**Department of Energy**
**Washington, DC 20585**

October 20, 2015

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

Subject: U.S. Department of Energy Office of Legacy Management (DOE) Letter of Response to the U.S. Nuclear Regulatory Commission's (NRC's) Comments on the *Data Validation Package, August and September 2014, Groundwater and Surface Water Sampling at the Tuba City, Arizona, Disposal Site*

To Whom It May Concern:

Thank you for your letter dated August 27, 2015, referencing the "U.S. Department of Energy Data Validation Package, Entitled *"August and September 2014, Groundwater and Surface Water Sampling at the Tuba City, Arizona, Disposal Site*, dated December 2014, and the letter dated May 18, 2015, Responding to the U.S. Nuclear Regulatory Commission Staff's Comments On Water Monitoring at the Moenkopi Wash (Docket Number WM-00073)."

The DOE response to your four comments regarding the August and September 2014 Data Validation Package identified in the August 27, 2015, letter follow.

NRC Comment 1
The "Water Sampling Field Activity Verification Checklist" indicates that three locations near Moenkopi Wash (965, 1571, and 1573) were not sampled. However, no rationale is provided as to why the sampling was not performed, other than the "site lead" instructed that the sampling not be performed.

DOE Response
DOE provided NRC correspondence dated May 18, 2015 (enclosed for reference), in which surface water sampling locations were addressed. The reduction in scope of surface water quality monitoring does not compromise or contradict the monitoring objectives identified in the Groundwater Compliance Action Plan (DOE 1999). Data redundancy as well as worker health and safety (i.e., some locations are encased in remote, above-ground concrete cisterns that represent fall and lifting hazards to field personnel) are the primary rationales for discontinuing water quality monitoring at the affected locations.

Location 965 is located far upgradient from the Tuba City disposal site cell in the Moenkopi Wash, and access to this location is difficult. Sampling at the 965 and 778 locations provide background water quality information for Moenkopi Wash. Location 778 provides background (upgradient) water quality information that is consistent with the data reported for location 965, even though location 778 is nearer to the site. Therefore, data collection at location 965 is redundant with data collection at location 778.

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Sampling at location 1571 (Jimmy Spring West) was discontinued because aquifer discharge that is expressed at this location is upgradient of the Shonto locations 1573 (Shonto Well West Pipe) and 1574 (Shonto Well East Pipe). Locations 1573 and 1574 are also expressions of groundwater discharge from the base of the aquifer. Therefore, water quality data from the location 1571 is redundant with the 1573 and 1574 locations.

Sampling at location 1573 (Shonto Well West Pipe) was discontinued and replaced by sample collection at location 1568—a cattle trough that receives the same water from the point of aquifer discharge as locations 1573 and 1574. Sample collection at location 1574 was also discontinued for the same reasons of data redundancy and worker health and safety concerns.

NRC Comment 2
The "potential Outliers Report" states that outliers were observed at 21 locations, but this is misleading as 41 outliers were observed, with the most number of outliers at location 1115. The staff suggests that DOE review this information to determine if it is significant.

DOE Response
For clarity the text for the first two sentences on page 55, paragraph 4 has been revised as follows: "Twenty one locations were identified as having potentially anomalous data, with a total of 42 analyses considered to be potentially anomalous. Further review of these data did not indicate any laboratory errors."

Contaminant rebound during intermittent operation of the extraction wells is suspected to account for anomalous values. The outlier value analysis captures the past ten years of data only. At well 1115, for example, the reported potential outlier value for uranium (0.15 milligrams per liter [mg/L]) is compared to the historical maximum of approximately 0.1 mg/L reported in 2009 (the range of data for the historical comparison appears in the caption in the upper left corner of the outliers tables). Dating back to 2000, when the well was first sampled, the maximum reported concentration was approximately 0.62 mg/L. The occurrence of rebounding concentrations within the extraction field is an expected result of intermittent operation of the remediation system. In this case, the anomalous values do not indicate significant plume migration.

