



State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF RADIATION CONTROL
Rusty Lundberg
Director

March 19, 2012

CERTIFIED MAIL
(Return Receipt Requested)

David C. Frydenlund, Vice President, Regulatory Affairs and Counsel
Denison Mines (USA) Corp.
1050 17th Street, Suite 950
Denver, CO 80265

Subject: Nitrate Corrective Action Plan for the White Mesa Mill Site dated February 27, 2012:
DRC Review Comments

Dear Mr. Frydenlund:

The Division of Radiation Control (DRC) review comments regarding the February 27, 2012 Denison Mines (USA) Corporation (DUSA) "Nitrate Corrective Action Plan for the White Mesa Mill Site" are enclosed (via URS Memorandum).

DRC anticipates that DUSA should be able to respond to the comments and submit a revised CAP on or before Monday, April 23, 2012. If DUSA does not agree with this due date then please request an alternate date, including justification(s) for the extension, on or before close-of-business, March 22, 2012.

If you have questions or concerns regarding the comments, or would like to arrange a meeting or teleconference to discuss the comments, please contact Tom Rushing at (801) 536-0080. Thank you.

Sincerely,

UTAH WATER QUALITY BOARD

Rusty Lundberg
Co-Executive Secretary

Enclosure: URS Memorandum (5 pp)

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MEMORANDUM

To: Phil Goble (DRC), Tom Rushing (DRC)
From: Paul Bitter (URS), Jeremy Cox (URS), Jon Luellen (URS)
cc: Robert Baird (URS)
Date: 19 March 2012
Re: Comments on the Revised Corrective Action Plan for Nitrate, White Mesa Uranium Mill Near Blanding Utah dated February 27, 2012

This memorandum contains the comments by URS and the Utah Department of Environmental Quality, Division of Radiation Control (DRC) on the revised Corrective Action Plan for Nitrate at the White Mesa Mill Site. The revised Corrective Action Plan (CAP) was prepared for Denison Mines USA (DUSA) by Hydro Geo Chem Inc., and was dated February 27, 2012. Comments have been provided by URS as a deliverable for Contract No. 116259 issued through the DRC. This review also is in accordance with the amended Memorandum of Understanding (MOU) between the DRC and DUSA dated December 2011. For purposes of expediency, the URS and DRC comments are edited for conciseness and combined into one memo. Note that format, grammar, and punctuation in the revised CAP were not reviewed for accuracy and consistency.

The comments regarding the revised Corrective Action Plan for Nitrate dated February 27, 2012 are presented below. A relatively large amount of text has been added to the CAP since the November 2011 draft version, and a number of new topics have been introduced, which has required an additional level of review. The deficiencies that have been identified during this review must be addressed in order to fully satisfy the requirements of the September 30, 2011 Stipulated Consent Agreement, Docket No. UGW09-03-A (SCA).

1. General comment: Replace all instances of “discreet” with “discrete” when discussing sampling.
2. General comment: DUSA should include a statement that every reasonable effort will be made to ensure that corrective action implementation effort for the nitrate plume is performed in a manner that is mutually compatible with, and integrated with, the corrective action implementation effort for the chloroform plume in terms of scope and operation to ensure the effects of corrective action operations for the nitrate plume do not impede or substantially reduce the effectiveness of corrective action operations for the chloroform plume, and vice versa.
3. Section 4.3, last paragraph: Please replace “permeability” with “conductivity” and define KGS.
4. Section 4.3.2, second paragraph: The revised CAP appears to state that the groundwater mound at TWN-2 (which is illustrated in Figure A.2) is a residual effect of the historical pond

that has persisted due to “enhanced infiltration of precipitation before recent re-grading of the land surface in that area” and “low permeability conditions at TWN-2.” Please define “recent” in this context. If nitrate concentrations in well TWN-2 and the groundwater mounding observed in this area do not decrease during Phase II, a re-examination of the elevated nitrate concentrations, and its possible source(s), and groundwater elevations in this well should be conducted during Phase III. Additionally, please replace “permeability” with “conductivity.”

