Denison Mines (USA) Corp.
1050 17th Street, Suite 950
Denver, CO 80265
USA

Tel : 303 628-7798
Fax : 303 389-4125

www.denisonmines.com

July 12, 2011

VIA PDF and FEDERAL EXPRESS

Mr. Rusty Lundberg
Executive Secretary
Utah Division of Radiation Control
Utah Department of Environmental Quality
195 North 1950 West
Salt Lake City, UT 84116-3097

Re: Nitrate Investigation Groundwater Phase 2 Detailed Workplan -- Nitrate Investigation at the White Mesa Mill Site -- Docket No. UGW09-03

Dear Mr. Lundberg:

Pursuant to page 7 of the Tolling Agreement, Revision 2, dated June 30, 2011 between Denison Mines (USA) Corp. ("Denison") and the Co-Executive Secretary of the Utah Water Quality Board, please find enclosed Denison's revisions, dated July 11, 2011, to the Phase 2 *White Mesa Mill Nitrate Investigation Detailed Work Plan and Schedule.*

This revision has been prepared in response to comments from Utah Division of Radiation Control and URS Corporation dated July 7, 2011. The revision has been provided in both clean and track changes ("redline") format for ease of review.

The responses to comments are summarized below. Each response below has been identified by the number of the corresponding comment in the July 7, 2011 letter.

1. No response required.
2. A reference section has been added to the Work Plan and QAP as requested.
3. The language has been modified to state "cryptosporidium is common in cattle and livestock".
4. No response required.
5. No response required.
6. No response required.
7. The text has been changed as follows "The text below describes how DUSA would determine whether a site-specific background study would be required, and how the

background would be developed". The text as modified clarifies that the site-specific background study is required only if positive detections are reported in the initial sampling. That is different from the text DRC has suggested, which could imply that a site-specific background study would be required regardless.

8. No response required.
9. The change has been made as requested.
10. The schedule has been changed as requested.
11. The following text has been added to Section 6.2.12 of Attachment 2: "Samples not shipped on the same day as they are collected will be refrigerated onsite until shipment". The holding time and schedule for sample shipments for HMX and RDX has been changed as requested.
12. The change has been made as requested.
13. No response required.
14. The laboratory has been selected. At the time of the initial QAP submission, DUSA was waiting for a response from the laboratories regarding their ability to analyze the cryptosporidium samples. DUSA has chosen Energy Laboratories (EL) in Casper Wyoming to complete the cryptosporidium analyses. EL is on the EPA list of acceptable laboratories. A footnote has been added to Table 1 listing EL as the laboratory that will be used for cryptosporidium analyses.
15. DUSA does not believe it is necessary or practicable to obtain DI water from a third party commercial source for the following reasons:
    1) The DI water from the Mill DI system is currently used and is considered suitable for all groundwater monitoring programs at the Mill which are subject to compliance and enforcement requirements. 2) The large volume of water necessary for decontamination and rinsate blanks precludes the ability to have the DI water produced and shipped from a third party. Per the currently approved Mill groundwater procedures, the portable pump is submerged into 55-gallon barrels of decontamination fluids and DI water and the fluids are pumped through the portable pump. The procedure proposed for this investigation is pumping 55-gallons of soap solution made with DI water followed by dual DI rinses; each 55 gallons. The soap solution can be reused for one sampling day; however, the DI solutions would be used only once and disposed of after they have been through the pump. Since there are seven wells that will be sampled using the portable pump, that is 770 gallons of DI water for that step alone. In addition to the 770 gallons, the added volume for soap solutions and the initial decontamination of the pump prior to the first use increases the total DI usage to over 1,000 gallons. Procurement of over 1,000 gallons of DI water from a third party commercial laboratory source is logistically not feasible. 3) Although, DRC has expressed a concern in the past that nitrate may be present in the Mill DI system, that concern is not relevant for the Phase 2 investigation in which nitrate will not be analyzed. 4) DUSA has successfully eliminated low-level nitrate from the rinsate blanks during the second quarter chloroform investigation through the addition of the second DI rinse (with an additional 55-gallons of DI water). The nitrate in the rinsate blanks is originating from the nitric acid rinse used during the decontamination processes currently used for the compliance monitoring programs. For this investigation DUSA has eliminated the nitric acid rinse during decontamination AND has added the second rinse

with DI water. For the foregoing reasons the requested change has not been made to the QAP.

16. The change has been made as requested.
17. The change has been made as requested.
18. DUSA does not believe that third-party validation is necessary or appropriate for the following reasons:

    1) The current validation procedure used is considered suitable for all groundwater monitoring programs at the Mill which are subject to compliance and enforcement requirements. 2) All of the QC sample reviews cited in the comment including duplicates, rinsate blanks, and laboratory QC samples are currently completed by the DUSA QA Manager as discussed in Section 9.0 of the QAP. Again, these reviews are considered suitable for compliance and enforcement determinations for all of the groundwater programs at the Mill. 3) The Executive Secretary has the ability to take split samples and to perform his own validation on those samples. 4) The scenario presented in the comment stating that low-level detections may be changed to nondetected results is in conflict with UDEQ-approved procedures currently enforced for Mill groundwater data. Changing a low-level detection to a nondetected result is the effective equivalent of raising the detection limit. To date, UDEQ has not allowed raising detection limits unless it is the result of a dilution necessary to bring a high sample result within the calibration range of an instrument. Per the approved QAP, a raised detection limit may be reported only if the result is greater than the raised detection limit. DUSA has received NOVs in the past for raising detection limits for samples with low-level or no detections to compensate for matrix interferences. DUSA has not been allowed to raise detection limits for the convenience of the laboratory and prevention of laboratory instrumental damage. 5) Validating data from this study and application of a different set of criteria would render the current data incomparable to historic data. None of the constituents being sampled in Phase 2 are present in the historical suite of data; however, application of differing criteria results in differing interpretations of data usability for whole data sets thus rendering the data incomparable. 6) Validation criteria need to be specified prior to sample collection and analysis so that the laboratory can produce data packages which provide the information necessary to complete the data validation specified. Specialized data package requests need to be submitted to the laboratory to minimize laboratory costs and laboratory labor. Requesting larger data packages after the fact causes delays in schedule, and data packages are difficult and expensive to recreate. Specification of this prior to analysis allows the timely collection of all of the appropriate data at the time of analysis. 7) If there are any detections of any of the constituents in Phase 2, Denison would consider repeat sampling for those constituents. A sentence to that effect has been added to Section 3.1 of the Phase 2 Nitrate Investigation Detailed Work Plan and Schedule. For these reasons, the requested change has not been made to the plans.

    If the Executive Secretary believes that third-party validation is required to verify the validity of low level detections, then the Mill's Groundwater Discharge Permit should

be amended to require third party validation prior to any accelerated monitoring or out of compliance requirements being triggered.

19. Perchlorate will be analyzed by EPA Method 6850. The RL is 0.5 ug/L, which is sufficient for meeting the objectives of this investigation. A Utah-certified laboratory has been chosen to complete the analyses.
20. The change has been made as requested.

If you have any further questions please contact me at 303-389-4132.

Yours very truly,

Jo Ann S. Tischler
Director, Compliance and Permitting

Enclosure.

cc Robert D. Baird, URS
Daniel W. Erskine, Ph.D, INTERA
David C. Frydenlund
Ron F. Hochstein
Harold R. Roberts
David E. Turk
Katherine A. Weinel

WHITE MESA URANIUM MILL
PHASE 2 NITRATE INVESTIGATION
DETAILED WORK PLAN AND SCHEDULE

July 12, 2011
Revision 1

Denison Mines (USA) Corp.
P.O. Box 809
Blanding, UT 84511

Contents

1.0 INTRODUCTION

Denison Mines (USA) Corp. ("DUSA") received a Request for Voluntary Plan and Schedule to Investigate and Remediate Nitrate Contamination at the White Mesa Mill (the "Mill") Site, near Blanding, Utah (the "Request") from the Co-Executive Secretary (the "Co-Executive Secretary") of the Utah Water Quality Board, of the Utah Department of Environmental Quality ("UDEQ") on September 30, 2008. In the Request, the Co-Executive Secretary noted that groundwater nitrate as nitrogen levels have exceeded the State water quality standard of 10 milligrams per liter ("mg/L") in certain monitoring wells at the Mill Site. For the remainder of this document, any reference to nitrate or ammonia, whether or not the reference specifies "as N," means the analyte "as nitrogen."

As a result of the Request, DUSA agreed to submit a plan of action and a schedule for Co-Executive Secretary approval for completion of a Contamination Investigation Report ("CIR") to determine the physical cause(s), location(s), transfer mechanism(s) and characteristics of all source(s) of the nitrate contamination in order to form a basis for and facilitate later submittal of a groundwater Corrective Action Plan ("CAP") that meets the requirements of Utah Administrative Code ("UAC") R317-6-6.15D, or to demonstrate conclusively that DUSA did not cause or contribute to the nitrate contamination in any manner and that, as a result, such a CAP is not necessary. Subsequently, in a letter dated December 1, 2009, UDEQ, noting that elevated chloride concentrations exist, apparently coincident with elevated nitrate concentrations, recommended that DUSA also address and explain the elevated chloride concentrations.

DUSA and the Co-Executive Secretary entered into a Stipulated Consent Agreement Docket No. UGW09-03, dated January 27, 2009 ("Consent Agreement"), related to nitrate contamination at the Mill. Pursuant to Item 6.A of the Consent Agreement, DUSA submitted a Nitrate CIR for the White Mesa Uranium Mill Site, Blanding, Utah, dated December 30, 2009, to the Utah Division of Radiation Control ("DRC"). By a letter dated October 5, 2010, the Co-Executive Secretary notified DUSA of his determination that the CIR is incomplete. By an email transmitted to the Co-Executive Secretary on October 20, 2010, and pursuant to Item 11 of the Consent Agreement, DUSA requested an amendment to the deadline stipulated in item 7.C of the Consent Agreement.

At an October 26, 2010, meeting with the Co-Executive Secretary, DRC staff, and legal counsel, DUSA reported that it was premature to submit a schedule for submittal of performance standards and a CAP for the nitrate contamination. In turn, DUSA presented a new theory for a possible source of the nitrate and chloride contamination beneath the Mill, based on DUSA's review of the scientific literature ("New Theory"), specifically, that the nitrate contamination source is or could be caused by naturally occurring nitrate and chloride salt deposits located in the vadose zone near or beneath the Mill site area, which have been mobilized by natural and/or artificial recharge. The parties agreed that this New Theory warranted additional investigation, along with certain of the other additional studies suggested in the October 5, 2010, DRC Notice. At a November 30, 2010, meeting between DRC Staff and DUSA the Co-Executive Secretary and DUSA further agreed that DUSA would prepare a detailed plan and schedule (the "Plan and Schedule") for performing additional required studies and for submittal of a revised CIR that meets the requirements of all applicable regulations on or before February 15, 2011. DUSA's commitment to prepare and submit the Plan and Schedule is set out in a Tolling Agreement (the "Tolling Agreement") dated December 15, 2010, between DUSA and the Co-Executive Secretary.

DUSA submitted a draft Work Plan on February 14, 2011. During subsequent discussions with DRC staff, the Co-Executive Secretary and DUSA agreed that the additional studies could require as many as five phases, and the schedule should include points of consultation between phases at which the Co-Executive Secretary and DUSA could evaluate and agree on the redirection, addition, or elimination of subsequent phases.

