

September 28, 2005

Mr. John H. Ellis  
President  
Sequoyah Fuels Corporation  
P.O. Box 610  
Gore, OK 74435

SUBJECT: SEQUOYAH FUELS CORPORATION - MATERIALS LICENSE NO. SUB-1010 -  
REQUEST FOR ADDITIONAL INFORMATION - GROUNDWATER  
CORRECTIVE ACTION PLAN (TAC L52528)

Dear Mr. Ellis:

By letter dated June 16, 2003, Sequoyah Fuels Corporation (SFC) submitted the "Corrective Action Plan Report" that describes the proposed groundwater corrective action plan (GWCAP) at SFC's Gore, Oklahoma site. The U.S. Nuclear Regulatory Commission (NRC) has completed a detailed technical review of that document. We have also reviewed information submitted by SFC on March 14, 2005, in response to our December 6, 2004 request for additional information. Our review has identified deficiencies in the proposed GWCAP. We will need the additional information identified in the enclosure in order for us to complete our review.

Within 30 days of this letter, please either provide the requested information, or a schedule to provide the information. If you have any questions concerning this letter please contact me at (301) 415-6629 or by e-mail at [mhf1@nrc.gov](mailto:mhf1@nrc.gov).

In accordance with 10 CFR Part 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

\RA\

Myron H. Fliegel, Project Manager  
Fuel Cycle Facilities Branch  
Division of Fuel Cycle Safety  
and Safeguards  
Office of Nuclear Material Safety  
and Safeguards

Docket No. 40-8027  
License No. SUB-1010

Enclosure: Request for Additional Information

cc: William Andrews, USGS  
Michael Broderick, OK DEQ  
Kelly Burch, Esq., OK AG  
Will Focht, OSU  
Alvin Gutterman, Esq., Morgan Lewis & Bockius  
Pat Gwin, Cherokee Nation  
Jeannine Hale, Esq., Cherokee Nation  
Craig Harlin, SFC  
Jim Harris, USACE  
Troy Poteete, Cherokee Nation  
Charles Scott, USFWS  
Saba Tahmassebi, OK DEQ  
Rita Ware, EPA  
Kim Winton, USGS  
Merritt Youngdeer, BIA

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<b>OFC</b>	FCFB		FCFB		FCFB	
<b>NAME</b>	MFliegel		BGarrett		RNelson	
<b>DATE</b>	09/12 /05		09/13/05		09/28/05	

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**Sequoyah Fuels Corporation  
Groundwater Corrective Action Plan Review  
Request for Additional Information**

**CAP2 Site Characterization**

- A. SFC should identify ground-water users with 2 miles of the site boundary and surface water users within 2 miles downstream of the site. This information is necessary to allow NRC staff to assess impacts of proposed remediation strategies on potential ground-water and surface water users. NRC staff will also use this information to determine if the proposed strategies will be protective of human health, safety, and the environment.
- B. Figures 2-8 through 2-13 contain geologic cross-sections; however, these also need to include the potentiometric surface of the uppermost aquifer and the locations and screen depths of ground-water monitoring wells used to measure the potentiometric surface. This information is necessary to examine the relationship between the potentiometric surface, site structures or features, and underlying geologic units. This information will allow NRC staff to evaluate whether extraction wells and trenches are placed in effective locations for capturing ground-water contamination.
- C. The CAP should include detailed hydrogeologic information for each aquifer defined at the site. Information should include hydraulic conductivity, storativity, specific yield, transmissivity, effective and total porosity, hydraulic gradients, variations in hydraulic gradient, and water balance computations. SFC should present the most recently estimated values. Background ground-water quality should also be discussed in the CAP. This information is necessary to allow NRC staff to evaluate whether the corrective action system is sufficiently designed to contain and remediate contaminated ground water.
- D. SFC should also present a discussion of the contouring method used to create potentiometric surface maps and should also present a contoured map of residuals. Discussions of the contouring method will allow NRC to evaluate the validity of the mapping procedure (not model validity). A residuals map will allow NRC staff to determine if data for certain areas of the site exhibits a high degree of uncertainty and whether such a condition would impact the selection of remedial alternatives.
- E. The CAP should include more information regarding contaminant transport, such as dispersivity (longitudinal, vertical, horizontal), retardation factors, and areal recharge rates. Discussions of the geochemical investigations and attenuation mechanisms should also be included in the CAP. SFC should present the most recently estimated values. This information is necessary for evaluating whether the contaminants at SFC would be amenable to the type of remedial actions proposed by SFC.

