APPENDIX F

GUIDANCE TO THE U.S. NUCLEAR REGULATORY COMMISSION STAFF ON EFFLUENT DISPOSAL AT LICENSED URANIUM RECOVERY FACILITIES: CONVENTIONAL MILLS

F1.0 BACKGROUND

U.S. Nuclear Regulatory Commission (NRC)-licensed uranium mill recovery facilities produce liquid wastes (i.e., effluent) that require proper disposal. NRC Office of Nuclear Material Safety and Safeguards policy is presented below.

F1.1 Purpose and Applicability

This appendix presents guidance and discusses the technical and regulatory basis for review and evaluation of applications for the disposal of liquid waste. It is primarily intended to guide NRC staff reviews of site-specific applications for disposal of liquid waste.

F1.2 On-Site Evaporation

Applications for on-site evaporation systems must demonstrate that the proposed disposal facility is designed, operated, and closed in a manner that prevents migration of waste from the evaporation systems to subsurface soil, ground water, or surface water in accordance with 10 CFR Part 40, Appendix A. Applicants must also demonstrate that site-specific ground-water protection standards and monitoring requirements are adequately established to detect any migration of contaminants to the ground water and to implement corrective action to restore ground-water quality if, and when, necessary, as required by the regulations.

If surface impoundments are employed for evaporation, but they are not used for waste disposal, they must comply with the design provisions for surface impoundments [Criterion 5A(1) through Criterion 5A(5)]; measures for ground-water protection programs (Criterion 5E); and seepage control (Criterion 5F) of 10 CFR Part 40, Appendix A. However, if surface impoundments are employed for evaporation and waste disposal, they must comply with the regulatory requirements in 10 CFR Part 40, Appendix A. These include the design provisions for surface impoundments [Criterion 5A(1) through Criterion 5A(5)]; measures for ground-water protection programs (Criterion 5E); and seepage control (Criterion 5F). In addition, evaporation ponds must also meet other generally applicable regulatory provisions in Appendix A, in particular, the site-specific ground-water protection standards and leak detection requirements (Criterion 5B and Criterion 5C); corrective action programs (Criterion 5D); ground-water monitoring requirements (Criterion 7); and closure requirements (Criterion 6).

F1.3 Release in Surface Waters

The new source performance standards [40 CFR 440.34(b)] stipulate that, for new sources, there should be no discharge of process wastewater to navigable waters from mills using the acid leach, alkaline leach, or combined acid and alkaline leach process for the extraction of uranium.

F1.4 Land Applications

Proposals for disposing of liquid waste by land applications, including irrigation, must demonstrate that doses are maintained as low as is reasonably achievable and within the dose limits in 10 CFR 20.1301. Proposed land application activities must be described in sufficient detail to satisfy the NRC need to assess environmental impacts. This may require analysis to assess the chemical toxicity of radioactive and non-radioactive constituents. Specifically, licensees must submit (1) a description of the waste, including its physical and chemical properties that are important to risk evaluation; (2) the proposed manner and conditions of waste disposal; (3) projected concentrations of radioactive contaminants in the soil; and (4) projected impacts on ground-water and surface water quality and on land uses, including crops and vegetation. In addition, projected exposures and health risks that may be associated with radioactive constituents reaching the food chain should be analyzed to ensure that doses are as low as is reasonably achievable and within the dose limits in 10 CFR 20.1301. Proposals should include provisions for periodic soil surveys to verify that contaminant levels in the soil do not exceed those projected and a remediation plan that can be implemented in the event that the projected levels are exceeded. Appropriate State and Federal agency permits must be obtained in accordance with 10 CFR 20.2007, and the applicant will be required to comply with NRC regulatory provisions for decommissioning.

F1.5 Deep Well Injection

Proposals for disposing of liquid waste by injecting the waste into deep wells must conform to the regulatory provisions in 10 CFR 20.2002 and demonstrate that doses are as low as is reasonably achievable and within the dose limits in 10 CFR 20.1301. The injection facility must be described in sufficient detail to satisfy the NRC need to assess environmental impacts. Specifically, proposals must describe the waste, including its physical and chemical properties important to risk evaluation, the proposed manner and conditions of waste disposal, an analysis and evaluation of pertinent information on the nature of the environment, information on the nature and location of other potentially affected facilities, and analyses and procedures to ensure that doses are as low as is reasonably achievable and within the dose limits in 10 CFR 20.1301.

In addition, pursuant to the provisions of 10 CFR 20.2007, proposals for disposal by injection in deep wells must also comply with any other applicable Federal, State, and local government regulations pertaining to deep well injection, and licensees must obtain any necessary permits for this purpose. In particular, proposals must satisfy the U.S. Environmental Protection Agency (EPA) regulatory provisions in 40 CFR Part 146, “Underground Injection Control Program: Criteria and Standards,” and obtain necessary permits from the EPA and/or States authorized by the EPA to enforce these provisions. In general, NRC staff will approve applications that satisfy EPA regulations in accordance with the Underground Injection Control Program and the applicable provisions of 10 CFR Part 20.

Licensees and applicants disposing of effluent by injecting it into deep wells are further required to comply with the NRC regulatory provisions for decommissioning. Wells should be abandoned in accordance with the requirements of the State engineer.