The Tolling Agreement was revised on April 28, 2011, to allow time for:

- DUSA to prepare and submit a Revised Work Plan for Phase 1.
- DUSA to prepare and submit a revised Work Plan(s) for Revised Phases 2 through 5, including a Conceptual Site Model ("CSM") of potential nitrate sources.
- The Co-Executive Secretary to review and approve the revised Work Plans, including modifications.
- The Co-executive Secretary and DUSA to agree on a revised or replacement Consent Agreement

Based on discussions culminating in the Revised Tolling Agreement, DRC and DUSA have agreed to conduct a multi-phased program designed to evaluate a number of potential sources of nitrate and chloride that may have contributed to the identified plume, both Mill-related sources, non-Mill sources, and sources resulting from historical use. The phased approach will include development of a CSM that will be refined as the investigation progresses and will be used by DRC and DUSA at several decision junctures to:

1. Determine which sources should be removed from further consideration.
2. Assist in quantifying the relative contribution of the remaining sources.
3. Determine whether or not to proceed with future phases of the investigation.

Based on agreements between DRC and DUSA, the Tolling Agreement was revised and finalized on June 30, 2011, to allow sufficient time for preparation and DRC approval of work plans and milestones dates for the remainder of the investigation.

The Phase 1 investigation is described in detail in the *Nitrate Investigation Revised Phase 1 Work Plan, White Mesa Mill Site*, dated May 13, 2011. A Phase 2 through 5 Work Plan, describing the remaining phases of the investigation per the Revised Tolling Agreement, was submitted on June 3, 2011 and is currently under revision in response to DRC comments. The purpose of Phases 2 through 5 is to collect data to fill the data gaps, test hypotheses, and update the CSM as described above. Following submittal of the Phase 2 through 5 Work Plan, the Revised Tolling Agreement required that DUSA would provide a Phase 2 Detailed Work Plan and Schedule by July 1, 2011.

This document, along with its attachments, is the Phase 2 Detailed Work Plan and Schedule. This Work Plan, combined with the schedule included as Attachment 1, and the Quality Assurance Plan ("QAP") for Phase 2 included as Attachment 2, will delineate the investigation-specific procedures and activities necessary to conduct the Phase 2 groundwater portion (non-isotopic groundwater analyses) of the investigation contemplated by the Revised Tolling Agreement.

2.0 DOCUMENT ORGANIZATION

Phase 2 of the nitrate investigation as contemplated by the Revised Tolling agreement dated April 28, 2011 includes the non-isotopic sampling and analysis of groundwater from existing wells at the Mill site. Based on agreements between DRC and DUSA, the Tolling Agreement is currently undergoing revision to allow sufficient time for preparation and DRC approval of Work Plans and milestones dates for the remainder of the nitrate investigation. Per this draft Tolling Agreement, a Detailed Work Plan and Schedule as well as a QAP is required for Phase 2 of the nitrate investigation. This document and the Attachments are designed to meet the requirements for the Phase 2 nitrate investigation described in the draft Tolling Agreement. This document is organized as follows:

- Work Plan – the Work Plan is the primary document and describes, either directly or through reference, the purpose of this phase of the investigation, the site description and site background, and the project objectives for Phase 2 of the nitrate investigation.

- Attachment 1 Schedule for Phase 2 – Attachment 1 of this Work Plan delineates the Phase 2 schedule for sampling, data receipt and data submission to DRC.

- Attachment 2 QAP – Attachment 2 of this Work Plan is the QAP for the Phase 2 nitrate investigation. The QAP provides the Quality Assurance ("QA")/Quality Control ("QC") sampling, analytical and data review procedures to be used during Phase 2 of the nitrate investigation. It is important to note that the QAP submitted as Attachment 2 of this Work Plan is based, where applicable, on the UDEQ-approved QAP currently used for groundwater sampling at the Mill site.

3.0 PURPOSE AND SCOPE OF THE INVESTIGATION

3.1 Project Purpose

The purpose of groundwater sampling for non-isotopic analytes is to test the hypotheses that nitrate and chloride mass observed in groundwater was caused by either military and/or agricultural uses of the Mill site.
To test the hypothesis that non-Mill related historic activities caused the nitrate and chloride mass observed in groundwater, non-isotopic marker or fingerprint analytes were chosen for analysis during Phase 2 of the nitrate investigation. The Phase 2 analytes were chosen because they are non-Mill related and specifically result and represent historical agricultural or military activities. The specific analytes of interest for the Phase 2 nitrate investigation are cryptosporidium, HMX, RDX, and perchlorate.

Cryptosporidium is a wasteborne intestinal parasite common in cattle and livestock. The presence of cryptosporidium in the groundwater samples collected during this investigation would be indicative of agricultural influences in the groundwater at the Mill site.

RDX, HMX and perchlorate are compounds which have historic military uses. RDX and HMX are military explosive compounds which are not available for commercial uses. The presence of either of these analytes would be indicative of military influences on the groundwater at the Mill site, particularly military activities associated involving incendiary devices.

Perchlorate is naturally occurring at extremely low levels, but was also used for multiple military applications, particularly as an oxidant in solid rocket fuels and incendiary and chemical munitions. Based on the historic military uses of the Mill site, perchlorate analyses at levels above background would also be indicative of military influences on the groundwater at the Mill site.

It is assumed that any instances of cryptosporidium, RDX and HMX would be associated with ponds or pond-like features, whose presence is necessary to generate the hydraulic head needed to carry constituents to groundwater. Not all locations with elevated nitrate and chloride are associated with an active pond. However, disturbances visible on aerial imagery far upgradient and far downgradient near wells containing elevated concentrations of nitrate and chloride may have been related to historical ponds at those locations. Therefore, an initial screening in a limited number of wells for cryptosporidium, RDX and HMX will be completed. If positive detections are reported in the initial well group, a more comprehensive sampling program and background determination will be completed for cryptosporidium. RDX and HMX will not have a background determination because they are not natural to the environment, that is, it is assumed that natural background concentrations would be non-detectable and

any detections would be the result of military activities. Positive detections of cryptosporidium and/or HMX and RDX may also be followed with repeat sampling.

Perchlorate was more frequently used in military applications, is relatively mobile, and as such the initial sampling and screening will include more existing wells. As with cryptosporidium, RDX and HMX, if any positive detections are reported, then a more comprehensive sampling program and background determination (cryptosporidium only) will be completed. Positive detections of perchlorate may also be followed with repeat sampling.

The data resulting from this the Phase 2 nitrate investigation will be used to support the decision processes which are described in the Phases 2 through 5 Work Plan.

3.2 Project Scope

The scope of this investigation does not include sampling and analysis for nitrate/nitrite as N, chloride and ammonia as N. Nitrate/nitrite as N, chloride and ammonia as N are routinely sampled under the groundwater point of compliance ("POC") sampling program and the chloroform and nitrate programs. The historic data resulting from those programs will be used as necessary to meet the objectives of this investigation. For these analytes, groundwater has already been established on an intra-well basis as provided in Table 2 of the Mill's current Groundwater Discharge Permit, and no further background analyses are necessary.

The scope of Phase 2 of the nitrate investigation includes sampling and analysis of a limited number of existing groundwater wells for cryptosporidium, RDX and HMX to determine if further investigation into agricultural and military based analytes is necessary. Additionally, a larger group of wells will be screened for perchlorate. The initial screening program for cryptosporidium, RDX and HMX will include sampling wells:

- TWN-2
- TW4-22

These wells were chosen for the initial screening program for cryptosporidium, RDX and HMX because those wells are located in or near the location of a large historic pond which is visible on historic aerial photographs. If positive detections are reported for cryptosporidium, RDX or HMX, the sampling program would be expanded to include a background determination and additional wells. The additional wells that would be sampled for cryptosporidium, RDX and HMX would include the wells listed below as the wells to be sampled for perchlorate. The background wells that would be used for cryptosporidium are also listed below in the background determination section of this Work Plan.

The initial screening program for perchlorate will include sampling wells:

- MW-20
- MW-31
- TWN-19
- TWN-2
- TWN-9
- TWN-17
- TW4-22
- MW-19
- MW-27

- MW-30
- TW4-24
- TW4-1

These wells were chosen for perchlorate screening due to their locations within the nitrate plume, their locations near historic military activities, or their locations near historic ponds or pond-like features.

The text below describes how DUSA would determine whether a site-specific background study would be required, and how the background would be developed.

Background Determination

EPA (2002) states that a minimum of eight to ten samples are required for a statistically significant background determination. Background for cryptosporidium and perchlorate will be determined by a one-time sampling of groundwater in the following 10 monitor wells (see Figure 1 of the QAP):

TWN-8
TWN-11
TWN-13
TWN-15
TWN-16
MW-1
MW-2
MW-3
MW-12
MW-18

The basis for the site-specific perchlorate background determination is as follows:

> Fram and Bellitz (2011) state: *"The data and model results indicate low concentrations (0.1–0.5 µg/L) of perchlorate occur under natural conditions in groundwater across a wide range of climates, beyond the arid to semiarid climates in which they mostly have been previously reported. The probability of detecting perchlorate at concentrations greater than 0.1 µg/L under natural conditions ranges from 50–70% in semiarid to arid regions of California and the Southwestern United States to 5–15% in the wettest regions sampled (the Northern California coast). The probability of concentrations above 1 µg/L under natural conditions is low (generally <3%)."* Therefore, if perchlorate is detected at concentrations above 1 µg/L a background will be determined.

Perchlorate and cryptosporidium results will be tabulated and background will be determined by the 95% upper confidence level on the mean (95% UCL).

Background does not need to be developed for RDX or HMX because they are not natural to the environment and therefore, any detection would be the result of military influences.

4.0 SITE DESCRIPTION

A detailed site description, background, site status, physical setting, and summary of previous investigations is included in the Phases 2 through 5 Work Plan submitted under separate cover on June 3, 2011.

5.0 PROJECT OBJECTIVES

The objectives of this phase of the nitrate investigation is to:

1. Establish background for comparison to analytes not already addressed in the Mill's existing background study reports and monitoring programs;
2. Produce valid data for comparison to background;
3. Identify locations of groundwater elevated in the constituents of concern; and
4. Provide data for incorporation in the Conceptual Site Model and decision process regarding nitrate sources.

6.0 PHASE 2 SCHEDULE

Attachment 1 to this Work Plan is the schedule for sampling, analysis and data submission to DRC. As indicated by the attached schedule, Phase 2 of the nitrate investigation may be conducted using a multi-campaign sampling and analysis approach. Samples will be collected for an initial screening of cryptosporidium, HMX, RDX and perchlorate as described in Section 3 above. The schedule included in this Work Plan shows the additional analyses and background determination that may be conducted. The determination of additional sampling will be made based on the analytical data resulting from the initial sampling campaign.

7.0 REFERENCES

Denison Mines (USA) Corp. and Utah Water Quality Board (Co-Executive Secretary). 2011. Tolling Agreement.

———. 2009. Stipulated Consent Agreement, Docket No. UGW09-03.

Fram, M.S., and Belitz, Kenneth. 2011. "Probability of Detecting Perchlorate under Natural Conditions in Deep Groundwater in California and the Southwestern United States." *Environ. Sci. Technol.*, 2011, 45 (4), pp 1271–1277.

