

June 22, 2006

Mr. Richard Bush
Project Manager
U.S. Department of Energy
Grand Junction Office
2597 B 3/4 Road
Grand Junction, CO 81503

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - FINAL GROUND WATER
COMPLIANCE ACTION PLAN FOR THE GUNNISON, COLORADO,
PROCESSING SITE, UMRCA PROJECT SITE

Dear Mr. Bush:

By letter dated May 17, 2005, the U.S. Department of Energy (DOE) submitted the Final Ground Water Compliance Action Plan for the Gunnison, Colorado Processing Site. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed this and supporting documents, using the 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 and finds that it needs additional information in order to complete its review. The information needed is identified in the enclosure.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

If you have any questions concerning this letter please contact me at (301) 415-7612, or via e-mail, to pxm2@nrc.gov.

Sincerely,

/RA/

Paul Michalak
Project Manager
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Docket No.: WM-00061

Enclosure: Request for Additional Information

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**REQUEST FOR ADDITIONAL INFORMATION
GUNNISON, COLORADO, UMTRA PROJECT SITE**

**Final Ground Water Compliance Action Plan for the
Gunnison, Colorado Processing Site,
May 2005**

Comment No. 1. Please reconcile the inconsistency between monitoring program, ground water quality data, and simulation results; provide model results for relevant layers of predicted plume; and install ground water monitoring wells that intercept the affected horizons.

The conceptual model implied by the U.S. Department of Energy's (DOE) conceptual and numerical ground water flow and contaminant transport model (model) and simulation results from this model are inconsistent with DOE's ground water monitoring program and the data this program generated.

The DOE model predicts contamination in shallow ground water downgradient of the site (DOE 2001a, Appendix H, p. H-81, Figure 42). No wells monitor this horizon outside the immediate vicinity of the source area. All downgradient wells defining middle (meso-scale) and far (distal) portions of the plume monitor deeper horizons. Since DOE's conceptual and numerical models predict that a component of the uranium plume will remain shallow, installation of ground water monitoring wells that intercept shallow ground water throughout the plume should be considered or the basis for their absence should be provided.

Predicted uranium concentrations are provided only for model layer 2 (10 to 25 feet below ground surface (bgs); DOE 2001a). The ensemble of DOE's ground water monitoring program, however, is focused on intermediate (50 to 60 ft bgs) and deep (90 to 100 ft bgs) horizons. Spatial and temporal patterns of uranium concentrations appear to indicate that the plume of uranium moves downward near the source area and moves laterally at depth (i.e., detected in the intermediate and deep horizons in the larger portion of the plume). Given these apparent patterns, results for model layers 4 and 6, which correspond to the monitored horizons in the meso-scale and distal portions of the plume, should be presented. This phenomenon is illustrated by well cluster 0013/0113. Well 0013 monitors shallow ground water; well 0113 monitors medium depth ground water. Concentrations in 0113 (medium depth) remain steadily greater than well 0013 (shallow) and might exhibit an increasing trend in 0113 relative to 0013. Consequently, the focus of plume simulation and representation of results should be on the intermediate and deep horizons.

The DOE simulated future ground water conditions using deterministic and stochastic numerical models. The stochastic model quantified uncertainty regarding the ability of natural flushing to meet performance standards at the 100-year compliance time frame. Results from these simulations indicate that in shallow ground water, the probability of exceeding the 0.044 milligrams per liter (mg/L) limit for uranium in ground water was 0.41 (DOE 2005; DOE 2001, Appendix H, p. H-81, Figure 42). Based on this result, the U.S. Nuclear Regulatory Commission (NRC) requested that DOE install ground water monitoring wells in the vicinity of the predicted exceedance; pursuant to satisfaction of this requirement, NRC withheld concurrence on the Site Observation Work Plan (NRC 2002). DOE has not yet installed these wells. It should also be noted that National Primary Drinking Water Regulation Maximum

Contaminant Level (MCL) for uranium is 0.030 mg/L. Although the UMTRCA standard for uranium is 0.044 mg/L, the NRC must consider the recently promulgated 0.030 mg/L MCL for uranium.

Basis: 40 CFR 192.20 (b)(4) requires that “the assessment should consider future plume movement, including an evaluation of such processes as attenuation and dilution and future contamination from beneath a disposal site.” It also requires that “the plan should include a monitoring program sufficient to verify projections of plume movement during the extended cleanup period.” Moreover, 40 CFR 192.12(c)(3) states that “Compliance with this subpart shall be demonstrated through the monitoring program established under paragraph (c)(1) of this section at those locations not beneath a disposal site and its cover where ground water contains listed constituents from residual radioactive material.” NUREG-1724 (page 1-8) states that the extent and magnitude of contamination involves determining whether the water quality at a location meets background water quality.

Comment No. 2. Please provide the justification for excluding ground water quality data in the vicinity of extant wells.

The uranium plume is defined in the Groundwater Compliance Action Plan (DOE 2005; Figure 2) by a limited number of monitoring wells. Two nested clusters of monitoring wells are present in the largely undefined center portion of the plume area southwest of the of Mill Site, but are unmonitored. Including wells 0135/0136 and 0062/0063 in the monitoring program will further refine and increase confidence in DOE’s plume definition, and provide data in the approximate area of greatest uncertainty with respect to future uranium concentrations. Note that the closest of these wells is approximately 1,100 feet down- and slightly cross-gradient of the predicted potential exceedance area.

