APPENDIX D

GUIDANCE TO THE U.S. NUCLEAR REGULATORY COMMISSION STAFF FOR REVIEWING LONG-TERM SURVEILLANCE PLANS

D1.0 BACKGROUND

The Atomic Energy Act of 1954, as amended (hereafter, the Act), contains the statutory requirements for transfer of the title and custody of byproduct material and any land used for the disposal of such byproduct material from a uranium mill licensee to either federal or state control, before termination of the licensee-specific license. These requirements are codified in 10 CFR Part 40, at Section 40.28, "General license for custody and long-term care of uranium or thorium byproduct materials disposal sites." Section 40.28, along with pertinent requirements stated in Appendix A to 10 CFR Part 40 (hereafter Appendix A), requires the completion of certain licensing actions before the transfer of the land and byproduct material to the United States or the appropriate state for long-term care. As part of the license termination process, the intended custodial agency, federal or state government, will prepare a long-term surveillance plan for review and concurrence/acceptance by the U.S. Nuclear Regulatory Commission (NRC). The long-term surveillance plan must document the general licensee's plan for long-term care, including inspection, monitoring, maintenance, and emergency measures necessary to protect public health and safety. This document presents guidance to the NRC staff on review of the long-term surveillance plan. Standard review plan Appendix E presents guidance on the license termination process, and presents the role of the long-term surveillance plan in the overall context of the license termination process.

Review and acceptance of long-term surveillance plans is the sole responsibility of the NRC. However, Agreement State comments prepared using this guidance are welcomed and will be considered, if provided.

D2.0 REVIEW OF LONG-TERM SURVEILLANCE PLAN

D2.1 Areas of Review

In accordance with 10 CFR 40.28(b), the long-term surveillance plan should present the following information:

(1) A legal description of the disposal site to be transferred and licensed

(2) A detailed description of the final conditions of the disposal site, including existing ground-water characterization

(3) A description of the long-term surveillance program, including proposed inspection frequency and reporting to the Commission; frequency and extent of ground-water monitoring, if required; appropriate constituent limits for ground water; inspection personnel qualifications; inspection procedures; record keeping; and quality assurance procedures

(4) The criteria for followup inspections in response to unusual observations from routine inspections or extreme natural events

(5) The criteria for instituting maintenance or emergency measures

D2.2 Information Reviewed

D2.2.1 Legal Description and Ownership of the Land

The reviewer should examine the documents to ensure that the ownership and legal description of the land are satisfactory. The review should include review of (1) the legal description of the disposal site; (2) a brief narrative of the disposal area land ownership, including the number of acres involved and the type of real estate instruments associated with the acquisitions; (3) information associated with the land transaction [i.e., book, page, county, State, and date of deeds; and agreement number and date associated with DOE/tribe agreement (waiver of liability from tribe when land is part of a reservation or has trust status)]; and (4) a statement that real estate correspondence and instruments are maintained and filed by the property management branch of the pertinent custodial agency. The documentation should clearly establish the custodial agency's land ownership when the land transfer takes place.

D2.2.2 Final Condition of the Disposal Site

The reviewer should examine the following: (1) documentation of defined and characterized final closure site condition; (2) as-built drawings; (3) description of disposal cell design; (4) final topographic maps; (5) vicinity maps; (6) ground and aerial photographs; (6) number, location, and condition of survey monuments, site markers, and signs; and (7) existing ground-water characterization and protection activities (if necessary), ground-water monitoring well network to detect changes in ground-water quality from tailings (including evaluating the monitoring data to quantify the rate and magnitude of change). Some of the information may be referenced to the information already submitted to NRC (such as the completion report), and the staff findings on the previously submitted information may be used in this review. It is noted that the final disposition of the tailings residual radioactive material, or wastes at the milling site, should be such that ongoing active maintenance is not necessary to preserve isolation. The descriptions of the final disposal site condition, the ground-water condition, and the proposed ground-water monitoring program should be of sufficient detail that future inspectors have a baseline to determine changes to the site.

D2.2.3 Long-Term Surveillance Program

The staff should review the surveillance (inspection and monitoring) program for:

(1) Frequency of Inspection—The physical condition of the site (fence, site markers, drains/ditches, rock-mulch/vegetative cover, etc.) should be inspected annually to determine any need for maintenance or monitoring or both. In addition, an inspection should follow an unusual event, such as a heavy storm or an earthquake. On the basis of a site-specific evaluation, NRC may require more frequent site inspections because of the particular features of a disposal site.

(2) Reporting to the Commission—Results of the inspections for all the sites under the licensee's jurisdiction will be reported to NRC annually within 90 days of the last site inspection in that calendar year. However, any site at which unusual damage or

disruption is discovered during the inspection requires a preliminary site inspection report to be submitted within 60 days.

(3) Ground-Water Monitoring—The reviewer should examine long-term surveillance plans to ensure that a ground-water monitoring program is in place to verify that the ground-water quality at the site will continue to meet applicable standards. In particular, the reviewer should determine whether:

(a) Background, point of compliance, and, if applicable, point of exposure wells have been located as described in the existing license. Wells should be correctly placed as to surface locations and aquifer completions. Well locations should be surveyed and located on site maps drawn to scale.

(b) The same ground-water protection standards (point of ground-water protection standards or alternate concentration limits) as in the existing license continue to apply. If there has been no leakage from the impoundment into the ground-water, appropriate ground-water parameters should be monitored and detection concentrations should be established that will give early warning of leakage. Appropriate parameters should be indicative of the tailings material and not significantly affected by retardation reactions. For acid tailings, appropriate detection parameters might include total dissolved solids, chloride, or sulfate.

