



## Department of Energy

Washington, DC 20585

March 28, 2019

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

Subject: U.S. Department of Energy, Office of Legacy Management Responses to U.S. Nuclear Regulatory Commission (NRC) Staff Comments for Additional Information for the Green River, Utah, Disposal Site Groundwater Compliance Action Plan (WM-00068)

To Whom It May Concern:

Enclosed is the document entitled "*Request for Additional Information on the U.S. Department of Energy, Office of Legacy Management's (DOE-LM) Draft Groundwater Compliance Action Plan for the Green River, Utah, Disposal Site Docket WM-00068*". This document is a compilation of U.S. Nuclear Regulatory Commission comments and proposed DOE-LM responses.

Please contact me at (970) 248-6621 or [Angelita.Denny@lm.doe.gov](mailto: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 Denny, Site Manager  
Office of Legacy Management

Enclosure

cc w/enclosure:

T. Lancaster, NRC  
M. Kautsky, DOE-LM (e)  
D. Miller, Navarro (e)  
J. Price, Navarro (e)  
DOE Read File  
File: GRN 0410.10 (records)

NM5501



**Request for Additional Information on the  
U.S. Department of Energy's  
Draft Groundwater Compliance Action Plan  
for the Green River, Utah, Disposal Site  
Docket WM-00068**

1. **Comment:** Additional information is needed to justify the U.S. Department of Energy's (DOE) determination that the Browns Wash alluvium is a limited use aquifer.

**Basis:** In Part 40 of Title 10 of the Code of Federal Regulations (10 CFR), the U.S. Nuclear Regulatory Commission (NRC) incorporates the groundwater protection standards imposed by the U.S. Environmental Protection Agency in Subparts D and E of Part 192 of Title 40 of the Code of Federal Regulations (40 CFR). The regulations of 40 CFR 192.11(e)(3) define limited use groundwater, in part, as groundwater that is not a current or potential source of drinking water because the quantity of water reasonably available for sustained continuous use is less than 150 gallons per day (570 liters per day).

In the 2011 Groundwater Compliance Action Plan (GCAP) for the Green River site (Available in the NRC's Agencywide Documents Access and Management System [ADAMSP<sup>1</sup> at Accession No. ML12068A089), DOE discusses that the groundwater in the Browns Wash alluvium beneath the Green River site appears to have been contaminated by former uranium-ore processing activities. In the 2011 GCAP, DOE states that the compliance strategy for the contamination within the Browns Wash alluvium is:

*No further remediation with the application of supplemental standards based on limited yield (sustained continuous flow of less than 150 gallons per day) for groundwater in the Browns Wash alluvium;*

In support of its limited yield argument in the 2011 GCAP, DOE refers to the 2002 Final Site Observational Work Plan (SOWP) for the Green River site (DOE, 2002; ADAMS Accession No. ML022810650), which states, "[b]ased on recent observation, the aquifer is relatively dry and is reasonably classified as limited use based on low yield (see Section 5.1.2.1)." In the 2002 SOWP, DOE considers the groundwater in the Browns Wash alluvium as limited use on the basis of low yield (DOE, 2002). Of the eight monitoring wells completed in the Browns Wash alluvium, four were dry, three had pumping rates less than 50 gallons per day (190 liters per day), and one well (Well 0191) yielded approximately 1,500 gallons per day (5,700 liters per day). Based on the disparity between Well 0191 and the remaining alluvial wells, DOE determined that flow rate for this well was not representative of the entire alluvial aquifer. DOE also discusses in the 2002 SOWP (DOE, 2002) that at the time of the field investigation, the region was experiencing a drought.

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<sup>1</sup> ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

It is not clear to NRC staff that the Brown's Wash alluvium, with well exceeding 1,500 gallons per day (5,700 liters per day) during a regional drought, is consistent with the definition of limited use groundwater based on yield.

**Path Forward:** Provide additional justification to support DOE's determination that the Browns Wash alluvium should be considered a limited use aquifer in light of Well 0191, which has recorded yields from the Browns Wash alluvium exceeding 150 gallons per day (570 liters per day). Additional justification should include any information regarding well yields from the Browns Wash alluvium, in particular, well yield information during non-drought conditions.

