Department of Energy
Washington, DC 20585

July 6, 2018

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Deputy Director
Mail Stop T8-F5
Washington, DC 20555-0001

WM- 00073

Subject: U.S. Department of Energy Office of Legacy Management Response to U.S. Nuclear Regulatory Commission letter dated August 28, 2017, "U.S. Nuclear Regulatory Commission Staff Review of Groundwater and Surface Water Reports for the Tuba City, Arizona, Disposal Site" (Accession Number ML 17229B248)

To Whom It May Concern:

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) has received the U.S. Nuclear Regulatory Commission's (NRC) comment on the Groundwater and Surface Water Reports for the Tuba City, Arizona, Disposal Site (Docket Number WM-00073). DOE's response is provided below.

NRC Comment
The LM's current groundwater sampling plans include constituents for analysis that are different from the list provided in the 1999 Groundwater Compliance Action Plan (GCAP). Specifically, the current sampling plans do not include cadmium, chromium, tin and zinc, which were discussed in the GCAP, but they do include arsenic, silica, and vanadium, three chemicals that were not discussed in the GCAP. In commenting on the LM report entitled "February 2016 Groundwater and Surface Water Sampling at the Tuba City, Arizona, Disposal Site" dated April 2016 (ADAMS Accession Number ML16207A062), the NRC staff noted this apparent discrepancy (ADAMS Accession Number ML 17076A111), but, to date, LM has not provided an explanation for it.

LM Response
Constituents Identified in the GCAP that are No Longer Sampled

LM searched its correspondence files and did not find a record where we notified or consulted with NRC about terminating the monitoring for cadmium, chromium, tin, and zinc. We summarize the basis for our decision in the following paragraphs, and request NRC to review the merits of our decision, and concur at this time, if appropriate.

The 1999 GCAP identified 18 constituents associated with milling activities that exceeded background groundwater concentrations: ammonium, cadmium, calcium, chloride, chromium, iron, magnesium, manganese, molybdenum, nitrate, potassium, selenium, sodium, strontium, sulfate, tin, uranium, and zinc. LM initially analyzed for all 18 constituents as intended in the GCAP. Analyses of cadmium, chromium, tin and zinc were discontinued after years of data collection showed concentrations presenting no exceedances of the risk thresholds documented in

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the "Baseline Risk Assessment (BLRA) for Ground Water Contamination at the Uranium Mill Tailings Site Near Tuba City, Arizona" (DOE, 1994). The changes to the analytical suite are consistent with the GCAP, which states "analysis of the contaminants that do not have a cleanup goal or standard will likely be discontinued after consultation with the concerned parties and after sufficient data are obtained to determine that concentrations are not increasing" (DOE 1999).

- Cadmium: Periods of sampling and analysis for cadmium vary from well to well, with the earliest analysis in 1982 and the latest in 2000. There were 14 exceedances of the 40 CFR 192.04 maximum concentration limit of 0.01 milligrams per liter (mg/L) recorded out of 654 analytical results. Cadmium results exceeding the standard ranged from 0.012 mg/L to 0.039 mg/L. In the final year of cadmium data collection (year 2000), there were five exceedances out of 164 results, and the exceedances occurred only in the newly installed extraction wells. Extraction wells were drilled with the objective of removing contamination from the plume, thus elevated concentrations of contaminants were expected. Cadmium concentrations in groundwater monitoring locations only exceeded the UMTRCA standard in the 1985 sampling events, and were in compliance with the 0.01 mg/L standard for all subsequent events, through the time when analysis for cadmium was terminated in 2000. For the entire data set, concentrations were consistently lower than the standard and averaged 0.0017 mg/L. With 14 exceedances out of 654 samples, cadmium detections occurred in 2.1 percent of samples. In risk assessment, constituents may be eliminated if their detection frequency is less than 5 percent. The low frequency of cadmium detections supports its elimination from the analytical suite.

- Chromium: The earliest analysis for chromium occurred in 1982 and the latest in 2008. Chromium results were not recorded in 1983, 1987, 1992, 1995 through 1999, and 2001 through 2007. There were 11 exceedances of the 40 CFR 192.04 maximum concentration limit of 0.05 mg/L, recorded out of 506 analytical results. Chromium results exceeding the standard ranged from 0.06 mg/L to 0.18 mg/L and all exceedances occurred in 1985, 1986 and 1988 samples. For the entire data set, concentrations were consistently lower than the standard and averaged 0.012 mg/L. Based on these low average concentrations, no exceedances in the later years of sampling, and general downward trend of the concentration, analysis of chromium was discontinued in 2009.

- Tin: Analyses for tin occurred in 1984, 1985, 1989 through 1992, and 2000. Tin is not a regulated constituent under 40 CFR 192.04, but is attributable to milling activities and was present at higher than background concentrations. As documented in the BLRA (DOE 1994), it was determined that the tin concentration in site groundwater was not a cause of excess potential risk to human health or the environment. The average concentration for the 374 results is 0.029 mg/L. The average concentration for analyses performed in 2000 (164 results) is 0.0003 mg/L. Based on the downward concentration trend and the low toxicity and risk associated with tin, analysis for this constituent was discontinued in 2001. As an update to the BLRA information, the most recent U.S.

