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Department of Energy  
Washington, DC 20585

January 22, 2016

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

Subject: U.S. Department of Energy (DOE) Office of Legacy Management Response to U.S. Nuclear Regulatory Commission's (NRCs) Comments on the *Data Validation Package [DVP], July 2015, Groundwater Sampling at the Shirley Basin South, Wyoming, Disposal Site*

To Whom It May Concern:

Thank you for your letter dated December 17, 2015, referencing NRC's comments on the *Data Validation Package, July 2015, Groundwater Sampling at the Shirley Basin South, Wyoming, Disposal Site*. We appreciate the detailed review of the subject document and would like to offer the following responses to your comments:

**NRC Comment #1:**

*"Wells 51-SC and 101-SC were not sampled because they were dry. These wells were dry during the 2009, 2010, 2011, 2012, 2013, and 2014 sampling events. In addition, well 102-SC was dry in 2011, 2012, and 2013. Suggest DOE consider abandoning these wells and re-establishing a new Point of Compliance well to replace well 51-SC."*

**DOE Response:**

Although wells 51-SC and 101-SC are dry, they are completed at the proper horizon in the Upper Sand Unit of the Wind River Formation and represent hydrological conditions at these locations. This is useful information, and therefore we are reluctant to abandon these wells. Moreover, site conditions will likely change in the future, and it is likely that these wells will not remain dry throughout the site monitoring period. We also believe that the current monitoring well network is adequate for long-term monitoring of the site. This monitoring network was established to ensure protection of human health and environment, and DOE believes this objective is still being met. However, DOE will continue to evaluate the monitoring network, and future enhancements may be done if this objective is no longer being met.

**NRC Comment #2:**

*"Concentration values for chromium, nickel, selenium, sulfate, and radium increased in the following wells since the 2014 sampling event: chromium: 5-SC, 54-SC; nickel: 5-SC, 5-DC, 19-DC, 54-SC; selenium: 5-SC, 5-DC, 54-SC; sulfate: 5-DC, 54-SC; radium-226: 5-DC, 110-DC; and, radium-228: 5-DC, 54-SC. The increases appear to be centered in 5-SC, 5-DC and 54-SC, potentially indicating an issue with cell integrity at the northern edge of the tailings impoundment. Suggest DOE review the current data for these wells and, when you have completed the review, NRC and DOE staffs discuss the increases."*



NM5520

**DOE Response:**

Variable analyte concentrations in wells 5-SC, 54-SC, and 5-DC are to be expected and are within or near the historical range of results (please see time versus concentration graphs from *Groundwater Evaluation and Recommended Monitoring for the Shirley Basin South, Wyoming, UMRACA Title II Disposal Site, August 2013*). These wells are completed in a highly reactive zone. This highly reactive zone is characterized by extremely low pH waters containing high levels of dissolved solids and is a result of a combination of former milling activities, former tailings pond leakage, and normal transient drainage from the encapsulated tailings. Because of this highly reactive zone, it is our opinion that it would be difficult to discern a potential tailings cell integrity issue. However, DOE will continue to use future monitoring data to evaluate potential tailings cell integrity issues. DOE believes that the elevated concentration of Ra-226 in the groundwater at well 110-DC is the result of radioactive decay from a nearby naturally occurring uranium ore body. Also, increasing water level elevations in the Main Sand Unit of the Wind River Formation could cause increased levels of contaminants in the groundwater (i.e., nickel concentrations in well 19-DC and sulfate concentrations in 5-DC), because the dry aquifer with adsorbed constituents has become re-saturated.

**NRC Comment #3:**

*"It is unclear from the data when the samples were analyzed. It would be helpful if all DVPs included the sample analysis date in the Laboratory Performance Assessment."*

**DOE Response:**

Sample hold-time is assessed during the data validation process; data from any sample analysis that exceeds the designated hold-time is identified and flagged as such. We are in the process of re-formatting the DVPs and will add a "sample analysis date."

**NRC Comment #4:**

*"The static water level data for wells 40-SC, 102-SC, 112-DC and 113-DC were not included in the report, while the trip report states that water levels were measured in all wells. In addition, the water level for wells 19-DC and 5-DC was 16 feet higher and 16 feet lower respectively, than the 2014 report. Suggest that DOE review the information to determine if it is an error or is significant."*

**DOE Response:**

The omission of some static water levels in the report was an oversight; the water levels were measured and recorded over a 2-day period, but only the results for one day were included in the DVP. We have determined that the water level elevations in wells 19-DC and 5-DC measured during the 2014 sampling event were recorded incorrectly and that the 2015 results are representative of the aquifer. LM is evaluating our process for sampling to address quality control issues associated with field data collection.

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

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Sincerely,



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