## **Department of Energy**



Washington, DC 20585

September 29, 2011

U.S. Nuclear Regulatory Commission Attn: Document Control Desk Deputy Director Mail Stop T8F5 Washington, DC 20555-0001

Subject: Actions Related to the Shirley Basin South, Wyoming, UMTRCA Title II Disposal Site

To Whom It May Concern:

This letter is in response to a letter from Mr. Dominick Orlando dated March 21, 2011, and addresses U.S. Department of Energy (DOE) activities and evaluations pertaining to groundwater issues at the Shirley Basin South, Wyoming, disposal site. The DOE response is in the order that the issues were presented in the U.S. Nuclear Regulatory Commission (NRC) letter.

Long-Term Surveillance Plan (LTSP) Reference: The Data Validation Package for the June 2010 groundwater sampling event erroneously referred to the draft 2009 LTSP for the Shirley Basin South site. As indicated in the referenced letter, this draft was withdrawn by DOE at the request of NRC for further evaluation and revision. DOE continues to meet the monitoring and maintenance requirements of the approved 2004 LTSP. Future Data Validation Packages will be revised accordingly.

<u>Evaluative Monitoring Work Plan</u>: NRC-approved alternate concentration limits (ACLs) for radium-228 and cadmium were exceeded during the first annual sampling event conducted by DOE in July 2005. Confirmatory sampling in December 2005 verified these exceedances (cadmium concentrations subsequently returned to levels below the ACL). Historical data provided by Petrotomics Company, the former licensee, indicated that these constituents had exceeded ACLs on numerous occasions prior to site transfer to DOE. In a letter to NRC dated March 1, 2006, DOE proposed to continue annual groundwater monitoring in accordance with the LTSP and would evaluate the results after the 2009 sampling event. DOE considered that letter to be the evaluative monitoring work plan.

In a letter to DOE dated March 27, 2006, the Wyoming Department of Environmental Quality (WDEQ) expressed concern about this monitoring approach and requested that DOE conduct additional investigations and evaluations to ensure contamination does not leave the site. Following subsequent communications between DOE, WDEQ, and NRC, NRC concurred with DOE's proposal to install six additional monitoring wells at the site along predicted groundwater flow paths and at the site boundary. These wells were installed in fall 2008.





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As summarized in the draft 2009 LTSP, an evaluation conducted by DOE led to the conclusion that contaminant concentrations in the wells were most likely due to rebound of the site aquifers rather than leakage from the disposal cell. DOE proposed a revised groundwater monitoring program that was intended to verify the disposal cell was continuing to perform as designed and contaminant concentrations at the site boundary remained protective of human health and the environment. NRC was prepared to approve the revised LTSP until sample results from the new wells indicated that the ACL for radium-226 was exceeded in one of the new wells at the site boundary. At NRC's request, DOE withdrew the draft 2009 LTSP for further evaluation and revision.

<u>Cause of ACL Exceedances</u>: DOE evaluated the elevated radium-226 and radium-228 concentrations at the site and prepared the enclosed report *Evaluation of Elevated Radium-226 and Radium-228 Concentrations at the Shirley Basin South, Wyoming, UMTRCA Title II Disposal Site*. DOE's analysis concluded that the elevated concentrations are most likely the result of natural causes and are not indicative of leakage from the disposal cell. The report demonstrates that monitoring results to date appear to be validating the Petrotomics Company groundwater model and that there is no evidence a contaminant plume is leaving the site.

<u>Request to Decommission Well 54-SC</u>: On March 17, 2010, DOE submitted a request to NRC to decommission well 54-SC because of a concern that it was a potential source of cross-contamination between the Upper Sand and Main Sand aquifers. Subsequent evaluation of site hydrogeology by DOE has provided a better understanding of the complexity of the sand units in the vicinity of the former uranium mine (Pit 4). Because of the fluvial environment during deposition of the Wind River Formation, the sand units vary in thickness and areal extent on the site, and the Upper Sand and Main Sand units coalesced into one sand unit in the Pit 4 area. It is difficult, consequently, to discern which sand units are screened in well 54-SC because of its close proximity to Pit 4, or if there is hydraulic communication between aquifers at the well location. Water level measurements in the well, however, suggest that it represents the Upper Sand aquifer. Therefore, DOE withdraws its request to decommission well 54-SC and will continue to monitor it as an Upper Sand well. DOE will also continue to monitor new well 101-SC (it has been dry since installation) because water levels may eventually rise into the screened interval of the well if the aquifer rebounds.

<u>Water Demands in the Area</u>: During each annual inspection, areas adjacent to the site are observed for any land use changes. The only new activities near the site have consisted of haul operations by Pathfinder Mining Company east of the site and state highway resurfacing west of the site. No new excavations or wells have been observed near the site. Any new activities near the site that might impact the site, including those that would require groundwater withdrawal, will be reported in the annual report to NRC.

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DOE regularly evaluates groundwater monitoring data, which are now more comprehensive because of the expanded monitoring well network, and has recently conducted a more formal evaluation of the current monitoring program. The evaluation and proposed revised monitoring plan are provided in the enclosed report Groundwater Monitoring Evaluation for the Shirley Basin South, Wyoming, UMTRCA Title II Site for NRC review. The LTSP will be revised accordingly and will be resubmitted to NRC for concurrence if NRC concurs with the revised monitoring plan. Monitoring plan recommendations are summarized as follows:

- 1. Continue monitoring for uranium and thorium-230, retaining their currently approved ACLs, as disposal cell performance indicators.
- 2. Discontinue monitoring the other hazardous constituents required by the existing LTSP (cadmium, chromium, lead, nickel, radium-226, radium-228, and selenium) because of either low concentrations in the tailings fluids or they are naturally occurring in the orebearing formation.
- 3. Monitor for chloride, nitrate, sulfate, total dissolved solids, and pH as cell performance and plume migration indicators.
- 4. Continue annual sampling of all site wells for a minimum of 5 years after NRC concurrence of the revised LTSP. After 5 years of sample results, DOE would evaluate the monitoring program to determine if changes to the program are appropriate and provide recommendations to NRC for review and concurrence.

Please call me at 720-377-9682 if you have any questions. Please send any correspondence to:

U.S. Department of Energy Office of Legacy Management 2597 Legacy Way Grand Junction, CO 81503

Sincerely,

Scott R. Surovchak 2011.09.26 10:31:36 -06'00'

Scott R. Surovchak Site Manager

Enclosures

cc w/enclosures: D. Orlando, NRC K. Frederick, WDEO D. Harris, WDEQ

cc w/enclosures continued: R. Bush, DOE (e) D. Shafer, DOE (e) D. Johnson, Stoller (e) File: SBS 410.02(A)

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