INTERA Inc. 2009. Nitrate Contamination Investigation Report, White Mesa Uranium Mill Site, Blanding Utah.

———. 2011a. Nitrate Investigation Revised Phase 1 Work Plan, White Mesa Mill Site, Blanding Utah. May 13.

———. 2011b. Nitrate Investigation Revised Phases 2 through 5 Work Plan, Rev. 1.0, White Mesa Mill Site, Blanding Utah (Draft).

U.S. Environmental Protection Agency (EPA). 2002. "Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites." Office of Emergency and Remedial Response, U.S. Environmental Protection Agency. Washington, DC, EPA 540-R-01-003. September.

ATTACHMENT 1
Phase 2 Schedule

Activity	Date(s)
DUSA submits Phase 2 Nitrate Investigation Detailed Work Plan and Schedule and QAP to UDEQ	Friday July 1, 2011
UDEQ provides comments on Phase 2 Nitrate Investigation Detailed Work Plan and Schedule and QAP	Monday July 11, 2011
DUSA responds to comments and submits revised Phase 2 Nitrate Investigation Detailed Work Plan and Schedule and QAP	Wednesday July 13, 2011
Field Work – Campaign 1	Monday July 18, 2011 – Friday July 22, 2011
Cryptosporidium and explosives shipped to analytical laboratories either the same day as collection or the day following collection (cryptosporidium and explosives samples will not be collected on Friday July 22, 2011 due to holding time limitations)	Monday July 18, 2011 – Thursday July 21, 2011
Samples (except cryptosporidium and explosives) shipped to analytical laboratories	Monday July 25, 2011
Samples (except cryptosporidium) arrive at analytical laboratories	Tuesday July 26, 2011
Analytical data received from analytical laboratories	Tuesday August 16, 2011
DUSA completes QA/QC review of data and completes determination of necessity of campaign 2/background sampling	Friday September 16, 2011
DUSA transmits analytical data packages, EDDs, and QA/QC review results to UDEQ	Friday September 16, 2011
Field Work – Campaign 2 (if required)	Monday September 19, 2011 – Friday September 30, 2011
Cryptosporidium and explosives shipped to analytical laboratories either the same day as collection or the day following collection (cryptosporidium and explosives samples will not be collected on Fridays due to holding time limitations)	Monday September 19, 2011 – Thursday September 29, 2011
Samples (except cryptosporidium and explosives) shipped to analytical laboratories	Monday September 26, 2011 and Monday October 3, 2011
Samples (except cryptosporidium) arrive at analytical laboratories	Tuesday September 27, 2011 and Tuesday October 4, 2011
Analytical data received from analytical laboratories	Friday November 4, 2011
DUSA transmits analytical data packages, EDDs, and QA/QC review results to UDEQ	Thursday December 8, 2011
Final Nitrate Investigation Report	As noted in Phases 2 through 5 Work Plan schedule

ATTACHMENT 2
Phase 2 QAP

WHITE MESA URANIUM MILL
GROUNDWATER MONITORING
QUALITY ASSURANCE PLAN
FOR PHASE 2 NITRATE INVESTIGATION

July 12, 2011
Revision 1

Denison Mines (USA) Corp.
P.O. Box 809
Blanding, UT 84511

List of Tables

List of Figures

List of Appendices

1.0 INTRODUCTION

This is the Quality Assurance Plan ("QAP") for the nitrate investigation, as required under the Final Tolling Agreement, dated June 30, 2011, by and between Denison Mines (USA) Corp. and the Co-Executive Secretary of the Utah Water Quality Board ("Co-Executive Secretary").

This QAP addresses the investigation-specific details and procedures necessary to complete Phase 2 of the nitrate investigation as discussed in the Phase 2 Nitrate Investigation Detailed Work Plan and Schedule. This QAP is in force only for the nitrate investigation described in the Revised Tolling Agreement. This QAP does not alter, in any way, the other groundwater sampling programs currently conducted at the Mill such as the groundwater Point of Compliance Monitoring Program, or the Chloroform and Nitrate monitoring programs. Future revisions and versions of the UDEQ-approved QAP will not include this Phase 2 QAP.

This QAP is based on the Utah Department of Environmental Quality (UDEQ)-approved Groundwater Monitoring Quality Assurance Plan ("UDEQ-approved GW QAP") submitted by Denison Mines (USA) Corp. ("DUSA") for groundwater monitoring activities conducted at the White Mesa Uranium Mill (the "Mill"), in Blanding Utah. The UDEQ-approved GW QAP referenced herein was submitted by DUSA to meet the requirements specified in the State of Utah Groundwater Discharge Permit ("GWDP") Number UGW370004. Pursuant to Part I.E.1.a of the GWDP, *"all groundwater monitoring and analysis performed under this Permit shall be conducted in accordance with a Quality Assurance Plan (QAP) currently approved by the Executive Secretary."* The current UDEQ-approved GW QAP, Revision 6, dated March 22, 2010, was used as the basis for this QAP.

The organization of this QAP is based on the UDEQ-approved QAP. The Section numbers used in this QAP are the same as those in the UDEQ-approved QAP. If the current nitrate investigation requirements differ from the UDEQ-approved QAP, the investigation-specific details are provided herein. If the requirements or procedures described in the UDEQ-approved QAP are to be used unchanged, the Section is repeated for ease of review and highlighted in grey. Any sections that have been newly developed or modified for the purposes of this nitrate investigation appear in regular type.

This QAP is based on the UDEQ-approved QAP to maximize the comparability of data collected during this nitrate investigation to the historic data collected during routine groundwater monitoring conducted at the Mill. In addition, utilizing UDEQ-approved procedures, where possible, eliminates the necessity for "re-review" of previously approved procedures and will allow completion of field work expeditiously.

1.2 Scope of the QAP

The QAP provides the Quality Assurance ("QA")/Quality Control ("QC") sampling, analytical and data review procedures to be used during Phase 2 of the nitrate investigation. The Work Plan is the primary document and describes, either directly or through reference, the purpose of this phase of the investigation, the site description and site background, and the project objectives for Phase 2 of the nitrate investigation.

1.3 Project Measurements

Project measurements will include field measurements collected during the purging and sampling of the wells and the analytical data resulting from the analysis of the samples collected during this nitrate investigation. Samples will be analyzed for perchlorate, RDX, HMX and cryptosporidium. Analytical methods are specified in Revised Table 1

1.5 Sampling Design

One groundwater sample will be collected from each of the wells specified in Section 6.2 of this QAP. Sampling methodology is described throughout this plan. Groundwater samples will be analyzed for perchlorate, RDX, HMX, and cryptosporidium to meet the project objectives listed in the Phase 2 Nitrate Investigation Detailed Work Plan and Schedule.

Data evaluation is described throughout this plan. Specifically QC assessment of the data collected during this nitrate investigation is discussed in Section 9.0 of this QAP.

2.0 ORGANIZATION AND RESPONSIBILITIES

2.1 Functional Groups

This Plan specifies roles for a QA Manager as well as representatives of three different functional groups: the data users; the data generators, and the data reviewers/approvers. The roles and responsibilities of these representatives are described below.

2.2 Overall Responsibility For the QA/QC Program

The overall responsibility for ensuring that the Quality Assurance/Quality Control ("QA/QC") measures are properly employed is the responsibility of the QA Manager. The QA Manager is typically not directly involved in the data generation (i.e., sampling or analysis) activities. The QA Manager is a qualified person designated by DUSA corporate management.

2.3 Data Requestors/Users

The generation of data that meets the objectives of this Plan is necessary for management to make informed decisions relating to the operation of the Mill facility, and to be consistent, as far as practicable, with the reporting requirements set out in the GWDP. Accordingly, the data requesters/users (the "Data Users") are therefore DUSA's corporate management and regulatory authorities through the implementation of such permits and regulations. The data quality objectives ("DQOs") required for any groundwater sampling event, such as acceptable minimum detection limits, are specified in this Plan.

2.4 Data Generators

The individuals who carry out the sampling and analysis activities at the request of the Data Users are the data generators. For Mill activities, this involves sample collection, record keeping and QA/QC activities conducted by one or more sampling and quality control/data monitors (each a "Sampling and QC Monitor"). The Sampling and QC Monitors are radiation and environmental technicians or other qualified Mill personnel as designated by the QA Manager. The Sampling and QC Monitors perform all field sampling activities, collect all field QC samples and perform all data recording and chain of custody activities in accordance with this Plan. Data generation at the contract analytical laboratory (the "Analytical Laboratory") utilized by the Mill to analyze the environmental samples is performed by or under an employee or agent (the "Analysis Monitor") of the Analytical Laboratory, in accordance with specific requirements of the Analytical Laboratory's own QA/QC program.

2.4.1 Sampling and QC Monitors

The Sampling and QC Monitors are responsible for field activities. These include:

a) Ensuring that samples are collected, preserved, and transported as specified in Plan;

b) Checking that all sample documentation (labels, field data worksheets, chain-of-custody records, packing lists) is correct and transmitting that information, along with the samples, to the Analytical Laboratory in accordance with this Plan;

c) Maintaining records of all samples, tracking those samples through subsequent processing and analysis, and, ultimately, where applicable, appropriately disposing of those samples at the conclusion of the program;

d) Preparing quality control samples for field sample collection during the sampling event;

e) Preparing QC and sample data for review by the QA Manager; and

f) Preparing QC and sample data for reporting and entry into a computer data base, where appropriate.

Ryan Palmer will serve as the Sampling and QC Monitor for Phase 2 of the nitrate investigation.

2.4.2 Analysis Monitor

The Analysis Monitor is responsible for QA/QC activities at the Analytical Laboratory. These include:

a) Training and qualifying personnel in specified Analytical Laboratory QC and analytical procedures, prior to receiving samples;

b) Receiving samples from the field and verifying that incoming samples correspond to the packing list or chain-of-custody sheet; and

Verifying that Analytical Laboratory QC and analytical procedures are being followed as specified in this Plan, by the Analytical Laboratory's QA/QC program, and in accordance with the requirements for maintaining National Environmental Laboratory Accreditation Program ("NELAP") and/or National Voluntary Laboratory Accreditation Program ("NAVLAP") certification as applicable.

The State of Utah does not currently have a certification process for cryptosporidium analyses. An EPA-Approved laboratory from the December 17, 2010 revision of "Laboratories Approved for the Analysis of Cryptosporidium under the Safe Drinking Water Act" will be used for the analysis of cryptosporidium. NELAC and NAVLAP certification are not available for microbiology laboratories and as such does not apply to the cryptosporidium laboratory. All other analyses will be performed by Utah-certified laboratories.

2.4.3 Data Reviewers/Approvers

The QA Manager has broad authority to approve or disapprove project plans, specific analyses and final reports. In general, the QA Manager is responsible for reviewing and advising on all aspects of QA/QC, including:

a) Ensuring that the data produced by the data generators meet the specifications set out in this Plan;

b) Making on-site evaluations and submitting audit samples to assist in reviewing QA/QC procedures;

c) Determining (with the Sampling and QC Monitor and Analysis Monitor) appropriate sampling equipment and sample containers, in accordance with this Plan, to minimize contamination; and

d) Supervising all QA/QC measures to assure proper adherence to this Plan and determining corrective measures to be taken when deviations from this Plan occur.