NRC Comment 3
The "Static Water Level data" indicates that the water elevation has varied by more than 10 feet from the previous report in wells 268, 273, 275, 276, 286, NMW 3A and NMW 7D, with the water elevation variance for wells NMW 3A and NMW 7D at 100 feet and 73 feet respectively. The staff suggests that the DOE review the data to determine if it is in error or if it indicates a significant change in water elevation at the sites.

DOE Response
Water levels reported for the subject wells (except wells NMW-3A and NMW-7D) are accurate as presented and reflect aquifer response to intermittent operation of the extraction wells (four or five wells located along the south side of the disposal cell) and non-operation of the infiltration trench. The water table variation at these wells is not reflected in the upgradient/background wells (901, 910, and 911), suggesting a local rather than regional effect. The water level result for wells NMW 3A and NMW-7D, recorded in February 2014, appears to be in error based on past and current water level determinations that consistently remain within less than one foot and 6 feet respectively. The reason for this error is not known. The erroneous data points did not result in misinterpreting the water table configuration or flow conditions.

NRC Comment 4
The Time Concentration Graphs only provide information on ammonia, sulfate, and uranium. It would be useful to provide time concentration graphs for all constituents sampled. In addition, the time and concentration information provided for location 262 (page 356) is inconsistent with previous reports. Suggest this time concentration graph be reviewed to determine if it is in error.

DOE Response
We will continue to provide the time concentration graphs for the primary constituents of concern (nitrate, sulfate, and uranium) as part of future DVPs. These are the most pervasive contaminants of concern at the site that drive the active remediation strategy and form the basis for evaluating remediation progress. DOE does not agree to present time varying concentration plots for all constituents sampled (such as major ions).

The location 262 concentration trend for uranium in the August and September 2014 Data Validation Package (see Page 356) is accurate. It is the corresponding graph presented in the February 2014 DVP, dated May 2014, that is inaccurate. The uranium graph for well 262 presented in the August and September 2014 DVP is consistent with results stored in the Office of Legacy Management data base and in the *February 2015 Groundwater and Surface Water Sampling at the Tuba City, Arizona, Disposal Site Data Validation Package*, dated June 2015 (Page 117). The reason for the inaccurate graph presented in the May 2014 DVP is not known. Continued trend analysis will occur at this and the other locations.

The DOE response to your comments regarding the letter dated May 18, 2015, "Responding to the U.S. Nuclear Regulatory Commission Staff's Comments on Water Monitoring at the Moenkopi Wash (Docket Number WM-00073)" follows.

NRC Comment (unnumbered comment, page 2, paragraph 1)
Regarding the May 18, 2015, letter: While agreeing with the NRC staff that the possibility of a hydraulic connection may exist between the disposal cell and Moenkopi Wash, and as such, monitoring Moenkopi Wash upstream and downstream of the disposal is warranted, you state that you will not sample Moenkopi Wash near locations 902 and 965, as we suggested in our March 9, 2015, letter (ML15041A276). Rather, you state that you will sample at locations 778, 759, and 1568. We believe that, while these locations may provide valuable information, a

location farther upstream near location 965 will provide better information on background conditions in Moenkopi Wash, and the staff suggests that you include an additional sample at this location. Finally, we note that it appears that the decision to modify the ground water monitoring locations was made during the August and September 2014 sampling event by the site lead. Although, the Long-term Surveillance Plan for the site provides flexibility for the DOE in monitoring the Moenkopi Wash, it would be helpful if the DOE would inform the NRC staff of changes to the ground water monitoring plan or provide an explanation for the change in the DVP.

DOE Response

We believe the Moenkopi Wash surface location sample 778 is upstream of the location where the plume would hypothetically intersect the wash based on anticipated plume trajectory in this area. This location is much safer to access than the 965 location, and continued sample collection there presents data redundancy. We suggest that continued sampling at the surface location 965 is excessive and that location 778 is sufficiently upgradient of the site and will therefore not to be impacted by the potential discharge of site-related contaminated groundwater to the wash.