## DOE Response

DOE agrees that Well 0191 completed in Browns Wash alluvium (alluvium) produced more than 150 gallons per day. Review of well logs and pumping test records presented in the SOWP (DOE 2002) suggests the yield from Well 0191 during testing may have been due to contribution of water from the weathered Mancos shale underlying the alluvium. However, additional water level monitoring data collected since 2002 (when the testing of the aquifer was conducted) indicates water levels in the alluvium have increased as much as approximately 5 feet and the saturated thickness has increased by approximately 5 times in certain locations. The increase in water levels would result in an increase in transmissivity of the aquifer and ultimately greater yields. For this reason, it is possible yields from the alluvium would exceed 150 gallons per day in Browns Wash alluvium today. DOE agrees with NRC that the compliance strategy for Browns Wash alluvium should not be supplemental standards based on limited yield. However, DOE's compliance strategy will be as follows:

Supplemental Standards based on widespread ambient contamination. Selenium concentrations in well 0707 (background location) have consistently exceeded the UMTRCA standard of 0.01 mg/l and the State of Utah standard of 0.05 mg/L.

2. **Comment:** Additional information is needed on the assumed point of exposure and institutional controls for the affected or potentially affected properties. It does not appear that DOE has adequate institutional controls beyond DOE- (or DOE- and Utah-) owned land within the area of concern (AOC), which includes land between the point of exposure and DOE- (or DOE- and Utah-) owned land. The NRC notes that while DOE can protest a proposal to drill a well in neighboring properties that are affected or potentially affected within the AOC, the Utah Division of Water Rights may ultimately permit such use.

**Basis:** As stated, in part, in 10 CFR 40.27(a),

*A general license is issued for the custody of and long-term care, including monitoring, maintenance, and emergency measures necessary to protect public health and safety and other actions necessary to comply with the standards promulgated under section 275(a) of the Atomic Energy Act of 1954, as amended, for disposal sites under title 1 of the Uranium Mill Tailings Radiation Control Act of 1978, as amended.*

The standards promulgated by the U.S. Environmental Protection Agency under Section 275(a) of the Atomic Energy Act of 1954, as amended, are specified in 40 CFR 192. These standards require, per 40 CFR 192.02(c)(3), that control of residual radioactive materials and their listed constituents be designed to provide reasonable assurance that the concentration in groundwater not exceed certain levels beyond the point of compliance. Per the standards, DOE may apply an alternate concentration limit if, after considering remedial or corrective actions to achieve the levels specified, the agency has determined, and the NRC concurred, that the constituent will not pose a substantial present or potential hazard to human health and the environment as long as the alternate concentration limit is not exceeded.

Section 3.0 of NUREG-1724, "Standard Review Plan for the Review of DOE Plans for Achieving Regulatory Compliance at Sites with Contaminated Ground Water Under Title I of the Uranium Mill Tailings Radiation Control Act," Draft Report for Comment (ADAMS Accession No. ML003731007), provides acceptable approaches for demonstrating that the alternate concentration limits proposed by DOE will not pose a substantial present or potential hazard to human health and the environment. The guidance in NUREG-1724, indicates that alternate concentration limits must be protective of human health and the environment at the point of exposure. Regarding the assumed point of exposure, NUREG-1724 states

*In most cases, the point of exposure is located at the downgradient edge of land that will be held by either the Federal Government or the State for long-term institutional control.*

*A distant-point of exposure could be justified, on the basis that land ownership by DOE would ensure that ground water from the contaminated aquifers between the disposal site and the point of exposure would not be used. In some rare instances, a distant-point of exposure may be established without invoking land ownership or long-term custody. Land ownership or long-term custody will not be an issue for establishing a distant point of exposure, if the possibility of human exposure is effectively impossible. When ground water is inaccessible or unsuitable for use, human exposure is considered effectively impossible.*

In Section 4.2 of the 2011 GCAP (DOE, 2011) DOE states,

*At the request of DOE (with concurrence from the Utah Division of Radiation Control), the State of Utah Division of Water Rights has included into their Area of Concern (AOC) program an area which falls mostly within a circle of approximate 3,000-ft radius and centered on the disposal cell (Figure 2).*