5. Section 5.1, second paragraph: The revised CAP states that “records or information have not been obtained to evidence the actual uses of the [historical] pond over the years.” Because no records are available to document uses of the pond, all of the following sentences in this paragraph regarding nitrate and chloride concentrations in the pond water and potential impacts on the perched groundwater quality are unsubstantiated. The last four sentences in this paragraph must be deleted.
6. Section 7, third paragraph, first sentence: Please add the clarification that Phase III, if required, will be conducted in consultation with the Executive Secretary.
7. Section 7.1.1.1 third paragraph: After further consideration by DRC, the soil screening levels for the potential 54 soil core samples (per Part 7.1.1.1 of the CAP) to determine the final extent of the concrete cover and future soil removal volumes should be based on the 2 X UCL concentration of Nitrate + Nitrite (as N) and Ammonia (as N), instead of 20 X UCL concentrations as was stated in previous comments made by the DRC. These screening levels are set to 4.29 mg/kg for Ammonia (as N) and 4.384 mg/kg for Nitrate + Nitrite (as N) to maintain consistency with the previous investigations of nitrate sources at the site. These concentrations were established in the *Preliminary results from Nitrate Phase 1 Investigation - data, mass balance and mass balance memo* submitted by DUSA via e-mail on August 1, 2011.
8. Figures 11-2A and 11-2B: It would be helpful to show sample locations GP-25B and GP-26B on these drawings.
9. Section 7.1.1.4, fourth paragraph: DUSA proposes to increase the reporting limits (RLs) for nitrate and ammonia in soil. The RLs for nitrate and ammonia, as reported in the tables transmitted to DRC on August 1, 2011 by DUSA, were 0.01 and 0.05, respectively. These RLs corresponded to dry weight compositions of approximately 0.24 mg/kg for nitrate and 1.1 mg/kg for ammonia. The revised CAP proposes RLs that are an order of magnitude higher (0.1 mg/kg and 0.5 mg/kg, respectively) based on detections in method blank samples in 2011. Increasing the RLs by an order of magnitude would result in samples containing up to 2.4 mg/kg of nitrate as N and 11 mg/kg ammonia as N being classified as non-detect. These concentrations significantly exceed the established background levels discussed in comment #7 above. While blank interferences during the 2011 are acknowledged, the analytical results presented in 2011 were appropriately flagged when the analytical result was less than five times the measured concentration in the method blank. The RLs and reporting procedures from the 2011 investigation should be retained.

10. Section 7.1.1.5, first paragraph: DI water from the Mill should not be used to decontaminate sampling equipment or provide rinsate samples. The DI water should come from a commercial third-party source, as specified by the May 2011 revised Phase 1 Work Plan.
11. Section 7.1.4: DUSA proposes to place the contaminated soil into the tailings cells during a future excavation. DUSA needs to demonstrate in this section, at least approximately, that there is sufficient space in the tailings cells upon facility closure to accommodate the nitrate-contaminated soil.
12. Section 7.2, first paragraph at top of Page 37: The discussion of pyrite and the possible oxidation of pyrite is hindered by the lack of quantitative evidence of how much pyrite is present in the borings or how much of the pyrite may be oxidized. A separate study is currently being undertaken by DUSA to quantify the amount of pyrite in the formation, as part of a separate investigation of sources of decreasing pH trends and Out-of Compliance status at several of the White Mesa monitoring wells. Please provide language explaining that the oxidation of pyrite in the formation has not been substantiated with quantified core analysis or remove any references to pyrite in the Nitrate CAP. The presence of dichloromethane, which is the product of microbially-mediated anaerobic degradation of chloroform, is sufficient evidence that there are some localized zones within the saturated zone that may be anaerobic. Additionally, if the responses to comments provided in the DUSA cover letter dated 27 February 2012 are to be incorporated into the CAP, then the response to comment 23 of the previous round of comments (19 January 2012) should be similarly revised.
13. Section 7.2, third paragraph on Page 39 and Section 8, second paragraph: Please clarify that containment and hydraulic control of the nitrate plume that will prevent physical expansion of the nitrate plume (as required by the SCA) will be quantified by (1) nitrate concentrations below the 10 mg/L Groundwater Quality Standard in samples collected from monitoring wells downgradient of TWN-22 and TWN-24 and (2) demonstration of a hydraulic capture zone that includes all of the nitrate plume upgradient of TWN-22 and TWN-24 through groundwater elevation data. Note that the four criteria listed in Section 8 do not require modification since they account for these two factors.
14. Section 7.2, last paragraph and Section 8, second paragraph: This text implies that no actions would be taken if nitrate concentrations in downgradient wells increase but do not exceed 10 mg/L. If nitrate concentrations in any of the wells exceed their respective Ground Water Compliance Limit (GWCL) listed in Table 2 of the current Permit, which are less than 10 mg/L, then notification is required and sampling frequencies for the wells is required to be accelerated per the White Mesa Mill Groundwater Discharge Permit (GWDP UGW370004) Part G.1. Please revise the text accordingly.
15. Section 7.2.1: Clarify in this section that Wells TWN-1, TWN-2, TWN-3, TWN-4, TWN-7, and TWN-18 will be retained for Quarterly Nitrate and Chloride monitoring as well as field collection parameters per the approved field collection form (including water level measurements), and wells TWN-14 and TWN-19 will be retained for Quarterly water level monitoring only. Please also add wells TW4-6 and TW4-16 for water level monitoring.