Enclosure

- F. The CAP should include more detailed discussions of the onsite and adjacent surface water bodies and seeps. Information should include flow rates, hazardous constituent concentrations, and surface water body dimensions, if applicable. SFC should also provide a current estimate of pollutant loads entering the Kerr Reservoir. This information is necessary to gauge quantitatively the impact that the current site pollution is having on the reservoir. This is particularly of interest for nitrates and arsenic. Nitrates migrate relatively quickly through ground water, and arsenic is a toxic metal.
- G. Regarding corrective actions performed to date, SFC should provide ground-water extraction rates for its trenches and an estimate of the mass of hazardous constituents recovered to date. Understanding the amount of material recovered by the current system allows NRC staff to assess its effectiveness. For example, if the recovered quantity is relatively small compared to the initial load, then another remediation strategy may be appropriate. SFC should provide the most recently estimated extraction rates and recovered masses.

### CAP3 **Corrective Actions**

- A. SFC's March 14, 2005, response to NRC's December 6, 2004, RAI provides information regarding the installation of proposed extraction wells in the northwest portion of the site, as part of the CAP. Locations and descriptions of these wells should be included in the main CAP text, so the complete remediation is described in the main document. In addition to the well locations, effects of pumping on the terrace ground-water system potentiometric surface, estimates of the capture zone, and expected pollutant yields should be provided in the CAP. Understanding these aspects of the extraction wells will allow NRC staff to evaluate whether or not the wells will remediate ground water effectively.
- B. The CAP should include on one map the entire industrial area with all site features, topography, remediation facilities (including trench dewatering wells), and color-coded potentiometric lines for all saturated zones (Shale 1 through Shale 4). Such a map is needed to gauge the spatial relationship between the areas of contamination, ground-water flow directions, and locations of remedial action structures.
- C. According to the March 14, 2005, response to NRC's request for additional information, the proposed remedial action appears to allow elevated nitrate and arsenic concentrations to **continue to** enter the Kerr Reservoir. Nitrates tend to impact water quality by promoting algal and protozoa growth, which, in-turn, decreases dissolved oxygen levels endangering aquatic habitats. Elevated nitrate levels also impact water quality for domestic use. Arsenic is a toxic metal that can stress aquatic fauna at low concentrations, depending on the species. Please provide justification for allowing elevated nitrate and arsenic levels to enter the surface water system.
- D. SFC dismissed phytoremediation as a potential remediation technology for this site because it could only be used in areas where ground water expressed itself at the

seeps. Discuss the possibility of using phytoremediation near source areas before nitrates and arsenic have entered deeper bedrock units, in addition to areas of seeps. Furthermore, discuss the possibility of using other technologies, such as bioremediation, in selected areas of the deeper bedrock aquifers to fix or remove nitrates or arsenic reducing overall pollutant loads to the reservoir. SFC should again review the remediation technologies presented in the GWCAP to determine if other strategies could be used at strategic points to minimize pollutant loads to the reservoir. Strategic remediation could increase the overall performance of the proposed remediation system instead of solely relying on ground-water contamination flowing to extraction structures at certain points, which may not occur exactly as predicted.

- E. Ground-water potentiometric surface maps provided in the CAP do not appear to reflect the effects of ground-water extraction from the trenches to date or expected effects of pumping from the proposed extraction wells. Such effects should be presented in the report to allow NRC staff to gauge the effectiveness of these remediation structures.
- F. SFC should provide in the CAP a discussion of concentrations and loads of constituents of concern that are currently and will continue to enter the Kerr Reservoir. NRC staff note that such information is contained in Appendix B of the Reclamation Plan (Hydrogeological and Geochemical Site Characterization Report, October 2002); however, this information should be incorporated in its entirety or by reference with a summary in the CAP. Furthermore, because the contaminant transport model has evolved since the date of the characterization report, reservoir constituent loads and concentrations should reflect the most recent updated model. This information will allow NRC staff to assess whether the proposed corrective actions are protective of human health, safety, and the environment.
- G. Section 6.5 of the CAP states that SFC will treat extracted ground water to land application standards presented in the existing source materials license (SUA-1010). However, the only standards described in the license are the ground-water protection standards listed under license condition 49. If SFC intends to treat extracted ground water to the ground-water protection standards, then it should revise Section 6.5 to that effect. SFC should also present the actual ground-water protection standards in the CAP. If SFC intends to treat extracted ground-water to a different set of standards, it should present those standards in the CAP and describe any potential environmental impacts that might result from discharging water treated to a different set of standards.