Data from these wells might also provide valuable information with which DOE can better calibrate its transport model. This would also help resolve the disparity in current plume location and predicted plume location; the area of greatest uncertainty is south of the plume’s current location. Absent their inclusion, DOE should justify their exclusion from the monitoring program.

Basis: 40 CFR 192.20 (b)(4) requires that “the plan should include a monitoring program sufficient to verify projections of plume movement during the extended cleanup period.” Moreover, 40 CFR 192.12(c)(3) states that “Compliance with this subpart shall be demonstrated through the monitoring program established under paragraph (c)(1) of this section at those locations not beneath a disposal site and its cover where ground water contains listed constituents from residual radioactive material.” NUREG-1724 (page 1-8) states that the extent and magnitude of contamination involves determining whether the water quality at a location meets background water quality.

Comment No. 3. Please provide plans to ensure that existing and future ground water monitoring wells provide high-quality data. The GCAP (DOE 2005) does not include plans for periodic well maintenance and re-development. The implicit expectation that aging monitoring wells will provide data of quality comparable to that generated early in their performance period is unsubstantiated.

Basis: NUREG-1724 (page 5-2) acceptance criteria for long-term monitoring includes provisions for ensuring that monitoring wells will provide high-quality data.

Comment No. 4. Surface water quality data are incomplete and should be supplemented with data from the South Fork of the Gunnison River.

The DOE has monitored surface water quality in the vicinity of the site, collecting samples from Tomichi Creek and the North Fork of the Gunnison River and has detected relatively low concentrations of uranium. The uranium plume, however, appears to most likely intercept and potentially affect the South Fork of the Gunnison River (South Fork), based on the plume definition and apparent flow direction depicted on Figure 2 of the GCAP (DOE 2005). No surface water quality samples have been taken from the South Fork or the main channel of the Gunnison River downstream of its confluence with the South Fork. Adverse effects on surface water quality cannot be ruled out without these data.

Basis: NUREG-1724 (page 3-3) acceptance criteria states that “the hazardous constituent transport in ground water and hydraulically connected surface water and the adverse effects on water quality, including the present and potential health and environmental hazards” should be assessed.

Comment No. 5. Please provide an analysis of statistical trends in ground water quality to support predictions of declining contaminant concentrations. DOE presents approximately eight years of uranium concentration data for ground water. In the distal and meso-scale portions of the plume, intermediate and deep elevation horizons, uranium concentrations appear to remain relatively static. Given the amount of time passed (12 years or 12% of the 100 year nominal time frame for natural flushing, based on the 2004 ground water data; DOE 2004), a decrease in uranium concentrations due to natural flushing should be detectable at a statistically significant level. Statistical analyses of temporal trends might demonstrate more convincingly that the predicted decline in uranium concentration will occur.

Basis: 40 CFR 192.20 (b)(4) requires that the design of site-specific monitoring programs include “... statistical evaluation of data trends...” as part of the characterization of the subsurface environment. NUREG-1724 (page 1-8) acceptance criteria states site characterization should include or reference information concerning geochemical conditions and water quality including confirmation of proper statistical analysis.

Comment No. 6. Please provide a discussion of potential tailings related contaminants other than uranium and manganese or provide the rationale for excluding them from your site characterization. No data are provided in the SOWP, Verification Monitoring Reports (VMRs), Environmental Assessment, or GCAPs (DOE 2000, 2001a, 2001b, 2002, 2003, 2004 and 2005) to indicate that other potential constituents of concern have been investigated. Only uranium, manganese, selected metals, and radionuclides (as contaminants), and wet chemistry parameters are reported. Table 1-1 (NUREG-1724, page 1-7) lists common uranium mill chemical constituents.

Basis: 40 CFR 192.02 (c)(2) requires that “the Secretary shall, on a site-specific basis, determine which of the constituents listed in Appendix I to Part 192 are present in or reasonable derived from residual radioactive materials...” NUREG-1724 (page 1-6)

states that geochemical conditions and water quality should be characterized sufficiently to identify the constituents of concern. Criteria for defining constituents of concern include: the constituent is reasonably expected to be in or derived from the tailings and the constituent is listed in either 40 CFR part 192, Appendix I or 40 CFR part 192, Subpart A, Table I.

References

DOE. 2000. Ground Water Compliance Action Plan. September 28 [ADAMS Accession No. ML003759664]

DOE. 2001a. Site Observation Work Plan for the Gunnison, Colorado, UMTRA Project Site. March [ADAMS Accession No. ML061720021]

DOE. 2001b. Ground Water Compliance Action Plan for the Gunnison, Colorado, UMTRA Project Site. July 12 [ADAMS Accession No. ML012060130]

DOE. 2002. Environmental Assessment of Ground Water Compliance at the Gunnison, Colorado, UMTRA Project Site. July 2002 [ADAMS Accession No. ML061670211]

DOE. 2003. Verification Monitoring Report for the Gunnison, Colorado, UMTRA Project Site. August 12 [ADAMS Accession No. ML032380067]

DOE. 2004. Verification Monitoring Report for the Gunnison, Colorado, UMTRCA Title I Processing Site. September [ADAMS Accession No. ML061670038]

DOE. 2005. Final Ground Water Compliance Action plan for the Gunnison, Colorado Processing Site. May 17 [ADAMS Accession No. ML051800436]

NRC. 2000. 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. NUREG-1724

NRC. 2002. Letter from Melvyn Leach, NRC to Donna Bergman-Tabbert, DOE, Subject: Review Of The Final Site Observational Work Plan For The Uranium Mill Tailings Remedial Action Program Site At Gunnison, Colorado, January 29 [ADAMS Accession No. ML020290548]