*The AOC is established to restrict the use of groundwater in the Cedar Mountain Formation and the Green River alluvium within this prescribed area. Specifically, the restriction is that no wells shall be completed in the Cedar Mountain Formation within the area and groundwater extracted from the Green River alluvium shall not be used for domestic purposes. Therefore, by definition, a well drilled outside the AOC becomes a potential POE [point of exposure].*

*The State of Utah updates the AOC program weekly; if a well permit is filed that falls within this area, both the Utah Division of Radiation Control and the DOE are notified. The Utah Division of Radiation Control and the DOE will then file a protest with the State engineers' office to deny the well permit application.*

Figure 2 in the 2011 GCAP (DOE, 2011) illustrates the AOC, and Figure 3-1 in the 2002 SOWP (DOE, 2002) shows that there is privately-owned land downgradient of the Green River site between the Green River and the land held by the State of Utah that lies within the AOC.

For the Green River Site, it is not clear to NRC staff that filing a protest with the State of Utah's engineer's office to deny the well permit application is both a durable and enforceable institutional control and therefore protective of public health and safety. First, it is not clear to NRC staff that all private property owners will, currently and in the future, file for a well permit with the State of Utah's engineer's office prior to completing a groundwater well. Second, it is not clear to NRC staff what recourse DOE has to enforce denial of the well permit application if the State of Utah's engineer's office elects to permit the well application regardless of DOE's protest.

**Path Forward:** DOE should provide additional information demonstrating the durability and enforceability of the AOC over the long term as an institutional control that would provide reasonable assurance that human exposure is effectively impossible, and, therefore, will not pose a substantial present or potential hazard to human health and the environment. The information should demonstrate how the filing of a protest can be considered a durable and enforceable institutional control over the long term and include a discussion of DOE's recourse to provide reasonable assurance that human exposure is effectively impossible should the State not deny a well permit application in the AOC.

Alternatively, DOE could assume a point of exposure at the down-gradient edge of land owned by DOE or the State of Utah; acquire affected or potentially affected properties or groundwater rights between the Green River disposal site and the point of exposure; or could demonstrate through an acceptable approach other than the process described for the AOC that land ownership or long-term custody will not be an issue for establishing a distant point of exposure because human exposure is effectively impossible over the long term (i.e., groundwater is inaccessible or unsuitable for use and thus human exposure is considered effectively impossible).

## **DOE Response**

DOE recognizes NRC's concern that the State Engineer could issue a well permit within the AOC regardless of protests by both the Utah Division of Waste Management and Radiation Control and DOE. However, the Assistant State Engineer is confident that such a well permit would be denied based on the types and concentrations of groundwater contaminants at the Green River site and that the State of Utah's primary purpose of the AOC designation is to be protective of human health and the environment.

As stated in the Draft GCAP, the Brown's Wash alluvium is excluded from the AOC designation; however, since the compliance strategy for this system will change, the Brown's Wash alluvium will be included in the AOC designation.

An action to augment the AOC program would be the establishment of a Groundwater Management Policy administered by the State Engineers Office in Utah. DOE currently has such a policy at the Monticello Mill Tailings Site to restrict access to uranium milling related groundwater contamination. This policy is essentially a formal restriction on well drilling permits. DOE will work with the State Engineer to develop a Groundwater Management Policy similar to the policy at the Monticello Mill Tailings Site (State of Utah 1999).

The Assistant State Engineer has indicated a willingness to discuss the AOC program and the proposed Groundwater Management Policy in greater detail with NRC and DOE. DOE looks forward to discussion on the AOC program in the future.

## References

DOE (U.S. Department of Energy), 2002. *Final Site Observational Work Plan for the Green River, Utah, UMTRA Project Site*, GJ0-2002-356-TAC, U.S. Department of Energy, Office of Legacy Management: Grand Junction, Colorado, September 2002. ADAMS Package Accession No. ML022810650.

DOE (U.S. Department of Energy), 2011. "Groundwater Compliance Action Plan for the Green River, Utah, Disposal Site," LMS/GRN/S07892, U.S. Department of Energy, Office of Legacy Management: Grand Junction, Colorado, December 2011. ADAMS Accession No. ML12068A089.

State of Utah, 1999. "Ground-Water Management Policy for the Monticello Mill Tailings Site and Adjacent Areas," Department of Natural Resources, Division of Water Rights, May 21. ...