Environmental Protection Agency Regional Screening level for tin in drinking water (June 2017) is 12 mg/l. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017)

- Zinc: Analyses for zinc occurred in 1984, 1985, 1989 through 1992, 2000, and 2008. Similar to tin, zinc was evaluated to determine if concentrations caused excess potential risk to human health or the environment. It was determined that the zinc concentration in site groundwater was not a cause of excess potential risk (BLRA as summarized in the SOWP, DOE 1998). Zinc is also an essential nutrient. The average concentration for all 480 results is 0.67 mg/L. The average concentration for analyses performed in 2008 is 0.014 mg/L. As an update to the BLRA information, the most recent U.S. Environmental Protection Agency Regional Screening levels for zinc in drinking water (June 2017) are 6 mg/l (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017). Because of the decreasing concentrations trends and the limited toxicity and risk associated with zinc, analysis for this constituent was stopped in 2009.

Constituents not listed in the GCAP that are Currently Sampled

Similar to the GCAP constituents that were dropped from the analyte list, we did not find a record where we notified or consulted with NRC about adding non-GCAP constituents to the analyte list. We summarize the basis for our decision in the following paragraphs, and request NRC to review the merits of our decision, and concur at this time, if appropriate.

It is likely the arsenic dataset starting in 2002 and the silica dataset starting in 2000 are related to groundwater treatment plant design and operation. There is no background documentation describing vanadium sampling and analysis. The history of analyses for arsenic, silica, and vanadium is summarized below.

- Arsenic: Analysis for arsenic occurred from 1982 to 1994, with the exceptions of 1983, 1986, 1987 and 1993. Analyses for arsenic resumed in 2002 and have occurred each year, to present. The 2002 resumption of analysis for arsenic coincided with startup of the distillation treatment system. The rationale to resume analysis may have been related to assembly of an analytical suite to support evaluation of treatment performance. There were 38 exceedances of the 40 CFR 192.04 maximum concentration limit of 0.05 milligrams per liter (mg/L) recorded out of 2329 analytical results. Arsenic results exceeding the standard ranged from 0.068 mg/L to 1.89 mg/L. All exceedances occurred in samples from extraction wells 1105 and 1106, and all occurred in the timeframe of groundwater treatment plant operation (2002 through 2014). For the entire data set, concentrations were consistently lower than the standard and averaged 0.011 mg/L.

- Silica: Analyses for silica were performed in 1985, 1988, 1991, 1992 and every year from 2000 to present. Silica is not considered a groundwater contaminant; however, it is commonly included in water quality characterization prior to water treatment design, as it can affect the efficiency of various treatment processes. Resumption of silica analysis

was likely intended to support treatment plant design. The average silica concentration for the 2676 results is 14.16 mg/L. The average concentration for 913 results, for the period from 2011 to present is 13.96 mg/L.

- Vanadium: Analyses for vanadium occurred from 1982 through 1994, with the exceptions of 1983, 1986, 1987, and 1993. The average of 386 results is 0.014 mg/L. The average of 83 results collected in 2016 is 0.009 mg/L.

Review of arsenic, silica and vanadium data reveal no concerns for potential risk to human health or the environment. Concentrations are not trending upward and there is no persistent exceedance of the UMTRCA standard for arsenic. Silica and vanadium were not identified as constituents of concern in the GCAP, and they do not have UMTRCA maximum concentration limits.

LM's proposed list of analytes to meet the requirements of the GCAP is provided in the table below. Rationale for deleting analytes is also provided in the table. Compliance with sampling and analysis requirements presented in the Long-Term Surveillance Plan is also noted.

DOE-LM Proposed Analyte List	Basis for Continued Sampling and Analysis:		
	GCAP (mill-related, but non-regulated)	GCAP (regulatory standard or goal)	Long-Term Surveillance Plan
Ammonium	•		
Calcium	•		
Chloride		•	
Iron	•		
Magnesium	•		
Manganese	•		
Molybdenum		•	•
Nitrate		•	•
Potassium	•		
Selenium		•	•
Sodium	•		
Strontium	•		
Sulfate		•	
Uranium		•	•
DOE-LM Proposed Deletions from Current Analyte List	**Basis for Deletion:**		
Arsenic	Concentrations show no persistent exceedance of UMTRCA standard.		
Cadmium	Concentrations show no persistent exceedance of UMTRCA standard.		
Chromium	Concentrations show no persistent exceedance of UMTRCA standard.		
Silica	No UMTRCA standard. Not identified as a contaminant of concern in the GCAP. Concentrations present no concern for potential risk to human health or environment.		
Tin	No UMTRCA standard. Not identified as a contaminant of concern in the GCAP. Concentrations present no concern for potential risk to human health or environment.		
Vanadium	No UMTRCA standard. Not identified as a contaminant of concern in the GCAP. Concentrations present no concern for potential risk to human health or environment.		
Zinc	No UMTRCA standard. Not identified as a contaminant of concern in the GCAP. Concentrations present no concern for potential risk to human health or environment.		

With NRC's concurrence, the cooperating agencies representing the Navajo and Hopi stakeholders will be informed of these proposed changes in the analytical suite.

Please contact me at (970) 248-6018 or Mark.Kautsky@lm.doe.gov if you have any questions. Please address any correspondence to:

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Sincerely,

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Mark Kautsky, Site Manager
Office of Legacy Management

cc:
D. Orlando, NRC (e)
P. Lemke, Navarro (e)
File: TUB 0400.02 (records)

Sites\Tuba City\7-5-18 TUB Response to NRC Analyte List