

NRC Staff Comments

Staff wishes to express our appreciation to the effort undertaken by Sequoyah Fuels Corporation (SFC) to produce this application. Overall, the application provided needed information on topics outlined in the available guidance documents which staff uses for its safety and environmental reviews of an Alternate Concentration Limit (ACL) application. Furthermore, Staff acknowledges SFC's extra effort to facilitate the review by including cross-reference tables to NUREG-1748 as well as the NUREG-1620 Section 4 Acceptance Criteria and considerations listed in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 40 Appendix A Criterion 5B(6), paragraphs (a) and (b). The cross-reference tables will be helpful in the acceptance review as well as the detailed technical review. NUREG-1620 encourages applicants to submit such cross-reference tables for applicants not following the stand format. Although this application largely follows the suggested format, the cross-reference table is helpful for any application that has a large number of pages, figures, tables and appendices.

As discussed below, though SFC addresses the required topics, staff has provided comments which may improve the application to ensure a timely, complete, and accurate review process. The comments are not critiquing adequacy of the proposal, rather, the intent for the comments is to possibly provide additional supporting rationale for a review, corrected missing or apparently errors, or indicate exactly where in the application that comment is addressed. Due to the scope and limited time of the audit process, it is likely staff did not identify all areas in the application which may address the comment. Staff anticipates that SFC would be able to address the comments without a significant delay to submitting the application for formal review. In general, staff does not want a licensee to undertake a wholesale revision of an application based on an audit review.

Administratively, at times, the table of contents did not match the tables, or figures. Additionally, staff observed that references were not consistent. As an example, staff spot checked three references during the review. One of the three was found in the Agencywide Documents Access and Management System (ADAMS). Results on the spot check for the other two ([MFG, 2010] on Figure 4.1-8; [AquiferTex, 2016] on Figure 4.1-7) provided less reliable results. For (MFG, 2010), no listing was found in Chapter 6 of the application, no document was found in ADAMS for a search using the docket number and year, but apparently this document was revised in February 2019 and included as an Enclosure for the 2019 Annual Performance Based License Report (ADAMS Accession No. [ML20076C635](#)). For (AquiferTex, 2016), the listing in Chapter 6 was for a AquiferTex, 2017, no document was found in ADAMS for a search using the docket number and year, and no document was listed in the attachments. Please ensure that references are accurately listed and, if an earlier report is incorporated by reference, that the reference is clear and specific, and the report is filed with the Commission in accordance with 10 CFR Section 40.31(a). These inconsistencies in figures, tables, and references could be remedied through the use of a technical editor prior to submission of the application.

The application does support most conclusions with supporting information; however, on rare occasions, a conclusion is written as a conclusory sentence without any reference to any supporting rationale or analysis. Those simple conclusory sentences would generally result in a request for additional information, and it is suggested that if such sentences are identified during prior to submittal, any supporting data will be referenced or appropriately summarized in the application. Some specific examples are provided later in our discussion.

One administrative item, the application did not include a cover letter or a Form 313. None is required at this time as the document was not formally submitted to the U.S. Nuclear Regulatory Commission (NRC). Note that a formal submittal will need at least the Form 313 signed by an authorized representative as required by 10 CFR Section 40.31 and Section 40.44. It is suggested that the cover letter includes a statement that this is a license amendment request for an ACL (and other requested changes to the license, if any). It is suggested that the proposed language for the amendment is included as well in the cover letter.

Technical Report

General Information

The information included in the application appears to be sufficient for submission to the NRC. As noted below in specific comments, staff suggests that the application includes adequate supporting data either directly or incorporated by a clear and accurate reference. The supporting data will be used by staff for verification purposes large, specifically verifying that the proposed conceptual model is supported by the data.

Hazzard Assessment

The information included in the application appears to be sufficient for submission to the NRC. Staff generally did not have any comments on this topic. One minor suggestion is to include the tailings impoundment details in the Source of Contamination Section.

Exposure Assessment

The information included in the application appears to be sufficient for submission to the NRC. Although only based on this preliminary audit review, it is staff's opinion that the information will provide a meaning technical review. Staff does have a comment on the locations of the points of compliance.

Corrective Action Assessment

The information included in the application appears to be sufficient for submission to the NRC. This is one area that staff would focus on in its acceptance review and detailed technical review. First, assessment of future alternative corrective actions appears to be comprehensive for a detailed technical review. The fact that the source areas for the existing groundwater contamination have been removed is a good example of a factor for consideration under Criterion 5E. For the active remediations, the application does provide good summaries of the historical operations. On the other hand, assessment of the efficacy of past corrective actions would be evaluated in depth. The phrase "consideration of practicable corrective actions" in Criterion 5B(6) applies to actions undertaken or not undertaken by a license. It appears that the application's evaluation is based primarily on the lack of yields rather decrease in contaminant levels. Such an argument may be acceptable provided it is adequately demonstrated that all practicable corrective actions were considered.

Alternate Concentration Limits

The information included in the application appears to be sufficient for submission to the NRC. Several specific comments are noted below.

