

June 23, 2014

Mr. Richard Bush, UMTRCA Program Manager
U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION FOR STAFF COMMENTS ON
THE TUBA CITY GROUNDWATER MODELING WORKPLAN
(DOCKET NO. WM-0073)

Dear Mr. Bush:

I am writing in response to your letter, dated April 22, 2014, in which you provided the "Draft Groundwater Modeling Work Plan for the Tuba City, Arizona, Disposal Site" to the U.S. Nuclear Regulatory Commission (NRC) staff for review (Agencywide Document Access and Management System (ADAMS) Accession Number ML14121A104). The NRC staff has reviewed the draft work plan and has several comments on the draft plan. The NRC staff's comments are enclosed.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's ADAMS. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

R. Bush

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If you have any questions, please contact me at 301-415-6749 or email at Dominick.Orlando@nrc.gov.

Sincerely,

/RA/

Dominick A. Orlando, Senior Project Manager
Materials Decommissioning Branch
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: WM-00058

Enclosure:
NRC Staff Comments on Draft
Groundwater Work Plan

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DATE	6/12/14	6/17/14	6/16/14	6/17/14	6/23/14

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**NRC Staff Comments on the
“Draft Groundwater Modeling Work Plan for the Tuba City, Arizona, Disposal Site
March 2014”**

1. The modeling work plan did not state what amount of information is necessary in order to have confidence in the model results, i.e., if the quality and quantity of data will be evaluated for sufficiency.

There appear to be features within the proposed model for which initial parameter values may be difficult to obtain. These include:

- a) Limestone beds which may control ground water flow and contaminant transport in the plume area,
- b) The properties of the Kayenta-Navajo Transition Zone (KNTZ; the KNTZ constitutes two-thirds of the model thickness,
- c) The properties of the less permeable zones of the aquifer vs. the zones of preferential flow (Sec. 5.1.1),
- d) Ground water inflow at the proposed model’s northern boundary since the hydraulic conductivity may be unknown in the KNTZ,
- e) The natural ground water flow direction within the proposed model domain; plume direction appears to move south-southwest rather than south-southeast (Sec. 2.2),
- f) The base of the N-aquifer, (i.e., both the Navajo Sandstone and the KNTZ), is unknown, especially near the Moenkopi Wash so that it is unclear if all the ground water discharges at or near the wash (Fig. 7),
- g) The ground water discharge in seeps along the cliff-face that bounds the wash (sec. 4.5.2),
- h) The ground water discharge in the Moenkopi Wash, since the surface water flow measured at the USGS gaging station may be a combination of water flow from both side of the wash, and
- i) Vertical hydraulic gradients (Sec. 3.2.5).

It is possible that many of these parameters may not be critical for the intended purpose of the model outcomes, however the sufficiency of data, or the lack of data, should be discussed. Section 8 discusses possible additional data needs although the last sentence in Section 8 contradicts this statement and prematurely states that additional data needs will not invalidate the model approach which presumably means the validity and usefulness of the model results.

2. Section 3.2.2 lists the four steps of the conceptual approach to evaluate plant transpiration. It is not clear why these steps do not apply to the vegetated areas of the model domain, rather than only along the plume flow path. In addition, it is not clear how step four can assist in the evaluation of plant transpiration and should be discussed in more detail. [Step 4. Use existing remote sensing tools to interpret and map groundwater discharge and recharge zones on a broader landscape scale in the vicinity of the Tuba City site.]
3. If Section 4.2.2 is assuming that recharge is equal to 100% precipitation (i.e., no runoff and no evaporation), then that should be stated.

4. Section 4.4.1.1 states that, "Horizontal and vertical hydraulic conductivity values described above suggest an equality that precludes significant vertical anisotropy."

However, Section 4.4.1 discusses hydraulic conductivities between approximately 1 to 10 ft/day and vertical hydraulic conductivities between 0.3 and 1.5 ft/day. This would suggest a vertical anisotropy of approximately 10 which is a relatively common assumption during model construction; however, further studies on this property could be undertaken during the sensitivity analyses.

In addition, no information apparently exists on vertical anisotropy for the KNTZ.

5. The potentially significant dual-domain flow and transport within the N-aquifer (see Sec. 5) was not discussed in the conceptual model of ground water flow (Sec. 3).
6. It is not clear if transport model calibration will also calibrate for the same steady-state and transient time periods as listed for the flow calibration: during (1) steady-state flow that preceded active remediation (baseline conditions), (2) transient water level drawdowns during the period of active remediation until suspended in October 2010, and (3) between October 2010 and September 2011.
7. It is not clear why the only transport model calibration targets include uranium concentrations, since Section 1.2 states that the primary contaminants also include nitrate and sulfate.
8. It is not clear what the goals of the calibration will be, i.e., at what level of error can the numerical model be considered calibrated. Whatever target range is considered, some technical justification should be documented for both the flow and the transport calibration.