October 13, 2015

Mr. Mark Kautsky, Site Manager
U.S. Department of Energy
Office of Legacy Management
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 PERFORMANCE REPORT APRIL 2014 THROUGH MARCH 2015 FOR THE SHIPROCK, NEW MEXICO, SITE" DATED AUGUST 2015 (DOCKET WM-00058)

Dear Mr. Kautsky:

I am writing to provide the U.S. Nuclear Regulatory Commission (NRC) staff's comments on the U.S. Department of Energy (DOE) report entitled "Annual Performance Report April 2014 Through March 2015 for the Shiprock, New Mexico, Site" dated August 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML15259A252). Based on our review of the annual performance report, the NRC staff has the following comments:

1. On October 29, 2014, the NRC staff provided comments on the report entitled "Annual Performance Report April 2012 Through March 2013 for the Shiprock, New Mexico, Site" dated November 2013 (ML14297A140). Based on the current information available to the NRC staff, comment 1 and observation 4 from our comments on the April 2012 through March 2013 report are still relevant. Previous comment 1 and previous observation 4 were:

   Previous Comment 1. To help overall understanding, inclusion of cross-sections of the terrace and floodplain and the approximate contours of the piezometric surface of the terrace would be beneficial.

   Previous Observation 4. The conceptual model for the terrace ground water system appears to include vertical movement of contaminated ground water from the terrace alluvium through the weathered Mancos Shale into fractures and bedding surfaces of the unweathered Mancos Shale before discharging into the floodplain. However, little information has been gathered on the vertical gradient within the terrace system. No downward vertical gradient in the terrace ground water system has been collected, for example, with data from a piezometer nest composed of two or more piezometers installed side by side at the same location. It would be helpful if approximation of the downward rate of flow or specific discharge of contaminated water was determined. A better understanding of the downward flow from the terrace may provide a better understanding for the concentration measurements in those floodplain wells

showing little improvement. A better basis for the terrace ground water flow and transport conceptual model would provide a better basis for making decisions.

2. On March 4, 2015, the NRC staff provided comments on the "Annual Performance Report April 2013 Through March 2014 for the Shiprock, New Mexico Site," dated October 2015 (ML15043A741). Based on the current information available to the NRC staff, comments 4.a and 4.b from our comments on the April 2013 through March 2014 report are still relevant. Previous comments 4.a and 4.b were:

   Previous Comment 4.a. With the drop in the terrace water table elevation, a greater percentage of the contaminated water will be found in the weathered Mancos Shale. Greater emphasis on this unit would be beneficial. West of U.S. Highway 491, only three wells exist sufficiently deep to monitor the upper weathered Mancos Shale. Contaminated water would occur at least as far down as the lower boundary of the weathered Mancos Shale. One of the purposes of the active remediation is to hydraulically cut off the recharge from the east terrace to the west terrace. However, most monitoring wells in the terrace are above the Mancos Shale and, therefore, cannot provide data about where the interface between the weathered and unweathered Mancos Shale is located and whether the hydraulic connection between the east terrace and the west terrace within the weathered Mancos Shale has been cut. Based on current information, it would appear that the hydraulic connection between the east terrace and the west terrace has not been cut. The steeper drop in the west terrace water table elevation (as shown in Figure 10 from the Performance Report of April 2013 Through March 2014) compared to the east terrace water table elevation would suggest an increase in the specific discharge from east to west, and claims that the hydraulic connection between the east terrace and the west terrace has been severed, should be further validated.

   Previous Comment 4.b. NRC staff had commented in the past (ML14288A599) that the results of the temporal redundancy analysis appear to indicate that semiannual sampling at most of the locations is warranted. To date, DOE has not addressed these comments and, as such, it would appear from the DOE report that semiannual sampling is still an optimal approach.

3. The NRC staff notes that the current annual performance report no longer includes the "Recommendations" section. Rather, the report states that recommendations for future actions and a technically sound and protective "path forward," are discussed by a technical working group on a regular basis and implemented as soon as feasible. However, it would be useful for the reader, if the DOE included the recommendations agreed upon by the working group in the report as the recommendations and actions of the working group are not currently being made publicly available.

4. The executive summary states that contaminant concentrations, in particular sulfate and uranium, appear to be increasing for some of the floodplain wells. It could be possible that a time-delayed correlation exists between the rainfall events effecting the alluvium-Mancos shale terrace ground water system and the increased flow of contaminants in some of the floodplain wells. It may be useful if the DOE evaluated the possibility of this correlation.

5. Section 2.2.1 discusses an initial objective for the terrace remediation system which is to attain a cumulative extraction rate of 8 gallons per minute and concludes that this objective will likely not be achieved. However, as mentioned in the same section, the newer wells, i.e., 1093R, 1095, and 1096, have noticeably improved pumping rates and better production than the other extraction wells, except for wells 818 and 1078. These wells were installed using a casing-advance drilling method. The DOE may want to evaluate if additional wells installed in such a manner and extending down into the weathered Mancos Shale would considerably boost the combined pumping rate from terrace extraction wells.

6. Table 4 shows the estimated total mass of selected constituents pumped from the terrace and the floodplain to the evaporation pond, including 327,173 pounds (lb.) of nitrate, 8,857,388 lb. of sulfate, and 738 lb. of uranium. If it is readily available, the NRC staff would be interested in any information the DOE has regarding what percentage of these constituents precipitate out of solution and settle to the bottom of the pond, and what constituents stay in solution.

7. Figure 10 of the Annual Performance Report April 2013 Through March 2014 showed the ground water elevation contours in terrace alluvial wells from March 2003 (Baseline) and March 2014 (Current). This figure has been replaced with Figure 11 in the current performance report showing the terrace alluvial ground water thickness contour maps from the Baseline year (2000) and Current year (March 2015). However, for estimating the total thickness of contaminated water, the terrace alluvial ground water thickness maps could be misinterpreted, since the weathered Mancos Shale is not included and, with the drop in the terrace water table elevation, a greater percentage of the contaminated water will be found in the weathered Mancos Shale. As such, this information should be included in any contaminated ground water thickness map.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure" 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 is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions concerning the NRC comments, please feel free to contact me at 301-415-6749 or at Dominick.Orlando@nrc.gov.

Sincerely,

/RA/

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

Docket No.: WM-00058

cc: Shiprock Distribution List

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