References

The information included in the application appears to be sufficient for submission to the NRC with the caveat noted above and in the specific comments below.

Appendices and Supporting Information

The information included in the application appears to be sufficient for submission to the NRC. It is suggested that an appendix include reports incorporated by reference and not previous submitted.

Availability of Documents

Would be helpful to keep the Box site up until the meeting summary is complete – in case we need to verify information for the meeting summary.

Specific Comments

1. The ACL application is a mixture of an ACL application and license termination. While the long-term-care boundary (LTCB) is a factor, we should be looking at the boundary of the license area and off-site impacts. If the ACL is based on a LTCB and it changes, then we would have to re-evaluate the ACL approval. Furthermore, it should be noted that an ACL application is not approval of the decommissioning of any associated infrastructure, including previous decommissioned structures. Approval of the ACL application will establish groundwater protection standards and termination of the corrective actions in accordance with Criterion 5D.
2. The ACL is based on a fate and transport model relying on SURFACT modeling software. SURFACT is based on the older version of MODFLOW (MODFLOW-1988) and incorporates functions for a fate and transport modeling of MT3D, which is an earlier version of MT3DMS and MT3D-USG. For this model, the assumptions are: (1) flow in fractures within the formation can be treated as “equivalent porous media”; and (2), flow through the sandstones is based on vertical conductance rather than any geometric constraints. The application should discuss how these assumptions would affect the fate and transport analysis.
3. Has the Army Corps of Engineers been contacted with respect to a plume and restrictions that might be emplaced?
4. The factor of safety (FOS) of 5 should be adequately justified. Given that the river has a designated status of high quality and the surrounding groundwater has a designation of special source water, would a lower FOS be appropriate? Furthermore, does the proposed FOS meet the intent of as low as reasonably achievable?
5. Nitrates in groundwater the southern portion of the site may suggest an alternative source. If the source were non-licensed material, what would be NRC’s role and what is the rationale for inclusion in a proposed long-term care?

6. This site is a bit unusual in that the source of groundwater contamination is not specifically the tailings impoundment, but other activities associated with the prior operations. The plumes are located downgradient of the tailings impoundment. Is it appropriate to evaluate the plume migration, set the ACL on that plume and then monitor at wells at which the plume was not modeled trend wells?
7. Staff notes that groundwater quality is provided in several places (e.g., Table ES-3, Appendices 1.2E and 2.2A). Appendix 2.2A does not include uranium concentrations. To facilitate staff's review, NRC requests that SFC provide groundwater and surface water quality and elevations in a single location, preferable electronically if available.
8. SFC should ensure that referenced reports produced by SFC are available to staff; NRC suggests the reference for those reports include the ADAMS Accession No., if available.
9. It is somewhat confusing to have the model initial and predictive simulation isopleth maps in Section 3 whereas the calibration simulations isopleth maps are provided in Section 2.
10. Did the model predict impacts to the small on-site streams? It appears some of the streams are ephemeral and may not be impacted. However, based on the writeup, stream flow was important for at least one stream, but staff did not identify a risk assessment.
11. The cross sections generally lack detail elevation, water table, well screens; however, the scale of the cross sections may not permit such details. If detailed cross sections are available in other reports, attach them as an appendix.
12. The Executive Summary is a bit long.
13. In Section 1.1, the text "*modification to concentrations that remain protective*" is not the purpose for an ACL. Establishing an ACL standard is a result of corrective actions not being able achieve background or maximum contaminant level (MCL) and that through a hazard assessment narrative, controls are in place to provide adequate protection.
14. On Page 1-6, paragraph 4, sentence 5 -needs a reference for the NRC conclusions.
15. In Section 1.3.1 (page 1-26), the reference for the existing standards to 10 CFR Part 40, Appendix A, Criterion 5C is not entirely accurate. The compliance standards are a mixture of background (5B(5)(a)), Table 5C (5B(5)(b)) and ACL (5B(5)(c)). The ACL's did not require a hazard assessment because they were MCLs published by the U.S. Environmental Protection Agency, which performed the hazard assessment during the promulgation of 40 CFR Part 141 MCLs.
16. Appendix 2.1-a, the word "dry" is listed next to the header.
17. Appendix 3-G is missing.
18. On Table 2.1-2, the units should be milligrams per kilogram rather than milligrams per liter.