(c) The sampling frequency is sufficient to protect the public and environment at the point of exposure and sufficient to ensure that the ground-water downgradient of the point of compliance will not be degraded to any great extent before contamination is detected. This will require a knowledge of potential contaminant plume velocities. It is anticipated that the calculation of potential contaminant plume velocities will be based on advective calculations (e.g., American Society for Testing and Materials Standards D 5447, D 5490, D 5609, D 5610, D 5611, D 5718, E 978; and Anderson and Woessner, 1992). However, more complex calculations that include such processes as dispersion and retardation may be performed if site conditions warrant them. For sites with alternate concentration limits, the sampling frequency should be sufficient to detect a potential contaminant plume, well before ground water at the point of exposure is degraded.

It is anticipated for most sites that routine monitoring once every 3 years will be acceptable unless site-specific conditions warrant an increased or decreased frequency of monitoring. If more frequent monitoring is required, the reviewer should assess the increase in the long-term care payment that must be made to support the more frequent monitoring. This increase should be included in the existing surety in addition to the long-term care payment made at the time of license termination.

(d) Water quality sampling and analysis procedures use appropriate American Society for Testing and Materials or equivalent standards. Wells are constructed to prevent surface-water contamination and are capped and secured to prevent tampering (American Society for Testing and Materials Standard D 5787).

(e) Actions that the long-term custodian would take should ground-water protection standards be exceeded are described.

If the staff review results in acceptance of the long-term surveillance plan, the staff may conclude that the DOE will conduct long-term surveillance that will confirm that constituents of concern will remain below the relevant standards in 10 CFR Part 40, Appendix A, Criteria 5B(5) and (6). The staff may also conclude that enough funds are available to cover the costs of long-term surveillance and control as required in 10 CFR Part 40, Appendix A, Criterion 10, and that site inspections are planned as required in 10 CFR Part 40, Appendix A, Criterion 12.

(4) Inspection Personnel Qualifications—The inspection team should be qualified to inspect such site features as subsidence and cracking; erosion by surface water; degradation of erosion protection (rock mulch cover or vegetative cover); integrity of site markers, fences, and settlement plates; and monitoring to verify the presence and concentration limits of hazardous constituents in the ground water. For inspections that follow unusual events, the team should consist of technical personnel of appropriate disciplines.

(5) Inspection Procedures—The long-term surveillance plan should present details of the inspection procedures such as checklists of items to be inspected, measurements or observations to be made, procedures for documenting the inspection data (photo, video, aerial photo as needed); and duration of inspection (1 to 2 days).

(6) Recordkeeping and Quality Assurance Procedures—Inspection data should be retained in a format suitable for future retrieval on a long-term basis. The quality assurance aspect of the collection of site and ground-water data, interpretation of the collected data, report preparation, and long-term retention of data should be reviewed.

D2.2.4 Criteria for Followup Inspections

The criteria for followup inspections in response to unusual observations from routine inspections or extreme natural events should be reviewed.

(1) If any unusual observation from the inspection warrants a detailed evaluation, then an unscheduled inspection (followup inspection) will be conducted for a detailed evaluation of the unusual observation encountered in the earlier inspection. The plan should discuss the level of physical distress to the site (settlement/crack magnitude, extent of subsidence, extent of degradation of erosion protection, etc.) and limits of the constituents not to be exceeded in the ground-water that would warrant a further detailed evaluation of the problem to determine the need for a cleanup activity.

(2) Occurrence of extreme natural events, such as large-magnitude storms and earthquakes or drought, warrants an inspection to verify the physical condition/integrity of the disposal site. The plan should present the magnitude of the natural events that would trigger this inspection.

D2.2.5 Criteria for Instituting Maintenance or Emergency Measures

The plan should present the criteria or the events that will trigger the initiation of maintenance and other emergency measures to restore the integrity of the disposal site and to protect the health and safety of the public. Quantitative and, if not practical, qualitative criteria that would trigger these measures should be discussed in the long-term surveillance plan.

D3.0 CONCLUSIONS

On the basis of its review of the long-term surveillance plan, the staff should be able to conclude that the long-term surveillance plan is in compliance with (1) the content requirements in 10 CFR 40.28(b), (2) the ownership of site and byproduct material requirement in Criterion 11 of Appendix A, and (3) the surveillance plan requirement in Criterion 12 of Appendix A. If the long-term surveillance plan is in compliance with these requirements, the staff can accept it.

D4.0 REFERENCES

American Society for Testing and Materials Standards

D 5447, "Standard Guide for Application of a Ground-water Flow Model to a Site-Specific Problem."

D 5490, "Standard Guide for Comparing Ground-water Flow Model Simulations to Site-Specific Information."

D 5609, "Standard Guide for Defining Boundary Conditions in Ground-water Flow Modeling."

D 5610, "Standard Guide for Defining Initial Conditions in Ground-water Flow Modeling."

D 5611, "Standard Guide for Conducting a Sensitivity Analysis for a Ground-water Flow Model Application."

D 5718, "Standard Guide for Documenting Ground-water Flow Model Application."

D 5787, "Standard Practice for Monitoring Well Protection."

E 978, "Standard Practice for Evaluating Mathematical Models for the Environmental Fate of Chemicals."

Anderson, M.P. and W.W. Woessner. *Applied Ground-Water Modeling: Simulation of Flow and Transport.* New York, New York: Academic Press. 1992.