TECHNICAL EVALUATION REPORT
BEAR CREEK UMTRCA TITLE II DISPOSAL SITE
LONG-TERM SURVEILLANCE PLAN GROUND WATER MONITORING PROGRAM REVIEW
CONVERSE COUNTY, WYOMING

FACILITY: Bear Creek Site

SOURCE MATERIAL LICENSE: SUA-1310

TECHNICAL REVIEWER: Lifeng Guo

PROJECT MANAGER: Tom McLaughlin

SUMMARY AND CONCLUSIONS:

By letter dated August 12, 2009, the U.S. Department of Energy (DOE) submitted the draft final Long-Term Surveillance Plan (LTSP) for the Bear Creek UMTRCA Title II disposal site in Converse County, Wyoming for U.S. Nuclear Regulatory Commission (NRC) staff review. This review focused on the ground water monitoring aspects of the draft LTSP. For the most part, DOE is proposing to continue the existing ground water monitoring program as specified in License Condition (LC) 47 of Source Materials License SUA-1310, and the staff generally concurs with this proposed program.

However, as discussed in this Technical Evaluation, DOE wants to eliminate the analytes beryllium, cadmium, chromium, molybdenum, and selenium from the long-term monitoring requirements. The NRC staff agrees with this approach because the concentration of these analytes has been below or at their detection limit for an extended period of sampling. However, monitoring for these analytes should be resumed if any of the remaining analytes are detected over their Alternate Concentration Limits (ACLs). DOE wants to add pH and specific conductance as analytical parameters and NRC agrees with these additions. The DOE Annual Inspection Report will include ground water monitoring results and concentration versus time graphs for sulfate and uranium for all wells. This will help inspectors to determine future water quality changes relative to these baselines. DOE is committing to checking the records at the Wyoming State Engineer's Office at least once every 10 years to determine if there have been significant changes in water demands in the vicinity of the Bear Creek disposal site.

BACKGROUND:

The Bear Creek Uranium Company (BCUC) disposal site is located in rural Converse County, approximately 45 miles northeast of Casper and about 37 miles north-northwest of Douglas, Wyoming. The climate is semi-arid, with a mean annual precipitation of 12 inches. During operation, approximately 4.7 million tons of tailings were produced and discharged as a slurry into an above-grade tailings basin. Reclamation of the BCUC mill consisted of demolishing site structures and consolidating contaminated materials in the mill tailings impoundment according

Enclosure

to a reclamation plan accepted by NRC in 1991. NRC concurred that site reclamation was complete in 2001. The grass-covered disposal cell occupies 101 acres of the 1,000 acre site. Seepage through the tailings embankment during operations resulted in contamination that was impracticable to remediate through corrective action. Therefore, BCUC proposed ACLs which NRC accepted in 1997. Point of exposure (POE) wells were installed at the boundary property and intersection of the two plumes of seepage along the Lang Draw (MW-109) and Northern flow paths (MW-111). MW-12 is the point of compliance (POC) well for the Lang Draw path and MW-74 is the POC well for the Northern flow path. MW-9 is considered the background well. Note that MW-9, located downgradient of the tailings impoundment and POC well, was completed in both the upper most alluvium and claystone/siltstone below.

In a letter dated March 16, 2000, BCUC requested an amendment to the ground water monitoring License Condition No. 47 to reflect completion of reclamation at the Bear Creek site and to facilitate eventual termination of the license. In issuing License Amendment No. 43, NRC agreed with BCUC and eliminated the need for the licensee to comply with the standards established for the POE wells. In the Technical Evaluation Report for this amendment, the staff stated that if BCUC is in compliance with the ground water protection standards at the POC locations, it is presumed that they are also in compliance with the ground water protection standards for the POE locations. Prior to this amendment the licensee had to meet the ground water standards for the POE wells which were established as lower than the background well.

Ground water monitoring under the current License Condition 47 is as follows:

The licensee shall implement a ground water compliance monitoring program containing the following:

A. Sample Well Nos. MW-9, MW-12, MW-43, and MW-74 on an annual frequency for nickel, combined radium-226 and -228, selenium, thorium-230, and uranium. Sample Well Nos. MW-12 and MW-74 on an annual frequency for beryllium, cadmium, chromium, and molybdenum. Sample Well Nos. MW-108, MW-109, MW-110, and MW-111 on an annual frequency for nickel, combined radium-226 and -228, thorium-230, uranium, chloride, and sulfate.

B. Comply with the following ground water protection standards at point of compliance Well Nos. MW-12 and MW-74, with background water quality established in Well No. MW-9: beryllium = 0.01 mg/L, cadmium = 0.01 mg/L, chromium = 0.05 mg/L, molybdenum = 0.02 mg/L, selenium = 0.025 mg/L, thorium-230 = 2.6 pCi/L, nickel= 3.8 mg/L, combined radium-226 and -228 = 46 pCi/L, and uranium = 2038 pCi/L

C. In the event the limits for the constituents in Subsection (B) are exceeded, the licensee will propose a new corrective action program with the objective of returning concentrations of those constituents to the concentration limits specified in Subsection (B).

TECHNICAL COMMENTS:

1) **Section 3.7.1 – Ground water Monitoring**. DOE has removed beryllium, cadmium, chromium, molybdenum, and selenium from its annual ground water monitoring program (see Table 3-4). Elevated concentrations of these omitted analytes were found in the tailings pore water. Indication of these elements in the ground water may be indicative of leaching from the tailings. However, the concentration of these analytes has been below or at their detection limit for the past eight years of monitoring.

   Recommendation:

   It is recommended that these constituents be added back to the monitoring program if any of the remaining analytes are detected above their ACL or other applied water quality standards, as given in Table 3-3 of the LTSP.

2) **Appendix C - Initial Site Inspection Checklist**.

   Recommendation:

   It is recommended that DOE include a data table(s) containing water level measurements and ground water quality information with their Annual Inspection Report to assure that changing ground water and contaminant plume conditions be observed and compared.

3) **LTSP Cover Letter**. DOE mentioned in the cover letter that final NRC concurrence to the LTSP is not expected until missing information is inserted into Appendix A of the document.

   Recommendation:

   Insert the following information into Appendix A of the document: the warrantee deed, and the Public Land Order Notice of Permanent Withdrawal as posted in the *Federal Register.*

REFERENCES:

U.S. Department of Energy (DOE), 2009, Letter from Scott Surovchak, DOE, to Myron Fliegel, NRC, issuing DOE's August 2009 Long-Term Surveillance Plan for the Bear Creek UMTRCA Title II Disposal Site, August 12, 2009.

U.S. Nuclear Regulatory Commission (NRC), Material License Number SUA-1310, Amendment No. 43, Pathfinders Mines Corporation, Lucky Mc Uranium Mill.