The QA Manager may delegate certain of these responsibilities to one or more Sampling and QC Monitors or to other qualified Mill personnel.

2.5 Responsibilities of Analytical Laboratory

Unless otherwise specified by DUSA corporate management, all environmental analysis of groundwater samples collected during this nitrate investigation will be performed by a contract Analytical Laboratory.

The Analytical Laboratory is responsible for providing sample analyses for groundwater samples and for reviewing all analytical data to assure that data are valid and of sufficient quality. The Analytical Laboratory is also responsible for data validation in accordance with the requirements for maintaining NELAP and/or NAVLAP certification as applicable.

The Analytical Laborator(ies) will be chosen by DUSA and must satisfy the following criteria: (1) experience in analyzing environmental samples with detail for precision and accuracy, (2) experience with similar matrix analyses, (3) operation of a stringent internal quality assurance program meeting NELAP and/or NAVLAP certification requirements (as applicable to all analyses except cryptosporidium) and that satisfies the criteria set out in Section 8 below, and (4) where possible, certified by the State of Utah for and capable of performing the analytical methods set out in Revised Table 1 (except for cryptosporidium as noted above).

A revision of Table 1 from the approved QAP, incorporating additional analytes for the Nitrate Phase 2 Investigation, has been included with this QAP.

2.6 Special Training and Certification

Site-specific training for all field personnel will be completed as required by Mill procedures and will be conducted by Mill personnel.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT OF DATA

The objective of this Plan is to ensure that monitoring data are generated at the Mill that meet the requirements for precision, accuracy, representativeness, completeness, and comparability required for management purposes and to comply with the reporting requirements established by applicable permits and regulationstand to meet the data needs for the decision analysis in the Phases 2 to 5 Work Plan (the Field and Analytical QC samples described in Sections 4.3 and 8.1 below are designed to ensure that these criteria are satisfied). Data subject to QA/QC measures are deemed more reliable than data without any QA/QC measures.

3.1 Precision

Precision is defined as the measure of variability that exists between individual sample measurements of the same property under identical conditions. Precision is measured through the analysis of samples containing identical concentrations of the parameters of concern. For duplicate measurements, precision is expressed as the relative percent difference ("RPD") of a data pair and will be calculated by the following equation:

$$RPD = [(A-B)/\{(A+B)/2\}] \times 100$$

Where A (original) and B (duplicate) are the reported concentration for field duplicate samples analyses (or, in the case of analyses performed by the Analytical Laboratory, the percent recoveries for matrix spike and matrix spike duplicate samples) (EPA SW-846, Chapter 1, Section 5.0, page 28).

3.2 Accuracy

Accuracy is defined as a measure of bias in a system or as the degree of agreement between a measured value and an accepted or true value. The accuracy of laboratory analyses is evaluated based on analyzing standards of known concentration both before and during analysis. Accuracy will be evaluated by the following equation (EPA SW-846, Chapter 1, Section 5.0, page 24):

$$\% \text{ Recovery} = (|A-B|/C) \times 100$$

Where:

A = the concentration of analyte in a sample
B = the concentration of analyte in an unspiked sample
C = the concentration of spike added

3.3 Representativeness

Representativeness is defined as the degree to which a set of data accurately represents the characteristics of a population, parameter, conditions at a sampling point, or an environmental condition. Representativeness is controlled by performing all sampling in compliance with this Plan.

3.4 Completeness

Completeness refers to the amount of valid data obtained from a measurement system in reference to the amount that could be obtained under ideal conditions. Laboratory completeness is a measure of the number of samples submitted for analysis compared to the number of analyses found acceptable after review of the analytical data. Completeness will be calculated by the following equation:

Completeness = (Number of valid data points/total number of measurements) x 100

Where the number of valid data points is the total number of valid analytical measurements based on the precision, accuracy, and holding time evaluation. Completeness is determined at the conclusion of the data validation.

The completeness goal for this investigation is 95%.

3.5 Comparability

Comparability refers to the confidence with which one set of data can be compared to another measuring the same property. Data are comparable if sampling conditions, collection techniques, measurement procedures, methods, and reporting units are consistent for all samples within a sample set.

3.6 Detection/Reporting Limits

The method detection limit ("MDL") is the minimum concentration of an analyte that can be reliably distinguished from background for a specific analytical method. The reporting limit represents the lowest concentration of an analyte that can be accurately and reproducibly quantified in a sample matrix. Project-required reporting limits are minimum quantitation limits for specific analytical methods and sample matrices that are typically several times the MDL to allow for matrix effects. The reporting limits for the nitrate investigation are specified in Revised Table 1. Reporting limits may be increased due to sample matrix interference (i.e., due to dilution gain).

A reporting limit is not specified for cryptosporidium in the EPA methodology. Reporting limits are not applicable to this method as it is a qualitative method and as such does not follow the same rigorous quantification systems for reporting limit determinations and quantitative methodologies.

4.0 FIELD SAMPLING QUALITY ASSURANCE METHODOLOGY

4.1 Controlling Well Contamination

Well contamination from external surface factors, is controlled by installation of a cap over the surface casing and cementing the surface section of the drill hole. Wells have surface covers of mild steel with a lockable cap cover. Radiation Safety staff has access to the keys locking the wells.

Subsurface well stagnation, for pumped wells, is reduced by pumping two well casing volumes of water from the wells, to the extent practicable. This ensures, to the extent practicable, that the aquifer zone water is being drawn into the well and is a representative sample.

4.2 Controlling Depth to Groundwater Measurements

Monitoring of depth to groundwater is controlled by comparing historical field log data to actual measurement depth. This serves as a check of the field measurements.

4.3 Water Quality Control Samples

Quality control samples collected during the nitrate investigation are as follows:

4.3.1 VOC Trip Blanks

Volatile organic compound ("VOC") trip blanks will not be collected during the nitrate investigation because the nitrate investigation samples will not be analyzed for VOCs and as such trip blanks are not required.

4.3.2 Equipment Rinsate Samples

Equipment rinsate samples are required when a portable (non-dedicated) pump is used for purging and sampling. For this investigation both dedicated pumps (in the point of compliance groundwater wells) and a portable pump (used for the nitrate and chloroform program wells) will be used for purging and sampling. Equipment rinsate samples will not be collected when the dedicated pumps are used for sampling.

When the portable pump is used for sampling, equipment rinsate samples will be collected at the frequency specified by UDEQ personnel (Phil Goble) in e-mail correspondence dated October 4, 2010. Per the e-mail correspondence, equipment rinsate samples are only required at the beginning of the sampling event and at the beginning of each day of sampling when the portable pump is used for purging and sampling. Decontamination of the portable pump is required prior to the first use and after each subsequent use.

Per standard Mill sampling procedures, if a well is purged dry using the portable pump it is sampled using a disposable bailer. All bailers used will be disposable and an equipment rinsate sample will not be required.

Equipment rinsate samples will be collected from the portable pump after the completion of decontamination as described in Section 6.2.5 of this QAP. The equipment rinsate sample will be collected from the portable pump by pumping deionized water into the laboratory-supplied sample containers.

Rinsate samples will be labeled with the name of the subsequently purged well with a terminal letter "R" added (e.g. TW4-7R).

4.3.3 Field Duplicates

One Duplicate set of samples submitted with each Batch per sampling campaign (defined in Section 4.3.4) of samples (DTG, Field and Laboratory Quality Assurance/Quality Control, 7.8), will be taken from one of the wells being sampled and will be submitted to the Analytical Laboratory and analyzed for perchlorate, cryptosporidium, HMX and RDX.

The duplicate sample is scheduled to be collected as noted in Section 6.2 below. Duplicates will be labeled with a "false" well number such as MW-65 or MW-70.

4.3.4 Definition of "Batch"

For the purposes of this Plan, a Batch is defined as 20 or fewer samples (EPA SW-846, Chapter 1, Section 5.0, page 23).

4.3.5 Deionized Field Blanks

A minimum of one deionized field blank (DIFB) will be collected during this investigation. A DIFB is a blank sample collected from the Mill deionized water system which is used to asses if any contamination is introduced into the decontamination and equipment rinsate processes from the deionized water used for decontamination and equipment rinsate collection.

The DIFB will be labeled with a "false" well number such as MW-60.

5.0 CALIBRATION

A fundamental requirement for collection of valid data is the proper calibration of all sample collection and analytical instruments. Sampling equipment shall be calibrated in accordance with manufacturers' recommendations, and Analytical Laboratory equipment shall be calibrated in accordance with Analytical Laboratory procedures.

5.1 Depth to Groundwater Measurements

Equipment used in depth to groundwater measurements will be checked prior to each use to ensure that the Water Sounding Device is functional.

5.2 Water Quality

The Field Parameter Meter will be calibrated prior to each sampling event and at the beginning of each day of the sampling event according to manufacturer's specifications (for example, by using two known pH solutions and one specific conductance standard.) Temperature will be checked comparatively by using a thermometer. Calibration results will be recorded on the Field Data Worksheet.

6.0 GROUNDWATER SAMPLING AND MEASUREMENT OF FIELD PARAMETERS

6.1 Groundwater Head Monitoring

6.1.1 Location and Frequency of Groundwater Head Monitoring

Depth to groundwater is measured quarterly in all point of compliance wells, background wells, monitoring wells, chloroform monitoring wells, nitrate program wells, and piezometers as stipulated in the GWDP and other program-specific plans, Corrective Action Orders, and Consent Agreements. The quarterly depth to groundwater measurements will be completed as required, independent of this investigation. Those measurements may be used during the interpretation of the nitrate investigation data, but are not required as part of the nitrate investigation and as such descriptions and requirements of those procedures are not required for the nitrate investigation. The quarterly depth to groundwater measurements will be collected following the procedures described in the UDEQ-approved QAP.

Depth to groundwater will be measured in the wells to be sampled, independent of the above-described quarterly program, immediately prior to sampling for the purposes of calculating casing/purge volumes. The pre-sampling depth to groundwater measurements will be recorded on the Field Data sheet for each well. Procedures for the pre-sample depth to groundwater measurement are described in Section 6.1.3 of the UDEQ-approved QAP.

6.1.2 Equipment Used for Groundwater Head Monitoring

Measurement of depth to groundwater is accomplished by using a Solinist – IT 300 or equivalent device (the "Water Sounding Device").

6.1.3 Field Sampling Procedures for Groundwater Head Monitoring

In the case of any well that is being sampled for groundwater quality, depth to groundwater is measured prior to sampling.

Depth to groundwater is measured from the top of the inner well casing or, for the piezometers, from the top of the casing, and is recorded on the Field Data Worksheet for Groundwater described in Section 7.1 (the "Field Data Worksheet"). Readings are taken by lowering the Water Sounding Device into the casing until the Device alarms, indicating that the water surface has been reached. The depth to groundwater is then determined by reference to the distance markings on the line attached to the Device. Data is recorded on the Field Data Worksheet as Depth to Water, to the nearest 0.01 of a foot.

6.2 Groundwater Compliance Monitoring

6.2.1 Location and Frequency of Groundwater Compliance Monitoring

Groundwater samples will be collected from the wells listed below for this nitrate investigation. Samples will be named according to the well number specified below.

