

August 27, 2015

Mr. Richard Bush, Program Manager  
U.S. Department of Energy  
2597 Legacy Way  
Grand Junction, CO 81503

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION STAFF REVIEW OF THE U.S. DEPARTMENT OF ENERGY REPORT ENTITLED "ANNUAL GROUNDWATER REPORT APRIL 2013 THROUGH MARCH 2014 TUBA CITY, ARIZONA, DISPOSAL SITE" DATED SEPTEMBER 2014 (Docket Number WM-00073)

Dear Mr. Bush:

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the U.S. Department of Energy (DOE) report entitled "Annual Groundwater Report April 2013 Through March 2014, Tuba City, Arizona, Disposal Site" dated September 2014 (Agency Document Access and Management System (ADAMS) Accession Number ML14364A209). Based on our review, we have the following comments:

1. As discussed below, we believe that the installation of additional ground water monitoring wells would provide information that may help determine if the contaminant plume has moved into the aquifer system beneath some portions of the lower terrace.
  - a. The figures in the report show, and the data in the report's appendixes indicate, a possible fracture-dominated hydraulic connection between the disposal cell area and the lower terrace. In addition, the 2013 annual ground water report discussed the potential for a hydraulic connection to the disposal cell by way of a fracture zone (see Section 3.1.2 and again in the section entitled "Lower Terrace Monitoring Wells" on page 22). However, neither the 2013 or the 2014 report discuss what, if any, evaluations the DOE intends to undertake to further evaluate the potential for this connection and/or if the plume has migrated further down gradient from monitoring wells 691 and 1003. The DOE should determine if this connection exists and if it is impacting the ground water near the site. This could be accomplished by installing additional wells down gradient from wells 691 and 1003.
  - b. Sections 4.1 and 4.4.1 in the 2014 report discuss a south to southeast flow gradient from the disposal cell to the Moenkopi Wash, and Figure 20 illustrates the southeastwardly direction of the flow. However, no ground water monitoring wells are present immediately below the scarp on the lower terrace northeast of monitoring well 695 and, as such, there are no monitoring wells available to capture a plume moving in aquifer horizon C in that area. Monitoring wells 258, 261, 914, 915, and 916 are all located above the lower terrace on the middle terrace. The highest concentrations of contaminants are usually located immediately below the water table. The above mentioned wells are monitoring portions of the aquifer that are several feet deeper than the water table and would not detect contaminants existing in aquifer horizons A and B. Installing

wells in aquifer horizon C, northeast of the Greasewood Area on the lower terrace would provide information that would be necessary to evaluate the potential for the migration of the plume into aquifer horizon C in this area.

2. Appendix B includes nitrate, sulfate, and uranium plume maps. The portrayals of plumes on the maps rely on data from various aquifer horizons. However, to accurately depict a plume, the data points used need to be from the aquifer horizon in which the plume is moving. As previously noted, information presented in previous ground water sampling reports indicate that the highest concentration of contaminants are usually located relatively near the water table. For the middle terrace, this would require data points from aquifer horizons A and B, unless the wells are near the extraction wells. For the lower terrace below the scarp, aquifer horizons A and B no longer exist, and, as such, the higher concentrations would be expected in aquifer horizon C near the water table. Current data points representing the lower terrace are a mixture of aquifer horizons C and D and, therefore, represent different depths of the aquifer system. A more accurate representation of the plume would use data points from a similar depth and not include data points representing ground water concentrations from the lower zone of aquifer horizon D or deeper. For example, monitoring well 1008 would not be reflective of the highest ground water concentrations, since its screen interval ranges from aquifer horizons B through E.
3. Section 5.1.1 discusses the Mann-Kendall trend analysis. The Mann-Kendall tests focused on uranium because it is likely to be the most limiting constituent at the site, from a ground water remediation standpoint, and the greatest contributor to potential health risks. More detailed discussions of the nitrate results would be useful as this constituent frequently is detected prior to the detection of radionuclide contaminants. In addition, the Mann-Kendall test was only run on data through July 2010. However, an apparent rebound effect was noted in Section 2.2.2 for some of the contaminants following the inactive remediation period in 2011. It would be useful if the Mann-Kendall trend analysis could be carried out after July 2010.
4. One of the conclusions on page 27 in Section 6.0 states that "The absence of widespread decreases in contaminant concentrations is attributed more to rate-limiting mass transfer processes in the subsurface than to limitations of the recovery design." The NRC staff was not able to identify where the rate-limiting mass transfer processes in the subsurface were discussed in the report. It would be helpful if the basis for this statement was discussed in the report.
5. Section 6.0, "Year in Review Summary," stated that, "The source of contamination in well 268 merits additional investigation." It is not clear from the report if the DOE plans on following up on this item by examining the well integrity.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice" a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

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If you have any questions concerning the NRC staff comments, please contact me at 301-415-6749 or by email at [Dominick.Orlando@nrc.gov](mailto:Dominick.Orlando@nrc.gov).

Sincerely,

*/RA/*

Dominick A. Orlando, Senior Project Manager  
Materials Decommissioning Branch  
Division of Decommissioning, Uranium Recovery, and  
Waste Programs  
Office of Nuclear Material Safety and Safeguards

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