The decision to modify sampling locations has been discussed previously in this document (see NRC Comment 1 and the corresponding DOE Response). We will inform NRC of proposed changes in monitoring locations prior to sample collection. The changes will be documented in the subsequent data validation package.

Please contact me at (970) 248-6073 or at Rich.Bush@lm.doe.gov if you have any questions. Please address any correspondence to:

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

Sincerely,

Richard P. Bush
Site Manager

Enclosure

cc:
D. Orlando, NRC
K. Karp, Navarro (e)
S. Smith, Navarro (e)
File: TUB 0400.02 (rc grand junction)
Sites\Tuba City\10-14-15 TUB Response to NRC Comments re Alternatives Analysis (NRC).docx

**Department of Energy**
**Washington, DC 20585**

May 18, 2015

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

Subject: DOE-LM Response to U. S. Nuclear Regulatory Commission's (NRC's) Comments Regarding Water Quality Monitoring at Moenkopi Wash [NRC Letter Dated March 9, 2015 – Ground Water Treatment Plant Shutdown at the Tuba City, Arizona, Uranium Mill Tailings Radiation Control Act Site (WM-00073)]

To Whom It May Concern:

Thank you for your letter dated March 9, 2015. The U.S. Department of Energy Office of Legacy Management (DOE-LM) agrees with the statements in your letter; however, we wanted to address the following comment:

> *"Preferred pathways are difficult to locate; and although the probability of preferred pathway transport to the Wash is low, sampling the Wash slightly upstream and downstream of the Tuba City disposal site, e.g., near sampling locations 902 and 965, would provide additional confidence that contaminants are not entering the Wash at levels threating public health and safety. Therefore, we request that the DOE sample the Moenkopi Wash upstream and downstream of the disposal site and include the results in your Data Validation Packages and Annual Groundwater Report for the site."*

We concur that the possibility of a hydraulic connection between the disposal cell and Moenkopi Wash by way of a continuous fracture or fractures is low, and agree that surface water monitoring in the wash upstream and downstream of the disposal site is warranted. Ongoing water quality monitoring suggests that the groundwater contaminant plume is essentially static at a position more than 1 mile upgradient of Moenkopi Wash. Upstream and downstream locations in Moenkopi Wash from a point in line with the groundwater flow direction have been monitored for water quality since 1986 and show no evidence of site-derived contamination.

Current surface water monitoring locations in Moenkopi Wash include those identified as 0778 (collected upstream of the disposal site directly from the creek), 0759 (collected downstream of the disposal site directly from the creek), and 1568 (collected upstream of the disposal site from seepage in the cliff face along the wash).

The enclosed map shows these and previous surface water monitoring locations, and the current groundwater monitoring locations. These locations are also presented in the September 2014 Annual Groundwater Report and the September 2014 Data Validation Package.

DOE-LM will continue to monitor surface water quality at locations 0778, 0759, and 1568 according to the current sampling and analysis protocol and schedule (annual). DOE-LM will discontinue water quality monitoring at seep location 1571 (Jimmy Spring West), seep location 1573 (Shonto Well West), and 0965 (far upstream creek location) because the data are redundant with the other sampling locations, and because access to water in concrete cisterns at some locations presents worker health and safety concerns. Eliminating these locations will not compromise monitoring objectives to detect possible impacts on water quality from groundwater discharge to the wash.

We also agree to elaborate on the evaluation of surface water monitoring data in the data validation packages (DVPs) and the annual groundwater reports. This will include adding time-varying concentration plots in the DVPs as is done for groundwater quality data; and including similar plots, maps, and interpretation of surface water monitoring in the annual groundwater reports. We will also review the applicable standards for water quality protection in Moenkopi Wash for comparison to the surface water monitoring results.

Please call me at (970) 248-6073 if you have any questions. Please address any correspondence to:

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

Sincerely,

Richard P. Bush
Site Manager

Enclosure

cc:
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