MEMORANDUM TO: Theodore S. Sherr, Chief
Licensing and International
Safeguards Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

February 4, 2000

FROM: Larry W. Camper, Chief
Decommissioning Branch
Division of Waste Management, NMSS

SUBJECT: RESPONSE TO TECHNICAL ASSISTANCE REQUEST–REVIEW OF FANSTEEL'S DECOMMISSIONING PLAN FOR ONSITE DISPOSAL UNDER RESTRICTED USE CRITERIA

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Docket No. 40-7580
License No. SMB-911

Attachment: Questions from review of Fansteel
Decom Plan, w/att (PA review)

CONTACT: Ted Smith, NMSS
(301) 415-6721

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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Preliminary Questions on Fansteel Containment Cell Design

Design Review

1. Hydrology: The Remedial Design Report (RDR) indicates that the site would be inundated by 11 feet of water following a failure of the Fort Gibson Dam based on the U.S. Army Corps of Engineers (USACE), inundation map (page B.2.1-7 and attachment 4 of Appendix B.2). However, this information is not considered to provide the level of detail needed to adequately analyze the peak Probable Maximum Flood (PMF) or dam failure flood levels at the site. The staff requires additional information in order to begin review of the long-term stabilization design relative to peak water levels and velocities expected from either a PMF, a dam failure, a dam failure resulting from a PMF, or multiple sequential failures of upstream dams. This information should include the following:

   a. Analyses of the Probable Maximum Flood and flood levels. The licensee should develop PMF estimates and water level estimates at the site associated with the PMF, assuming that the upstream dams do not fail.

   b. Analyses of flood levels associated with single or multiple failures of upstream dams, using unsteady flow models. Alternately, conservative simplified analyses may be used to "bound" the estimates of peak water level and velocity.

   c. Information related to the hydrologic design of the various dams upstream of the site. This information should include data regarding the dam height, reservoir volume, spillway design flood and/or ability to pass the PMF, and other pertinent facts about the dam. Much of this information may be available from Federal agencies such as the USACE.

   The staff recognizes the complexity associated with such analyses, and the information requested above should not be considered to be a complete or final list of the data and analyses needed by the staff. Depending on assumptions and parameters associated with the cell design, such detailed analyses may not even be necessary. At the present time, the staff does not have sufficient information to determine the amount of information needed to provide a basis for the selection of the erosion protection design. The staff suggests that a meeting be held to discuss the options available and to discuss the hydrologic setting of the dams and river systems in the site area.

2. Geochemistry: The Treatability Study Report (TSR) was reviewed for geochemical properties of the stabilized and solidified material. The staff requested clarification of the following issues:

Attachment

a. The appendix C CoreLab analysis lists a value of 40,300 pCi/g for K-40 in Section 2 on Page 2. Specific activity of K-40 is 7.0E6 pCi/g; so one would expect a sample that contains 5% K (approx. 50,000 mg/kg as shown on Table 3) should yield 41 pCi/g (assuming natural abundance of 0.0117% K-40), which differs from the listed value by two orders of magnitude. The results are similar for K-40 concentrations shown on page 2 of Appendix C-3 and C-4. The licensee should review and verify the data, and provide an explanation for the high K values in appendix C.

b. In Table 11 of the TSR, some of the well samples appear to exceed the drinking water criteria for cadmium, lead, nitrates, and arsenic. The leachates from some of the Toxic Characteristic Leachate Procedure (TCLP) or from the American National Standard for the Measurement of the Leachability of Solidified Low-Level Radioactive Wastes by a Short -Term Test Procedure (American National Standards Institute/American Nuclear Society [ANSI/ANS] Method 16.1), exceed the drinking water criteria for fluoride, cadmium, and lead. The licensee should explain these levels with respect to any applicable state and federal agency clean/drinking water laws and regulations.

b. Paragraph 4.3.4 on page 16 states that in the TCLP test all Resource Conservation and Recovery Act (RCRA) metals in S/S materials, as presented in Table 4, were below applicable drinking water levels. However, the Table 4 S/S processed material values for cadmium, (0.0087, 0.0096 and 0.0063 mg/L) appear to exceed the drinking water limit, listed on Table 11 as 0.005 mg/L. The licensee should explain this apparent discrepancy.

d. In Table 3 of the TSP, the fluoride concentration in the feedstock soils is 388 mg/kg. However, in the three mixes it is 26, 30, and 125 mg/kg. Addition of cement and $CaCl_2$ alone could not be responsible for this decrease in fluoride from mix to mix. The variability of the fluoride concentration could undermine the conclusions about the effectiveness of $CaCl_2$ in restoring mechanical strength as described in Sections 2.6 and 2.7, on Pages 6 and 7 of the TSP.

e. The leachate from the TCLP has a fluoride concentration of 551 mg/L (see Table 4, mix No 3). Concentrations of fluoride more than 4 mg/L exceed the Drinking Water Standard. This also undermines the discussion regarding the addition of calcium to the feedstock soil to tie up the fluoride as fluorite. The licensee should explain the high fluoride concentration and how it relates to the higher mechanical strength of the S/S cylinder samples from mix No. 3.

Performance Assessment

3. Dose Modeling: No analysis has been conducted that incorporates a dose contribution from the concentration-based unrestricted release portion of the site to the dose-based restricted release portion of the site. This could be particularly important for dose contributions from groundwater. Although there is currently no published guidance on how to address this situation, staff proposes the licensee be required to show that the dose calculations include contributions from both the BTP and LTR areas of the site, and that in combination, they will

not fail the standard. Alternatively, the licensee could be required to demonstrate separability of the site for dose contribution, either through geophysical conditions or engineered barriers.

The staff technical review on performance assessment is also provided as an attachment. A summary of staff comments follows:

In the RESRAD analysis:

a. Staff questions the use of a runoff coefficient of 0.99 in lieu of 0.95.
b. Staff questions the use of hydraulic and transport parameters for shale in lieu of those for sand to represent the saturated zone.
c. Staff questions the depth of intake wells and aquifer thickness used in the model.
d. Staff recommends evaluating the doses at periods for longer than 1000 years, based on time to maximum dose.
e. Staff recommends licensee take credit for improved leachability of the stabilized soil.

Staff also questioned the timing for shutdown of the groundwater collection system. The licensee should perform an analysis with site-specific parameters to estimate the time required for collection water to meet regulatory limits and make provision for operation of collection system for that period of time.

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Completion Date	2/4/00