16. Section 7.2.2: Table 1 includes a “Nitrate Operations and Maintenance Plan” but such a document is not discussed in Section 7.2.2. A brief description of the plan should be added to this section or another appropriate section.
17. Sections 7.2.2, 8.3, and 9.0 (all): These sections discuss the procedures to be used for conveying pumped groundwater to the tailings cells for disposal. Contingency Plan procedures, as presented in Sections 8.1 through 8.4, include procedures to be followed if groundwater pumping recovery rates drop from anticipated production levels. The CAP needs to include a discussion of procedures/measures to be taken for handling of pumped groundwater if pumped groundwater inventories conveyed to the tailings cells are found to lead to exceedances in maximum allowable specified threshold values (e.g., maximum allowable daily water level) in a cell containment system’s leak detection system.
18. Section 7.2.4, second paragraph: To be consistent with the Ground Water Monitoring Quality Assurance Plan dated March 22, 2010, the required purge volume is two casing volumes and stabilization of field parameters, not three pore volumes as stated in this paragraph. In this paragraph and elsewhere in the report, ensure that groundwater sampling procedures are consistent with the currently approved Quality Assurance Plan (QAP) (Currently Approved QAP dated 3/22/2010 Revision 6).
19. Section 7.3: If Phase II active remediation efforts through groundwater pumping do not remediate all nitrate concentrations equal to or less than 10 mg/L at the “TWN/TW4” monitoring wells, and equal to or less than GWPL’s at the “MW” monitoring wells within a time frame specified below, then further consideration of alternate remediation technologies will need to be evaluated per Phase III. DRC sees a 5-year time frame for limitation of Phase II implementation as suitable to demonstrate the effectiveness of Phase II groundwater pumping, elimination of the nitrate plume, and return of the facility monitoring wells to compliance with Ground Water Quality Standards and GWCL’s. If definitive evidence does not show plume elimination and compliance within the 5 year timeline, then DUSA will be required to submit a revised CAP for Executive Secretary Review and Approval for Phase III. Please include language in the CAP that acknowledges the Phase II compliance time limitation.
20. Section 8.2 and Section 10.2.7: The revised CAP states that the progress of Phase II will be monitored, in part, through an assessment that nitrate concentrations are “generally stable or declining (disregarding short-term fluctuations)” or are not “generally increasing” within the plume. However, criteria for assessing whether the nitrate concentrations are stable, declining, or generally increasing are not provided. Specific, statistically-based criteria need to be provided in the CAP to quantify whether the nitrate concentrations are stable, declining, or increasing. The criteria should account for the potential for short-term fluctuations. Provide a detailed description of statistical methods which will be used.
21. Table 1: The newly proposed schedule for constructing the concrete cover around the ammonium sulfate tanks does not appear to include any review and approval of the analytical data or proposed cover area by DRC prior to construction of the cover. The proposed schedule must be modified to include such review and approval.

[End of comments]