) may have unanticipated consequences, both with respect to the Sequoyah facility and to other facilities subject to NRC regulation. It further points out 1) that there might be other facilities that could, under the recommended revised interpretation, reclassify some wastes as 11e.(2) byproduct material, and 2) that the proposed reclassification might have the effect of bringing some wastes that have not been regulated by NRC, such as from side stream recovery operations at phosphate facilities, under NRC authority. These possibilities are not discussed in the Draft Commission Paper.

The Panel agrees with the DPV that the proposed Sequoyah proposal and staff recommendation could leave open the possibility for other facilities in the fuel cycle to make similar arguments for 11e.(2) waste. This issue needs to be considered more fully in the Final Commission Paper.

Other Points of the DPV

The DPV also considers the question of whether the Commission Paper recommendation provides an easier path to remediating the Sequoyah site, and discusses the two options of the Draft Commission Paper in light of the performance goals identified in the NRC Strategic Plan. Although the Panel comments on the path to remediation in its recommendations, it does not consider these discussions as primary determining factors in answering the question of where to draw the line in

defining 11e.(2) byproduct material, and as such has not addressed these discussions specifically.

Recommendations

The Panel has evaluated the DPV, the Draft Commission paper and attachments, and a variety of related background documents to determine if the issues raised in the DPV warrant further consideration and inclusion in the Final Commission Paper. The recommendations of the panel are intended to improve the quality of the information provided to the Commission so that it has a sufficient basis to make a decision on the staff position for responding to the SFC proposal.

As discussed above, the DPV presented by Fliegel and Lusher raises several important considerations that were not included in the Draft Commission Paper discussion. These considerations relate to the definition of 11e.(2) byproduct material, the intent of UMTRCA, the radiological characteristics of the waste, and the consequences of implementing the recommended option of the Draft Commission Paper. The DPV primary concern is that the staff recommended acceptance of the SFC proposal ignores the clear differences in the operations and functions of and will blur long-held regulatory distinctions between mining and milling operations and other uranium or thorium processing facilities, such as UF6 conversion facilities (see Figure 1). The DPV argues that staff acceptance of the re-definition of 11e.(2) byproduct material in the SFC proposal will lead to a situation where any facility working with uranium and/or thorium could fall under the regulatory framework specifically developed for mining and milling operations.

It does not appear that the Draft Commission Paper has made a complete case for recommending Option 2, i.e., acceptance of the SFC proposal. In particular, the paper is lacking in the following areas:

- The Draft Commission Paper does not discuss the bases for the general change in OGC's interpretation of the definition of 11e.(2), or the particular change in OGC's position on the applicability of UMTRCA to the SFC waste.

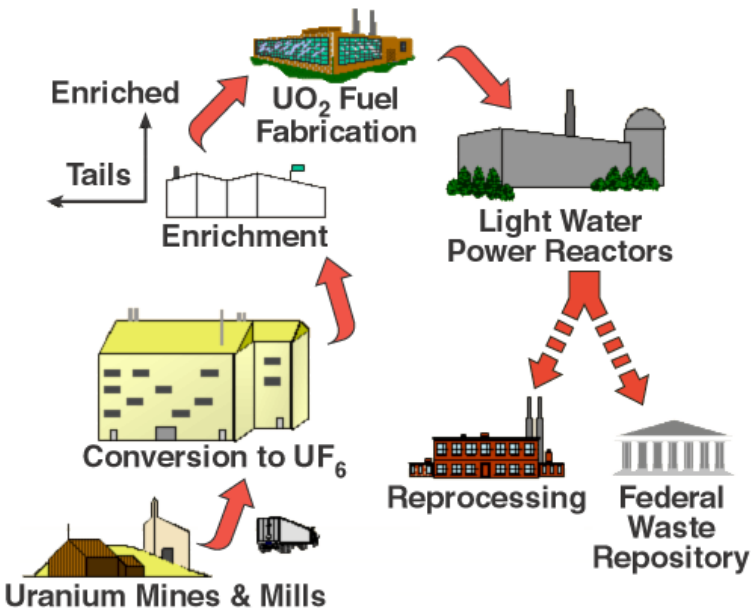
- Although the Commission Paper acknowledges the need for DOE approval, it should state specifically that the termination of the Sequoyah license ultimately is based on DOE agreeing to take title to source material wastes and provide perpetual care either as a LLW disposal cell under Section 151b of the AEA or as an 11e.(2) disposal cell with LLW disposed of in it under UMTRCA.

- In discussing extraction/concentration, the Draft Commission Paper does not recognize that although concentration occurs, the goal at the front end of this conversion facility is primarily aimed at achieving the specific chemical form needed to match the particular requirements of the UF6 conversion process.

- The Draft Commission Paper has not fully addressed the historical background associated with the NRC definition of "ore" for classifying wastes as 11e.(2) byproduct material.

- The Draft Commission Paper does not present a position on the intent of UMTRCA, and the panel believes that the intent of UMTRCA is an additional factor that should be included in the Paper for the Commission's full consideration of this issue.

- T
C
d
w
at
fa
si
di
ty
w



- T
C
d
p
c
re
re
fa
c
ar
waste.

h e D r a f t ommission Paper oes not address the aste characteristics the Sequoyah cility, nor any gnificance of its fferences from pical uranium milling astes.

h e D r a f t ommission Paper oes not address the ossible unintended onsequences of its commendation with gard to other cilities in the fuel ycle making similar guments for 11e.(2)

It appears that the impetus for the staff recommendation to define SFC wastes as 11e.(2) byproduct material primarily is based on concerns about providing for long-term institutional control of the site. In its proposal, SFC makes a number of arguments dealing with the staff experience with decommissioning under Appendix A of 10 CFR part 40 in contrast to limited experience with decommissioning under the License Termination Rule (LTR) in Subpart E of 10CFR Part 20. Further, the Draft Commission Paper recommends that the Sequoyah facility waste be classified as 11e.(2) byproduct material, because it would result in a well tested and defined process for decommissioning the site. The panel believes that it may be more appropriate for the staff to seek ways to ensure the LTR decommissioning process works effectively, particularly with respect to provisions for long-term institutional care, rather than addressing ways to fit the SFC site into the mill tailings program. Acceptance of the SFC proposal may result in the NRC having to deal with long-term control issues at other decommissioning sites by exception and on a case-by-case basis, rather than through establishment of a robust LTR process.

The Commission will need a clear presentation of all the issues discussed above to make a well-informed policy decision. The Panel recommends that the Draft Commission Paper be revised to address the areas itemized above. With this additional information included in the Commission Paper, the Panel's opinion (given the information available to it and the regulatory framework as it exists) is that the case for Option 2 as it stands is not a strong one, and that the staff may wish to consider other options.

Figure 1. Graphical representation of uranium fuel cycle taken from NRC's website. The DPV argues that the definition of 11e(2) byproduct material in the AEA is applied to wastes from mining and milling operations, and that the regulatory framework has been developed to deal specifically with those wastes and was not intended to be applied to UF_6 conversion facilities.