The purpose of groundwater sampling for the Phase 2 nitrate investigation is to provide data to supplement the Conceptual Site Model and to support or eliminate hypotheses regarding potential sources of nitrate and chloride at the site. The sampling delineated herein is not compliance monitoring.

The following wells, which are also presented on Figure 1, will be sampled for cryptosporidium, RDX and HMX during the Phase 2 nitrate investigation, campaign 1 are as follows:

- TWN-2
- TW4-22

The following wells, which are also presented on Figure 1, will be sampled for perchlorate during the Phase 2 nitrate investigation, campaign 1 are as follows:

- MW-20
- MW-31
- TWN-19
- TWN-2
- TWN-9
- TWN-17
- MW-19
- MW-27
- MW-30
- TW4-22
- TW4-24
- TW4-1

UDEQ proposed that TW4-4 be sampled during this investigation. TW4-4 is a continuously pumped well under the chloroform monitoring program conducted under the State of Utah Notice of Violation and Groundwater Corrective Action Order UDEQ Docket No. UGQ-20-01. Because TW4-4 is a continuously pumped well it is not representative of groundwater conditions because it is drawing water in a radial pattern from around the well. The pumping results in groundwater from the well becoming a mixture of water that has been in contact with a wide variety of aquifer matrices and, therefore, it is not possible to

interpret a water quality analysis from a sample collected from that well. TW4-1 has been substituted for TW4-4 due to its close proximity to TW4-4 and its location within the nitrate plume.

Background (if necessary) for cryptosporidium and perchlorate will be determined by a one-time sampling of groundwater in the following monitor wells (see Figure 1):

- TWN-8
- TWN-11
- TWN-13
- TWN-15
- TWN-16
- MW-1
- MW-2
- MW-3
- MW-12
- MW-18

6.2.2 Quarterly and Semi-Annual Sampling Required Under Paragraphs I.E.1.a) or I.E.1.b) of the GWDP

The paragraphs cited in this Section are not applicable to this nitrate investigation because the wells sampled during this nitrate investigation are not being sampled to satisfy the requirements of Paragraphs I.E.1.a) or I.E.1.b) of the GWDP. The nitrate investigation is being conducted to satisfy the objectives specified in The Nitrate Investigation Phase 2 Detailed Work Plan and Schedule.

The samples collected during the nitrate investigation will be sampled for the following parameters:

- Field parameters – depth to groundwater, pH, temperature, specific conductance, redox potential (Eh) and turbidity in the manner specified herein, and
- Analytical parameters – cryptosporidium, perchlorate, HMX and RDX. Analytical methods are specified in the Revised Table 1 included with this QAP.

6.2.3 Quarterly or Monthly Sampling Required Under Paragraphs I.G.1 or I.G.2 of the GWDP

This Section is not applicable to the nitrate investigation. No monthly or quarterly accelerated sampling will be conducted as part of the nitrate investigation.

6.2.4 Sampling Equipment for Groundwater Compliance Monitoring

All equipment used for purging and sampling of groundwater which enters the well or may otherwise contact sampled groundwater, shall be made of inert materials.

For the purposes of this QAP the following equipment definitions shall apply:

- Disposable Bailer: A bailer that is disposable to be used at one specific well for the use of purging or sampling. Disposable bailers will be disposed of after a single use and will not be decontaminated. Equipment rinsate samples will not be collected when a disposable bailer is used to purge or sample a well.
- Dedicated Pump: A pump that is dedicated to one specific well for purging and sampling. Dedicated pumps will remain secured inside the well casing.
- Portable Pump: A pump that is used for purging and sampling at one or more wells.

Sampling will be completed using the equipment listed below or an equivalent. Combinations of the equipment listed below may be used as necessary to collect samples for this investigation. The equipment used to collect samples at each well will be determined by site-specific conditions encountered at the time of sampling (for example, volume of groundwater available etc.). Sampling equipment includes:

- Bailers made of inert materials,
- Water level measurement tape/sounding device,
- Field Data sheets,
- Sample labels,
- Sample coolers and ice,
- Disposable gloves,
- Purge water containment system
- Dedicated pumps,
- Sample filters for perchlorate (provided by the Analytical Laboratory)
- Generator,
- Flow Cell Multi-Parameter Meter system or equivalent. Field parameters are measured by using a flow cell system that enables the measurements to be taken on a real-time basis without exposing the water stream to the atmosphere. The Field Parameter Meter measures the following parameters:

    (i) Water temperature;
    (ii) Specific conductivity;
    (iii) Turbidity
    (iv) Standard pH;
    (v) Redox potential (Eh).

- Sample containers and preservation chemicals (as provided by the Analytical Laboratory), and

- Five gallon bucket.

6.2.5 Decontamination Procedures

If the portable (non-dedicated) pump is to be used for purging and sampling, prior to each sampling event and between each sampling location (well), decontaminate the portable (non-dedicated) sampling pump prior to its use for purging or sampling using the procedure outlined below. The detergent/deionized water mixture will be reused for one sampling day per UDEQ personnel (as documented in e-mail correspondence from Phil Goble dated October 4, 2010).

a) Submerse the pump into a 55-gallon drum containing a non-phosphate detergent and deionized water mixture. Pump the detergent/deionized water mixture through the pump for approximately 5 minutes to simulate pumping 50 gallons of detergent/water mixture. This decontamination fluid can be reused for one day of sampling as noted above.

b) Submerse the pump into a 55-gallon drum containing deionized water. Pump the detergent/deionized water mixture through the pump. Dispose of the deionized water and do not reuse.

c) Repeat step b) above. If an equipment rinsate sample will be collected use the deionized water from this step.

The pump should then be protected from contamination until used for purging or sampling.

All water produced during decontamination will be disposed of in Tailings Cell 1.

6.2.6 Pre-Purging/ Sampling Activities

- If a portable (non-dedicated) pump is to be used, prior to commencing the event's sampling activities, check the pumping equipment to ensure that no air is leaking into the discharge line, in order to prevent aeration of the samples;

- If a portable (non-dedicated) pump is to be used, prior to each sampling event and at the beginning of each day during the sampling event, decontaminate the sampling pump using the procedure set forth in Section 6.2.5;

- If a portable (non-dedicated) pump is to be used, after completion of decontamination prepare one equipment rinsate sample per day.

6.2.7 Well Purging/Measurement of Field Parameters

a) Remove the well casing cap and measure and record depth to groundwater by following the procedures set out in paragraph 6.1.3 above;

b) Determine the casing volume (V) in gallons, where h is column height of the water in the well (calculated by subtracting the depth to groundwater in the well from the total depth of the well), V = 0.653*h, for a 4" casing volume and V = .367*h for a 3" casing volume. Record the casing volume on the Field Data Worksheet;

c) If the RSO has advised the field technician that immiscible contaminants (i.e., LNAPLs or DNAPLs) are known to occur or could potentially occur in the subsurface at the location of the well, follow the additional procedures, to be provided by the RSO, prior to well purging;

d) Purging, Where Use of Pump is Effective (See paragraph 6.2.7 e)) below, where bailer is required)

If a portable (non-dedicated) pump is used, ensure that it has been decontaminated in accordance with Section 6.2.5 since its last use in a different well, lower the pump into the well, making sure to keep the pump at least five feet from the bottom of the well. Be sure never to drop the pump into the well, as this will cause degassing of the water upon impact. Once the pump is lowered into the well, or if the well has a dedicated pump, perform the following steps:

(i) Commence pumping;

(ii) Determine pump flow rate by using a stopwatch and a calibrated bucket by measuring the number of seconds required to fill to the one-gallon mark. Record this in the "pumping rate" section of the Field Data Worksheet;

(iii) Calculate the amount of time to evacuate two casing volumes;

(iv) Evacuate two casing volumes (if possible) by pumping for the length of time determined in paragraph (iii);

(v) Take measurements of field parameters (pH, specific conductance, temperature, redox potential and turbidity) during well purging, using the Field Parameter Meter and turbidity measuring instrument. These measurements will be recorded on the Field Data Worksheet. Purging is completed after two casing volumes have been removed and the field parameters pH, temperature, specific conductance, redox potential (Eh) and turbidity have stabilized to within 10% RPD over at least two consecutive measurements. The groundwater in the well should recover to within at least 90% of the measured groundwater static surface before sampling. In addition, turbidity measurement in the water should be $\leq$ 5 NTU prior to sampling (DTG Well Development 6.7, page 6-48) unless the well is characterized by water that has a higher turbidity. A flow-cell needs to be used for field parameters. If the well is purged to dryness or is purged such that full recovery exceeds two hours, the well should be sampled as soon as a sufficient volume of groundwater is available to fill sample containers (DTG, Well Purging, 7.2.4, page 7-9);

(vi) If the well yields two casing volumes, the individual performing the sampling should immediately proceed to Section 6.2.8);

(vii) If the well cannot yield two casing volumes,

A. Evacuate the well to dryness and record the number of gallons evacuated on the Field Data Worksheet; and

B. Prior to sampling, measure and record depth to groundwater on the Field Data Worksheet following the procedures set out in paragraph 6.1.3 above;

e) Purging, Where Use of Pump is Not Effective

For wells where a pump is not effective for purging and/or sampling (wells with shallow water columns, i.e., where the water column is less than five feet above the bottom of the well casing or the well takes over two days to recover from purging), a disposable bailer, made of inert materials, may be used. If a bailer is used, the following procedure will be followed:

(i) Use the sound level instrument to determine the water column and figure the amount of water that must be evacuated;

(ii) Attach a 3" disposable bailer to a rope and reel;

(iii) Lower the bailer into the well and listen for contact with the solution. Once contact is made, allow the bailer to gradually sink in the well, being careful not to allow the bailer to come in contact with the bottom sediment;

(iv) After the bailer is full, retrieve the bailer and discharge the water from the bailer into 5 gallon buckets. By doing this, one can record the number of gallons purged;

(v) After the bailer is emptied, lower the bailer back into the well and gain another sample as before. This process will continue until the two casing volumes have been collected or until no more water can be retrieved. When the process is finished for the well, the bailer will be disposed of; and

(vi) Take field measurements referred to in paragraph 6.2.7(d)(v) above from the water in the buckets

f) All water produced during well purging will be containerized. Containerized water will be disposed of in either Tailings Cell .

6.2.8 Samples to be Taken and Order of Taking Samples

For the nitrate investigation, samples will be collected from each well in the following order:

- Perchlorate
- Cryptosporidium
- RDX and HMX

Sample containers, chemical preservatives and filters for perchlorate will be provided by the analytical laboratory. Sample containers and analytical holding times are specified in Revised Table 1.

6.2.9 Field Duplicate Samples

Per the UDEQ-approved QAP, one set of field duplicate samples is required for each batch of samples per campaign. Field duplicates will be analyzed for the same parameters as noted above. Field duplicates will be collected by alternately filling the parent sample followed by filling the duplicate sample container. Samples will be collected in the order specified in Section 6.2.8 above.

6.2.10 VOCs and Nutrient Sampling/Perchlorate Cryptosporidium, RDX, HMX Sampling

VOCs and nutrients will not be collected during the nitrate investigation. The following procedure will be used to collect the samples for perchlorate, cryptosporidium, and RDX and HMX.

Sample collection will vary depending on whether a portable pump, dedicated pump or bailer is used for purging the well prior to sampling.

