Department of Energy

Washington, DC 20585
September 30, 2022

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

Subject: U.S. Department of Energy Office of Legacy Management Response to U.S. Nuclear Regulatory Commission's Request for Additional Information on Green River, Utah, Disposal Site Groundwater Compliance Action Plan (Docket No. WM - 0068)

Dear Mr. Lancaster:

In response to the U.S. Nuclear Regulatory Commission (NRC) letter dated April 29, 2019, the U.S. Department of Energy (DOE) is working to develop the information necessary to address the requests for additional information (RAIs) and complete a revised Groundwater Compliance Action Plan (GCAP) for the Green River, Utah, Disposal Site in accordance with the standards in NUREG-1724 (enclosed). DOE recognizes NRC's concerns regarding the claim of limited use due to low yield in the Browns Wash alluvium and the protectiveness of institutional controls (ICs) for the Cedar Mountain Formation wells.

DOE is currently planning the work necessary to fill in data gaps regarding these concerns and, ultimately, to develop responsible and durable compliance strategies for both aquifers that safeguard human health and the environment. A comprehensive plan for the development of the final Green River site GCAP will be shared with NRC at an appropriate time.

Please contact me at (970) 248-6621 or Angelita.Denny@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,

Angelita M. Denny
2022.09.30
13:01:42 -06'00'

Angelita Denny
Green River Site Manager

Enclosure

cc w/enclosure via email:
Mark Kautsky, DOE-LM
Paul Kerl, DOE-LM
David Atkinson, RSI
Jeff Carman, RSI
DOE Read File
F/20/647

ACCEPTANCE EVALUATION OF RAI #1 RESPONSE

NRC staff reviewed earlier DOE documents that provide additional insight on the background determination of well 0707. In the Final Site Observational Work Plan (Agencywide Documents Access and Management System [ADAMS] Accession No. ML022820657), dated September 2002, DOE stated:

> Monitor well 0707 is upgradient of the millsite in the Browns Wash alluvium; however, because it contains nitrate, uranium, and sulfate, the BLRA did not consider this well to be representative of background (DOE 1995). Historical uranium concentrations in ground water in monitor well 0707 are relatively low, ranging from 0.008 to 0.029 milligrams per liter (mg/L) for 25 measurements (Appendix C). Nitrate concentrations in ground water in monitor well 0707 range from 1 to 30 mg/L for 25 measurements, with two exceptions: in 1986 and 1987 (prior to construction of the disposal cell) nitrate concentrations were 120 and 140 mg/L, respectively. Sulfate concentrations in ground water for the 25 measurements ranged from 4,770 to 6,549 mg/L. Monitor well 0707 was dry during the July 2002 sampling event.
>
> The historical uranium concentrations in ground water in monitor well 0707 are relatively low and may not have been influenced by the millsite. The two high nitrate values may be analytical error, or nitrate could be derived from local sources such as septic systems, agricultural fertilizers, sewage lagoons, and munitions dumps. Sulfate concentrations in ground water in monitor well 0707 are higher than in the Cedar Mountain Formation wells near the disposal cell suggesting that some or all of the sulfate is derived from other sources. Therefore, it is reasonable that monitor well 0707 has not been affected by the milling process and may be representative of background.

In the baseline risk assessment (BLRA), dated September 1994, DOE stated:

> There are currently no background ground water quality data for the alluvial system. The only upgradient monitor well screened in the alluvium is monitor well 707 (Figure 3.1). Water quality analysis of ground water from monitor well 707 shows that this water is consistently high in nitrate (9 to 140 milligrams per liter [mg/L]), uranium (0.01 to 0.03 mg/L), and sulfate (4800 to 6500 mg/L), the constituents common to the milling process. Even though monitor well 707 is upgradient from the current tailings area, the presence of these constituents, especially nitrate, in ground water raises suspicion as to whether ground water from this location has been affected by the milling process.

NRC staff agrees with DOE's assessment in the 1994 BLRA, which stated that contaminant concentrations at well 0707 raise suspicion as to whether the groundwater at this location was affected by the milling process. In the case of the relatively high nitrate values at well 0707 in 1986 and 1987, these observations did predate the current disposal cell. However, former mill operations were conducted between 1958 and 1961. Mill

operations during this period could have reversed the local groundwater flow direction in the Browns Wash alluvium from the former tailings pile towards well 0707. In the Remedial Action Plan, dated December 1989, DOE reported that the water table elevation at well 808, which was completed in the Browns Wash alluvium beneath the former tailings pile, was 4068.1 feet (ft), and the water table elevation at well 0707 was 4069.7 ft in 1987. Similarly, the higher sulfate concentrations in well 0707 versus the Cedar Mountain Formation wells could have been caused by former mill activities since the former tailings pile was directly above the Browns Wash alluvium. Accordingly, it appears to be plausible that the contaminant concentrations observed at well 0707 are related to mill activities rather than representative of background conditions.

DOE proposed including the Browns Wash alluvium in the area of concern (AOC) with ICs, as is discussed further below. Inclusion of the Browns Wash alluvium into the AOC with ICs would be a significant change to the GCAP. For example, the proposed site-wide alternate concentration limit in Table 10 of the GCAP for uranium of 4.4 milligrams per liter (mg/L) is less than the observed value of 13.0 mg/L in Table 4 of the GCAP for Browns Wash alluvium monitoring. Depending on the path forward and the implementation of ICs, DOE may need to revise aspects of the GCAP to account for the inclusion of the Browns Wash alluvium within the AOC.

DOE response: DOE is planning to complete additional evaluations before proposing a Browns Wash alluvium compliance strategy.

ACCEPTANCE EVALUATION OF RAI #2 RESPONSE

NRC staff remains concerned that the AOC program, as described in the 2011 GCAP, does not appear to be both durable and enforceable. However, the formal restriction on well drilling permits with a groundwater management policy, as proposed in DOE's response, may be considered durable and enforceable. NRC staff notes that an acceptable IC is not currently in place and that one will need to be in place prior to NRC concurrence on the DOE GCAP for the Green River site.

DOE response: DOE is planning to conduct additional evaluations before seeking IC approval.