19. On Figure 3.1-81, OBS-F is not labeled.
20. Ensure the figures and tables are consistent.
21. For example, the extent of Shale Unit 1 on Figure 1.2-31 differs from the extent shown on the modeling figures (3.1-25, 3.1-29, 2.2-1). Furthermore, the nitrate concentrations extend beyond the extent of Shale Unit. SFC would need to explain this phenomenon. The concentrations in Shale Unit 2 2018 Modeled Groundwater Nitrate Concentrations (Figure 2.2-2) exhibit an increase over the initial (2009) concentrations shown in Figure 3.1-40. SFC would need to explain how this was modeled and, assuming the increase was measured, what is the source of the increase.
22. On Figure 3.1-57, the arsenic concentration listed for MW059A is 4590 mg/L and is within color contour of >1 mg/L, but Appendix 3.1-E (page 22) the first (initial?) concentration for well MW059A as 1.34 (mg/L?). It appears that the concentration listed on Figure 3.1-57 is for nitrate (see Appendix 3.1-d [page 22]). SFC should verify that the figures accurately reflect the data.
23. On Figure 3.1-86 Modeled Nitrate Concentrations at 49 years, the geologic unit (model layer) is not specified (is it a combined isopleth?). On this figure, the (dark green) color contour at both OBS-H and OBS-I indicates a concentration between 100 and 1000 mg/L (the legend color does not quite match).
24. Based on Figures 3.1-83, 3.1-88, 3.1-93 and 3.1-102, Segment 4 includes OBS-H, but Figure 3.2-1 has OBS-H with Segment 5.
25. What is the difference between Figure 3.1-68 and 3.1-69? Figure 3.1-68 is titled as Shale Unit 4 (Model Layer 5) Model initial Uranium Concentrations whereas Figure 3.1-69 is titled Shale Unit 5 (Model Layer 6) Model initial Uranium Concentrations, but the wells and uranium levels are the same (5.9 ug/L). The levels for several wells (MW127A, MW057A and MW059A) are not consistent with values listed in Appendix 3.1.
26. What is the difference between Figure 3.1-11 and 3.1-12? Figure 3.1-11 is titled as Surface Deposits (Model Layer 1) Hydraulic Conductivity whereas Figure 3.1-12 is titled Shale Unit 1 (Model Layer 2) Hydraulic Conductivity, but there appears to be no difference. Is this correct?
27. Figure 3.1-4 Are the cyan colored cells within the interior of the modeled area constant head boundaries?
28. Figure 3.1-5 & 3.1-6 Are the constant head boundaries (CHB) dark blue rather than cyan as indicated in the legend? Where is the flow barrier (storm pond dam and alternative 4)?
29. Figure 3.1-5 & 3.1-6 Are the CHB dark blue rather than cyan as indicated in the legend?
30. Figure 3.1-18 Legend only has a value for storage, but lists storage, yield and porosity. The assumption is yield is specific yield.

31. Figure 3.1-30 Recharge Zone rates does not match those listed on Table 3.1-6. Colors are difficult to differentiate.
32. Table 3.1-4 may have Storage and Specific yield reversed. Also, is storage actually storage coefficient (MODFLOW, 1988) or specific storage (MODFLOW-2000)?
33. Figure 3.1-2 Should include legend. Do the dark gray areas reflect cells with small lengths, inactive cells or boundary conditions?
34. Table 3.1-8 For "Flow", what is the units. Does it refer to flow model and the statics are on the model-predicted heads?
35. Table 3.1-2 Will need to have a table that better explains the TVM (i.e., Zone 1, xxx ft/d sp1-sp3, yyy ft/d for sp4-6, etc.). Is the conductivity the only parameter that varied? What about porosity? Recharge? Concentrations?

Environmental Report

1. The ER appears to be complete, in that it appears to address the areas recommended in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." The crosswalk between the Environmental Report (ER) and NUREG-1748 was helpful in evaluating the completeness of the ER.
2. It is suggested that the Purpose and Need for SFC's proposed action be clarified, as it includes conclusory statements.
 - In Section 1.4, the stated Purpose and Need discusses the attempt to restore the ground water to the levels required in License Condition 49B, but also includes conclusions about levels at the point of exposure and whether the levels are as low as is reasonably achievable. This Section ends with the ACL request.
3. It is suggested that SFC's stated proposed action be clarified to address solely the ACL request.
 - In Section 1.5, the stated Proposed Action includes ACLs, along with other steps eventually leading to transfer of the site to a long-term custodian. This appears to exceed the stated need for SFC's amendment request.
4. It is suggested that the applicable NRC requirements identified in Section 1.6.1 be expanded to include the relevant groundwater protection standard criteria in Appendix A to 10 CFR Part 40.
5. It is suggested that SFC provide the data and analysis to support the environmental impact conclusions in Chapter 4. Examples where such data and analysis appear to be missing are provided below:
 - In Section 4.1, environmental justice conclusions are given without supporting data or analysis.

- In Section 4.2, estimates of the loads of road base needed and of employees involved are provided without supporting data or analysis.
 - In Section 4.5.1, acreages of surface disturbance for Alternatives 2, 3, and 4 are presented, without supporting data or analysis.
6. It is suggested that SFC provide additional information about the construction needs for the two proposed monitoring wells and for the plugging and abandonment of other wells. This would include data and analysis consistent with that provided for the other alternatives and allow for a comparative analysis of the proposed action and reasonable alternatives.
 7. In Section 2.1, nitrate is assumed as a reasonable bounding surrogate for the other constituents with regard to performance of the respective alternatives. It is suggested that SFC provide a discussion as to why this is a conservative assumption for the purposes of SFC's modeling and analysis.