Per the UDEQ-approved, routine groundwater sampling procedures in use at the Mill site, the wells with dedicated pumps will be sampled directly from the pump immediately after purging. If the well does not run dry, purging will be considered complete after two casing volumes have been removed and field parameters have stabilized as indicated in Section 6.2.7. All dedicated pumps used for purging and sampling are "low flow" pumps and therefore volatilization of constituents is not a concern.

If the wells go dry prior to purging two casing volumes, the stabilization of field parameters or both, the well will be sampled when it recovers to within at least 90 percent of the static groundwater level before sampling. If a well is purged dry, stabilization of field parameters is no longer required. If the well is purged dry, and full recovery exceeds 2 hours, the well will be sampled as soon as a sufficient volume of water is available to fill the sample containers.

The UDEQ-approved, routine groundwater (chloroform and nitrate sampling programs) sampling procedures will be used for the wells purged with the portable pump. The portable pump will be used to purge the well as required in Section 6.2.7, if the well does not go dry. The day following purging, the wells will be sampled with a disposable bailer. If the wells go dry prior to purging two casing volumes, the stabilization of field parameters or both, the well will be sampled the following day with a disposable bailer if there is sufficient water to fill all of the sample containers. If sufficient water is not available for

sampling, the wells will be sampled as soon as sufficient water is available to fill all of the sample containers.

The perchlorate sample will be filtered prior to filling the sample container. To complete the filtering, perchlorate samples will be collected as a bulk sample into a clean, unused sample container. A portion of the bulk sample will be filtered using a syringe and filter provided by the laboratory, into the final sample container (also provided by the laboratory). The filters, bulk sample containers and syringes will be disposable and will not require decontamination.

Chemical preservatives will be added to the laboratory-supplied sample containers. The sample is then added to the preserved container either from the dedicated pump or the bailer depending on the purging method used.

6.2.11 Heavy Metals, All Other Non-Radiologic and Gross Alpha Sampling

Heavy metals and gross alpha samples will not be collected during the nitrate investigation.

Only perchlorate samples will require filtering in the field. The perchlorate field filter procedure is described above and as such the filtering procedures in the UDEQ-approved QAP are not applicable.

6.2.12 Procedures to Follow After Sampling

Per the EPA analytical methods for perchlorate and cryptosporidium, the receipt temperatures at the Analytical Laboratories are less than or equal to 10°C and less than or equal to 20°C respectively. The receipt temperature for RDX and HMX is 6°C.

Samples not shipped on the same day as they are collected will be refrigerated on-site until shipment.

6.2.13 Sample Shipment

The following procedures will be implemented when samples collected during the remediation activities are shipped:

- The cooler will be filled with bubble wrap, sample containers, and packing material. Sufficient packing material will be used to minimize sample container breakage during shipment.
- The COC forms will be placed inside a plastic bag. The bag will be sealed and taped to the inside of the cooler lid. The air bill, if required, will be filled out before the samples are handed over to the carrier. The Analytical Laboratory will be notified if the sampler suspects that the sample contains any substance that would require Analytical Laboratory personnel to take safety precautions.
- The cooler will be closed and taped shut with packing tape around both ends. If the cooler has a drain, it will be taped shut both inside and outside of the cooler.
- Signed and dated custody seals will be placed on the front and side of each cooler. Wide clear tape will be placed over the seals.
- The COC form will be transported within the taped, sealed cooler. When the cooler is received at the Analytical Laboratory, Analytical Laboratory personnel will open the cooler and sign the COC form to document transfer of samples.
- Multiple coolers may be sent in one shipment to the Analytical Laboratory. The outsides of the coolers will be marked to indicate the number of coolers in the shipment.

7.0 SAMPLE DOCUMENTATION TRACKING AND RECORD KEEPING

7.1 Field Data Worksheets

Documentation of observations and data from sampling provide important information about the sampling process and provide a permanent record for sampling activities. All observations and field sampling data will be recorded in waterproof ink on the Field Data Worksheets, which will be maintained on file at the Mill.

The Field Data Worksheets will contain the following information:

- Name of the site/facility
- description of sampling event
- location of sample (well name)
- sampler's name(s) and signature(s)
- date(s) and time(s) of well purging and sample collection
- type of well purging equipment used (pump or bailer)
- previous well sampled during the sampling event
- well depth
- depth to groundwater before purging and sampling
- results of in-field measurements (pH, specific conductance, water temperature)
- redox potential (Eh) measurements
- turbidity measurements
- calculated well casing volume
- volume of water purged before sampling
- volume of water purged when field parameters are measured
- type and condition of well pump
- description of samples taken
- sample handling, including filtration and preservation
- volume of water collected for analysis
- types of sample containers and preservatives
- weather conditions and external air temperature
- name of certified Analytical Laboratory.

The Field Data Worksheets will also contain detailed notes describing any other significant factors during the sampling event, including, as applicable: condition of the well cap and lock; water appearance, color, odor, clarity; presence of debris or solids; any variances from this Procedure; and any other relevant feature or condition. An example of a Field Data Worksheet that incorporates this information is provided as Appendix 1.

7.2 Chain-of-Custody and Analytical Request Record

Standard sample custody procedures will be used to maintain and document sample integrity during collection, transportation, storage, and analysis. A sample will be considered to be in custody if one of the following statements applies:

- It is in a person's physical possession or view.
- It is in a secure area with restricted access.

- It is placed in a container and secured with an official seal in such a way that the sample cannot be reached without breaking the seal.

COC procedures provide an accurate written record that traces the possession of individual samples from the time of collection in the field to the time of acceptance at the Analytical Laboratory. The COC form will also be used to document all samples collected and the analyses requested. Information that the field personnel will record on the COC form includes the following:

- Project name and number
- Sampling location
- Name and signature of sampler
- Destination of sample (Analytical Laboratory name)
- Sample ID
- Date and time of collection
- Number and type of containers filled
- Analyses requested
- Preservatives used (if applicable)
- Filtering (if applicable)
- Signatures of individuals involved in custody transfer, including the date and time of transfer
- Project contact and phone number

Field personnel will sign COC forms. The COC form will be placed in a waterproof plastic bag and taped to the inside of the shipping container used to transport the samples. Signed air bills will serve as evidence of custody transfer between field personnel and the courier, and between the courier and the Analytical Laboratory. Copies of the COC form and the air bill will be retained and filed by field personnel before the containers are shipped.

The Analytical Laboratory sample custodian will receive all incoming samples, sign the accompanying COC forms, and retain copies of the forms as permanent records. The Analytical Laboratory sample custodian will record all pertinent information concerning the samples, including the persons delivering the samples, the date and time received, sample condition at the time of receipt (e.g., sealed, unsealed, or broken container; temperature; or other relevant remarks), the sample IDs, and any unique Analytical Laboratory IDs for the samples. When the sample transfer process is complete, the custodian is responsible for maintaining internal log books, tracking reports, and other records necessary to maintain custody throughout sample preparation and analysis.

The Analytical Laboratory will provide a secure storage area for all samples. Access to this area will be restricted to authorized personnel. The custodian will ensure that samples requiring special handling, including samples that are heat- or light-sensitive, radioactive, or have other unusual physical characteristics, are properly stored and maintained pending analysis.

7.3 Record Keeping

The original Field Data Worksheets are maintained at the Mill site.

Electronic copies of the analyses from the Analytical Laboratory, showing the laboratory analytical results for the groundwater samples are maintained in the DUSA corporate offices. Hardcopies may be printed by the Mill Staff, however, the record copy is maintained in the DUSA corporate offices.

The State of Utah does not currently have a certification process for cryptosporidium analyses. An EPA-Approved laboratory from the December 17, 2010 revision of "Laboratories Approved for the Analysis of Cryptosporidium under the Safe Drinking Water Act" will be used for the analysis of cryptosporidium. NELAC and NAVLAP certification are not available for microbiology laboratories and as such does not apply to the cryptosporidium laboratory. All other analyses will be performed by Utah-certified laboratories.

Once all the data for the nitrate investigation is received, key data from the Field Data Worksheets and from the analytical data reports are maintained in a computer file. These computer files are maintained at the DUSA corporate offices.

8.0 ANALYTICAL PROCEDURES AND QA/QC

Analytical Laboratory QA provides a means for establishing consistency in the performance of analytical procedures and assuring adherence to analytical methods utilized. Analytical Laboratory QC programs include traceability of measurements to independent reference materials and internal controls.

8.1 Analytical Quality Control

Analytical QA/QC will be governed by the QA/QC program of the Analytical Laboratory as well as the analytical method. In choosing and retaining the Analytical Laboratory, DUSA will use Analytical Laboratories that are certified by the State of Utah and by NELAP and/or NAVLAP for perchlorate, HMX and RDX (if possible), are capable of performing the analytical procedures specified in Section 8.2, and have a QA/QC program that includes the analytical method QC requirements.

8.1.2 Spikes, Blanks and Duplicates

Analytical Laboratory QC samples will assess the accuracy and precision of the analyses. Following are descriptions of the types of QC samples that may be used by the Analytical Laboratory to assess the quality of the data. Analytical QC will be completed as required by the specific method used for analysis. Assessment of Analytical Laboratory QC samples will be as specified in the method. Cryptosporidium analysis is a microbiological qualitative analysis and as such some of the QC samples discussed below may not be applicable. QC for cryptosporidium will follow the EPA method.

a. Matrix Spike/Matrix Spike Duplicate
   A spiked field sample analyzed in duplicate may be analyzed with every analytical batch. Analytes stipulated by the analytical method, by applicable regulations, or by other specific requirements may be spiked into the samples. Selection of the sample to be spiked depends on the information required and the variety of conditions within a typical matrix. The matrix spike sample serves as a check evaluating the effect of the sample matrix on the accuracy of analysis. The matrix spike duplicate serves as a check of the analytical precision. Assessment of the matrix spike/matrix spike duplicate will be completed using the method- and Analytical Laboratory-established limits.

b. Method Blanks
Each analytical batch shall be accompanied by a method blank. The method blank shall be carried through the entire analytical procedure. Contamination detected in analysis of method blanks will be used to evaluate any Analytical Laboratory contamination of environmental samples which may have occurred. Method blank detections will be assessed to determine if there is any effect on the sample data usability. Method blank effects will be discussed and a determination made on a case-by-case basis.

c. Check Samples
Each analytical batch shall contain a number of check samples. For each method, the Analytical Laboratory will analyze the check samples or their equivalents specified in the analytical method. Check samples may include a laboratory control sample ("LCS"), calibration checks, laboratory fortified blanks, or sample duplicates. Check samples will be reviewed for compliance with the Analytical Laboratory and method-specified acceptance limits.

8.2 Analytical Laboratory Procedures

The analytical procedures to be used by the Analytical Laboratory for the nitrate investigation are specified in Revised Table 1.

9.0 INTERNAL QUALITY CONTROL CHECKS

Internal quality control checks are inherent in this Plan. The QA Manager will monitor the performance of the Sample and QC Monitors, and, to the extent practicable, the Analysis Monitor to ensure that they are following this Plan. In addition, either the QA Manager or a Sampling and QC Monitor will review and validate the analytical data generated by the Analytical Laboratory to ensure that it meets the DQOs established by this Plant. Finally, periodic system and performance audits will be performed, as detailed in Section 12 below.

9.1 Field QC Check Procedures

The QA Manager will perform the following QA/QC analysis of field procedures:

9.1.1 Review of Compliance With the Procedures Contained in this Plan

Observation of technician performance is monitored by the QA Manager on a periodic basis to ensure compliance with this Plan. Assessment of technician performance may be conducted through on-site observation or through review of field documentation.

9.1.2 Analyte Completeness Review

The QA Manager will review all analytical results to confirm that the analytical results are complete (i.e., there is an analytical result for each required constituent). The completeness goal for this project is 95%.

9.1.3 Blank Comparisons

Equipment rinsate samples will be compared with original sample results. Non-conformance conditions will exist when contaminant levels in the blank(s)/samples(s) are within an order of magnitude of the original sample result. (TEGD, Field QA/QC Program, page 119).

9.1.4 Duplicate Sample Comparisons

a) Relative Percent Difference

RPDs will be calculated in comparisons of duplicate and original field sample results. Non-conformance will exist when the RPD $\geq$ 20%, unless the measured activities are less than 5 times the required detection limit (Standard Methods, 1998) (EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994, 9240.1-05-01, p. 25).

b) Radiologics Counting Error

Samples collected during the nitrate investigation will not be analyzed for radiologic constituents and therefore this section does not apply.

c) Radiologics, Duplicate Samples

Samples collected during the nitrate investigation will not be analyzed for radiologic constituents and therefore this section does not apply.

9.2 Analytical Laboratory QA Reviews

All data will undergo a QC review which will include validating holding times and QC samples. Overall data assessment will be a part of the validation process as well.

The Analysis Monitor or data validation specialist will evaluate the quality of the data based on the analytical methods used. The reviewer will check the following: (1) sample preparation information is correct and complete, (2) analysis information is correct and complete, (3) appropriate Analytical Laboratory procedures are followed, (4) analytical results are correct and complete, (5) QC samples are within established control limits, (6) blanks are within QC limits, (7) special sample preparation and analytical requirements have been met, and (8) documentation is complete.

The Analytical Laboratory will prepare and retain full QC and analytical documentation. The Analytical Laboratory will report the data along with the QA/QC data. The Analytical Laboratory will provide the following information: (1) cover sheet listing samples included in report with a narrative, (2) results of compounds identified and quantified, and (3) reporting limits for all analytes. Also to be included are the QA/QC analytical results.

9.3 QA Manager Review of Analytical Laboratory Results and Procedures

a) Reporting Limit Comparisons

The QA Manager shall confirm that all reporting limits used by the Analytical Laboratory are in conformance with the reporting limits set out on Table 1. Non-conformance shall be defined as: 1) a reporting limit that violates these provisions, unless the reporting limit must be increased due to sample matrix interference (i.e., due to dilution gain);

b) Laboratory Methods Review

The QA Manager shall confirm that the analytical methods used by the Analytical Laboratory are those specified in Table 1.

c) Holding Time Examination

The QA Manager will review the analytical reports to verify that the holding time for each contaminant was not exceeded. Non-conformance shall be defined when the holding time is exceeded.

d) Sample Temperature Examination

The QA Manager shall review the analytical reports to verify that the samples were received by the Analytical Laboratory at a temperature no greater than the approved temperature listed in Table 1. Non-conformance shall be defined when the sample temperature is exceeded.

9.4 Analytical Data

All QA/QC data and records required by the Analytical Laboratory's QA/QC program shall be retained by the Analytical Laboratory and shall be made available to DUSA as requested.

10.0 CORRECTIVE ACTION

10.1 When Corrective Action is Required

The Sampling and QC Monitors and Analytical Laboratory are responsible for following procedures in accordance with this Plan. Corrective action should be taken for any procedure deficiencies or deviations noted in this Plan. All deviations from field sampling procedures will be noted on the Field Data Worksheets or other applicable records. Any QA/QC problems that arise will be brought to the immediate attention of the QA Manager. Analytical Laboratory deviations will be recorded by the Analysis Monitor in a logbook as well.

Non-conformance will be handled as follows:

a) When non-conformance occurs as specified in Sections 9.1.3, 9.1.4 or 9.3, the data may be qualified to denote the problem
b) When a sample is lost, sample container broken, or the sample or analyte was omitted, resample within 10 days of discovery and analyze again in compliance with all requirements of this Plan.

11.0 REPORTING

Reporting of the nitrate investigation results will be completed as described in the schedule contained in the Phase 2 Nitrate Detailed Work Plan and Schedule.

12.0 SYSTEM AND PERFORMANCE AUDITS

12.1 QA Manager to Perform System Audits and Performance Audits

DUSA may perform system and performance audits in order to ensure that data of known and defensible quality are produced during a sampling program. The frequency and timing of system and performance audits shall be as determined by DUSA.

12.2 Systems Audits

System audits are qualitative evaluations of all components of field and Analytical Laboratory QC measurement systems. They determine if the measurement systems are being used appropriately. System audits may review field and Analytical Laboratory operations, including sampling equipment, laboratory equipment, sampling procedures, and equipment calibrations, to evaluate the effectiveness of the QA program and to identify any weakness that may exist. The audits may be carried out before all systems are operational, during the program, or after the completion of the program. Such audits typically involve a comparison of the activities required under this Plan with those actually scheduled or performed. A special type of systems audit is the data management audit. This audit addresses only data collection and management activities.

12.3 Performance Audits

The performance audit is a quantitative evaluation of the measurement systems of a program. It requires testing the measurement systems with samples of known composition or behavior to evaluate precision and accuracy. With respect to performance audits of the analytical process, either blind performance evaluation samples will be submitted to the Analytical Laboratory for analysis, or the auditor will request that it provide results of the blind studies that the Analytical Laboratory must provide to its NELAP and/or NAVLAP accreditation agency on an annual basis. The performance audit is carried out without the knowledge of the analysts, to the extent practicable.

12.4 Follow-Up Actions

Response to the system audits and performance audits is required when deviations are found and corrective action is required. Where a corrective action is required, the steps set out in Section 10.2 will be followed.

12.5 Audit Records

Audit records for all audits conducted will be retained in Mill Central Files. These records will contain audit reports, written records of completion for corrective actions, and any other documents associated with the audits supporting audit findings or corrective actions.

13.0 PREVENTIVE MAINTENANCE

Preventive maintenance concerns the proper maintenance and care of field and laboratory instruments. Preventive maintenance helps ensure that monitoring data generated will be of sufficient quality to meet QA objectives. Both field and laboratory instruments have a set maintenance schedule to ensure proper functioning of the instruments.

Field instruments will be maintained as per the manufacturer's specifications and established sampling practice. Field instruments will be checked and calibrated prior to use, in accordance with Section 5. Batteries will be charged and checked daily when these instruments are in use. All equipment out of service will be immediately replaced. Field instruments will be protected from adverse weather conditions during sampling activities. Instruments will be stored properly at the end of each working day.

Calibration and maintenance problems encountered will be recorded in the Field Data Worksheets or logbook.

The Analytical Laboratory is responsible for the maintenance and calibration of its instruments in accordance with Analytical Laboratory procedures and as required in order to maintain its NELAP and/or NAVLAP certifications. Preventive maintenance will be performed on a scheduled basis to minimize downtime and the potential interruption of analytical work.

14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

14.1 Ongoing QA/QC Reporting

The following reporting activities shall be undertaken on a regular basis:

a) The Sample and QC Monitors shall report to the QA Manager regularly regarding progress of the applicable sampling program. The Sample and QC Monitors will also brief the QA Manager on any QA/QC issues associated with such sampling activities.

b) The Analytical Laboratory shall maintain detailed procedures for laboratory record keeping. Each data set report submitted to the Mill's QA Manager or his staff will identify the analytical methods performed and all QA/QC measures not within the established control limits. Any QA/QC problems will be brought to the QA Manager's attention as soon as possible; and

c) After sampling has been completed and final analyses are completed and reviewed, a brief data evaluation summary report will be prepared by the Analytical Laboratory for review by the QA Manager, by a Sampling and QC Monitor or by such other qualified person as may be designated by the QA Manager. The report will be prepared in accordance with NELAP and/or NAVLAP requirements and will summarize the data validation efforts and provide an evaluation of the data quality.

14.2 Periodic Reporting to Management

Periodic reports to management as described in the UDEQ-approved QAP are not applicable to this nitrate investigation. The nitrate investigation described herein will be assessed as part of the entire sampling program as part of an annual assessment. Assessments and specific reporting resulting from the implementation of this nitrate investigation are discussed throughout this plan and the Phase 2 Nitrate Detailed Work Plan and Schedule.

15.0 AMENDMENT

Amendment of this plan may be made to accommodate field conditions noted during sampling. Amendments to this plan will be documented on the Field Data Sheets, logbooks or both as applicable. Field conditions which prompted the changes will be fully described so as to properly document and describe the site conditions.

16.0 REFERENCES

American Public Health Association. 1998. Standard Methods for the Examination of Water and Wastewater.

Denison Mines (USA) Corp. 2010. White Mesa Uranium Mill Groundwater Monitoring Quality Assurance Plan, Revision 6.

State of Utah, Division of Water Quality, Department of Environmental Quality, Utah Water Quality Board. 2011. Groundwater Discharge Permit Number UGW370004. February 15.

———. 1999. State of Utah Notice of Violation and Corrective Action Order, UDEQ Docket No. UGO-20-01.

U.S. Environmental Protection Agency (EPA). 1986. "RCRA Ground-Water Monitoring Technical Enforcement Guidance Document." Office of Waste Programs Enforcement, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency. Washington, DC, EPA/530/SW-86/055. September.

———. 1992. "RCRA Ground-Water Monitoring: Draft Technical Guidance." Office of Solid Waste, U.S. Environmental Protection Agency. Washington, DC. November.

———. 1994a. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods." U.S. Environmental Protection Agency Publication SW-846, Third Ed., Chapter 1, Section 5.

———. 1994b. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, 9240.1-05-01." Office of Emergency and Remedial Response, U.S. Environmental Protection Agency. Washington, DC, EPA 540/R-94/013. February. P. 25.

———. 2007. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods." U.S. Environmental Protection Agency Publication SW-846, Fourth Ed.

———. 2005. "Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA." Office of Water (4607), U.S. Environmental Protection Agency. Washington, DC, EPA 815-R-05-002. December.

———. 2010. "Laboratories Approved for the Analysis of Cryptosporidium Under the Safe Drinking Water Act." July 16.

Revised Table 1
Analytical Methods, Reporting Limits Holding Times, Preservation, Temperature and Volume Requirements for Phase 2 of the Nitrate Investigation

Contaminant	Analytical Methods to be Used	Reporting Limit[1]	Maximum Holding Times	Chemical Sample Preservation Requirements	Sample Temperature Requirements	Minimum Volume/Sample Container*
Explosives (RDX and HMX)	EPA 8330[2]	0.1 ug/L	7 days to extraction/40 days for extract	None	$\leq 6^{\circ}C$	3 – 1 liter amber glass bottles
Perchlorate	EPA 6850[2]	0.5 ug/L	28 days	None	$\leq 10^{\circ}C$	1 – 250 ml. polyethylene
Cryptosporidium[3]	1623[4]	NA	96 hours until filtration	None	$\leq 20^{\circ}C$	1 – 10 liter cubitainer

*Sample containers will be provided by the Analytical Laboratory. Volume requirements listed above are the minimum volumes. The laboratory may request additional volume or containers.

[1] The Analytical Laboratory will be required to meet the reporting limits ("RLs") in the foregoing Table, unless the RL must be increased due to sample matrix interference (i.e., due to dilution gain), in which case the increased RL will be used.

[2] Method 8330 and 6850 are from EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

[3] Cryptosporidium analyses will be completed by Energy Laboratories in Casper Wyoming..

[4] Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, EPA Office of Water (4607), EPA 815-R-05-002, December 2005.

Table 2 Groundwater Sample Locations

Well ID	Sample ID	Duplicate/MS/MSDLocation ID	Analytes[1]
Campaign 1			
TWN-2	TWN-2	X	Cryptosporidium Perchlorate Explosives (RDX and HMX)
TW4-22	TW4-22		Cryptosporidium Perchlorate Explosives (RDX and HMX)
MW-19	MW-19		Perchlorate
MW-20	MW-20		Perchlorate
MW-27	MW-27		Perchlorate
MW-30	MW-30		Perchlorate
MW-31	MW-31		Perchlorate
TWN-9	TWN-9		Perchlorate
TWN-17	TWN-17		Perchlorate
TWN-19	TWN-19		Perchlorate
TW4-1	TW4-1		Perchlorate
TW4-24	TW4-24		Perchlorate
DIFB	DIFB		Perchlorate
Campaign 2 (if needed)			
MW-19	MW-19		Cryptosporidium Explosives (RDX and HMX)
MW-20	MW-20		Cryptosporidium Explosives (RDX and HMX)
MW-27	MW-27		Cryptosporidium Explosives (RDX and HMX)
MW-30	MW-30		Cryptosporidium Explosives (RDX and HMX)
MW-31	MW-31		Cryptosporidium Explosives (RDX and HMX)
TWN-2	TWN-2		Cryptosporidium Explosives (RDX and HMX)
TWN-9	TWN-9		Cryptosporidium Explosives (RDX and HMX)
TWN-17	TWN-17		Cryptosporidium Explosives (RDX and HMX)
TWN-19	TWN-19		Cryptosporidium Explosives (RDX and HMX)
TW4-1	TW4-1		Cryptosporidium Explosives (RDX and HMX)
TW4-24	TW4-24	X	Cryptosporidium Explosives (RDX and HMX)
DIFB	MW-60		Cryptosporidium Explosives (RDX and HMX)
Background Wells – Campaign 2			
TWN-8	TWN-8		Cryptosporidium Explosives (RDX and HMX) Perchlorate

Well ID	Sample ID	Duplicate/MS/MSDLocation ID	Analytes[1]
TWN-11	TWN-11		Cryptosporidium Explosives (RDX and HMX) Perchlorate
TWN-13	TWN-13		Cryptosporidium Explosives (RDX and HMX) Perchlorate
TWN-15	TWN-15		Cryptosporidium Explosives (RDX and HMX) Perchlorate
TWN-16	TWN-16		Cryptosporidium Explosives (RDX and HMX) Perchlorate
MW-1	MW-1		Cryptosporidium Explosives (RDX and HMX) Perchlorate
MW-2	MW-2		Cryptosporidium Explosives (RDX and HMX) Perchlorate
MW-3	MW-3		Cryptosporidium Explosives (RDX and HMX) Perchlorate
MW-12	MW-12		Cryptosporidium Explosives (RDX and HMX) Perchlorate
MW-18	MW-18	X	Cryptosporidium Explosives (RDX and HMX) Perchlorate

[1] Analytical methods, sample volumes, containers and preservation are listed in Table 1.

Duplicate samples will be labeled as MW-65 or MW-70.

Duplicate samples and extra volume for MS/MSD analyses may be collected from alternate wells if insufficient volume is unavailable after purging. The decision to move a duplicate sample/extra volume for MS/MSD will be made in the field based on field conditions and will be documented in the field notes. Cryptosporidium samples are not analyzed for MS/MSD and as such this does not apply to the cryptosporidium samples.

Appendix 1
Field Data Work Sheet

DENISON MINES

ATTACHMENT 1
WHITE MESA URANIUM MILL
FIELD DATA WORKSHEET FOR GROUND WATER

Attachment 1

See instruction

Description of Sampling Event:

Location (well name):

Sampler Name and initials:

Date and Time for Purging

and Sampling (if different)

Well Purging Equip Used: ☐ pump or ☐ bailer

Well Pump (if other than Bennet)

Sampling Event

Prev. Well Sampled in Sampling Event

pH Buffer 7.0

pH Buffer 4.0

Specific Conductance μMHOS/ cm

Well Depth(0.01ft):

Depth to Water Before Purging

Casing Volume (V) 4" Well: (.653h)
3" Well: (.367h)

Conductance (avg)

pH of Water (avg)

Well Water Temp. (avg)

Redox Potential (Eh)

Turbidity

Weather Cond.

Ext'l Amb. Temp. °C (prior sampling event)

Time		Gal. Purged	
Conductance		pH	
Temp. °C			
Redox Potential Eh (mV)			
Turbidity (NTU)			

Time		Gal. Purged	
Conductance		pH	
Temp. °C			
Redox Potential Eh (mV)			
Turbidity (NTU)			

Time		Gal. Purged	
Conductance		pH	
Temp. °C			
Redox Potential Eh (mV)			
Turbidity (NTU)			

Time		Gal. Purged	
Conductance		pH	
Temp. °C			
Redox Potential Eh (mV)			
Turbidity (NTU)			

Volume of Water Purged [ ] gallon(s)

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = [ ]

Time to evacuate two casing volumes (2V)
T = 2V/Q = [ ]

Number of casing volumes evacuated (if other than two) [ ]

If well evacuated to dryness, number of gallons evacuated [ ]

Name of Certified Analytical Laboratory if Other Than Energy Lab[ ]

Type of Sample	Sample Taken		Sample Vol (indicate if other than as specified below)	Filtered		Preservative Type	Preservative Added	
	Y	N		Y	N		Y	N
VOCs	☐	☐	3x40 ml	☐	☐	HCL	☐	☐
Nutrients	☐	☐	100 ml	☐	☐	H2SO4	☐	☐
Heavy Metals	☐	☐	250 ml	☐	☐	HNO3	☐	☐
All Other Non Radiologics	☐	☐	250 ml	☐	☐	No Preserv.	☐	☐
Gross Alpha	☐	☐	1,000 ml	☐	☐	HNO3	☐	☐
Other (specify)	☐	☐	Sample volume	☐	☐		☐	☐

If preservative is used, specify Type and Quantity of Preservative:

_____

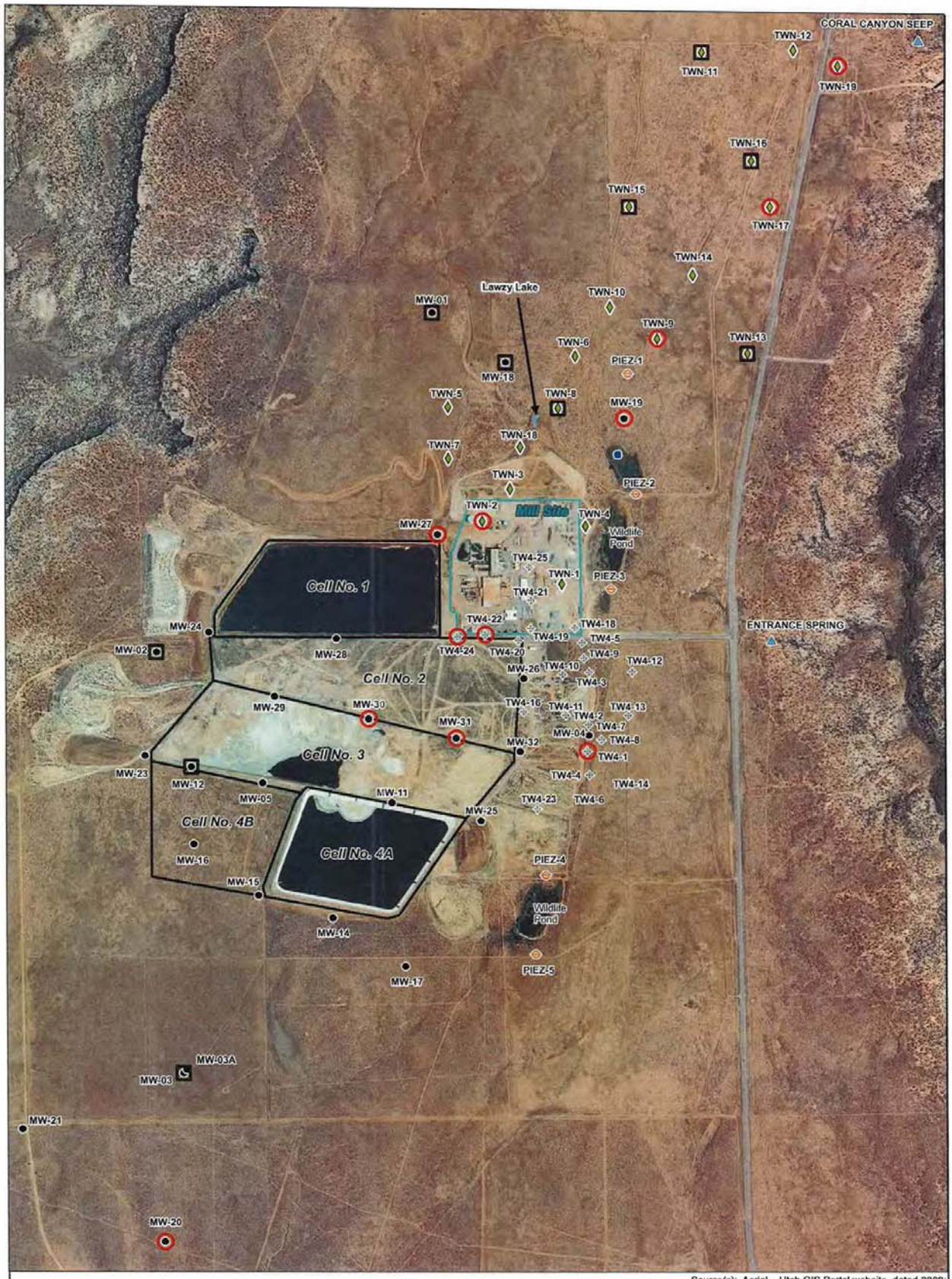
See instruction

Comment

[ ]

[ ] Do not touch this cell (SheetName)

Figure



Source(s): Aerial – Utah GIS Portal website, dated 2009; Wells – HGC, Inc., May 2008 report.

N

S

1,000 500 0 1,000 Feet

Legend

- Wells used in Phase 2 Groundwater Sampling
- Background Well
- Monitoring Well
- Piezometer
- Spring/Seep
- Surface Water
- Chloroform Monitoring Well
- Nitrate Monitoring Well

INTERA

Figure 1
Phase 2 Groundwater Sampling Locations
Nitrate Investigation Revised Phase 2-5 Work Plan

S:\Projects\UC-001-01-001 Denison Mines\GIS\mapdocs\2011_Phase2-5\QAP\Figure1_Ph2gwSampleLocsBG.mxd