State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF RADIATION CONTROL
Rusty Lundberg
Director

July 12, 2012

CERTIFIED MAIL
(Return Receipt Requested)

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

Subject: Stipulated Consent Agreement, Docket No. UGW12-03

Dear Mr. Frydenlund:

A copy of the duly executed Stipulated Consent Agreement, Docket No. UGW12-03 (SCA) is enclosed. The SCA is dated and effective as of July 12, 2012.

Please contact Tom Rushing at (801) 536-0080 if you have any questions regarding this matter.

Sincerely,

Rusty

Rusty Lundberg
Director

Enclosure: Stipulated Consent Agreement Docket No. UGW12-03

RL:TR:tr

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UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

IN THE MATTER OF **DENISON MINES (USA) CORP.** **1050 17th Street, SUITE 950** **DENVER, COLORADO 80265**	**STIPULATED CONSENT AGREEMENT** **DOCKET No. UGW12-03**

A. STATUTORY AUTHORITY

This **STIPULATION AND CONSENT AGREEMENT (AGREEMENT)** is between Denison Mines (USA) Corp. (**DUSA**) and the Director of the Utah Division of Radiation Control[1] (**DIRECTOR**) under the Utah Water Quality Act, Utah Code Ann. (UCA) §§ 19-5-101 to 19-5-124 (the **ACT**), including sections 19-5-104, -106, -111 and -115. This **AGREEMENT** is also executed in accordance with the Utah Administrative Procedures Act, Utah Code Ann. §§ 63G4-101 to -601 and Administrative Procedure Rules, Utah Admin Code R305-6.

Under the Water Quality Act, Utah Code Ann. Title 19, Chapter 5, "Director" for purposes of groundwater quality at a facility licensed by and under the jurisdiction of the Division of Radiation Control, means the Director of the Division of Radiation Control. Utah Code Ann. § 19-5-102(6).

The **DIRECTOR** may enforce rules made by the Water Quality Board in accordance with Utah Code Ann. § 19-5-106(2)(d)

B. APPLICABLE STATUTORY AND REGULATORY PROVISIONS

1. Utah Code Ann. § 19-5-107(1)(a) requires that:

   "Except as provided in this chapter or rules made under it, it is unlawful for any person to discharge a pollutant into waters of the state or to cause pollution which constitutes a menace to public health and welfare, or is harmful to wildlife, fish or aquatic life, or impairs domestic, agricultural, industrial, recreational, or other beneficial uses of water, or to place or cause to be placed any wastes in a location where there is probable cause to believe it will cause pollution."

2. **DUSA** was issued Utah Ground Water Quality Discharge Permit No. UGW370004 (Permit) on March 8, 2005. Said Permit was modified by the **DIRECTOR** on March 17, 2008, January 20, 2010, June 17, 2010, February 15, 2011 and was last modified on July 14, 2011.

3. The **DIRECTOR** issued DUSA a May 9, 2011 Notice of Violation and Compliance Order, Docket No. UGW11-02 (NOV) for multiple violations of the Permit, including violations of UCA § 19-5-107 and Part I.G.1 of the Permit for exceeding Permit Ground Water Concentration Limits (GWCL's) in Table 2 of the Permit for two consecutive sampling events (out-of-compliance status), and Part I.G.4(c) of the Permit for failing to subsequently submit required reports and to conduct required source assessment activities

[1] Effective May 8, 2012 and in accordance with Utah Code Ann. § 19-1-105 the title "Executive Secretary" was changed to "Division Director."

for wells/monitoring parameters in out-of-compliance status.

4. Part E.2 of the NOV required **DUSA** to submit a report with revised statistics for Field pH for several of the facility ground water monitoring wells on or before June 30, 2011. This requirement was included to address out-of-compliance status for pH at several ground water monitoring wells, and as per a **DUSA** February 1, 2011, letter notifying the **DIRECTOR** that the out-of-compliance status appeared to be due to the Permit GWCL's being based on historic laboratory results instead of field measurements.

C. FINDINGS OF FACT

1. **DUSA** receives and processes natural uranium-bearing ores, including certain specified alternate feed materials, and possesses byproduct material in the form of uranium waste tailings and other uranium byproduct waste generated by the Licensee's milling operations. This facility is located approximately six (6) miles south of Blanding, Utah on White Mesa in Sections 28, 29, 32 and 33, Township 37 South, Range 22 East, Salt Lake Baseline and Meridian, San Juan County, Utah.

2. Part E.2 of the NOV required **DUSA** to submit a report with revised statistics for Field pH for several of the facility ground water monitoring wells on or before June 30, 2011. This requirement was included to address out-of-compliance status for pH at several ground water monitoring wells, and as per a **DUSA** February 1, 2011 letter notifying the **DIRECTOR** that the out-of-compliance status appeared to be due to the Permit GWCL's being based on historic laboratory results instead of field measurements.

3. In response to the NOV, **DUSA** submitted several documents to provide updates and work plans to investigate the out-of-compliance wells/monitoring parameters (and updates regarding the revised pH statistics) in order to comply with the Act, Permit and NOV. A summary of the pertinent updates and documents follows:

   A) The pH study was not provided according to timelines set in the NOV. On June 30, 2011, **DUSA** e-mailed the **DIRECTOR** requesting an extension of the submittal date. This request included a summary of the suspected root cause of pH exceedences, a discussion of actions taken and recommended future actions. Based on **DUSA's** request, the **DIRECTOR** concurred that additional coordination was needed in order to agree upon elements of additional pH study related to the apparent decreasing trends.

   B) **DUSA** submitted a Plan and Time Schedule dated June 13, 2011 for violations cited in the NOV for the 1st, 2nd, 3rd and 4th quarters of 2010 and also included actions for GWCL exceedences in the 1st quarter of 2011.

   C) **DUSA** submitted a Plan and Time Schedule dated September 7, 2011 for out-of-compliance parameters in the 2nd quarter 2011.

   D) **DUSA** submitted a Plan and Time Schedule dated January 20, 2012, for

assessment of pH under Utah Groundwater Discharge Permit UGW370004.

E) **DUSA** submitted a Plan and Time Schedule dated April 13, 2012, for assessment of pH under Utah Groundwater Discharge Permit UGW370004 (Revised based on e-mail and telephone communication between representatives of **DUSA** and the Division of Radiation Control).

4. Corrective action for the out of compliance wells/parameters will be in accordance with the terms of this **AGREEMENT**, and based on outlined studies, objectives and schedules in the **DUSA** Plan and Time Schedules (dated June 13, 2011, September 7, 2011, and April 13, 2012). If future information indicates that this agreed upon course of action is inadequate, additional measures may be required by the **DIRECTOR** through separate correspondence or formal enforcement action as deemed appropriate. **DUSA** retains all administrative and judicial rights to appeal or otherwise contest such action(s).

D. AGREEMENT

1. **DUSA** will complete an investigation of the causes of out-of-compliance parameters and decreasing pH trends according to "Plan and Time Schedule" documents dated June 13, 2011, September 7, 2011 and April 13, 2012 (Included as Attachments A, B, and C of this SCA respectively). DUSA shall follow all elements of the Plan and Time Schedule Documents, as modified below, and further agrees that:

   A) A sample of existing cuttings and/or core will be submitted for laboratory analysis of pyrite for each of the monitoring wells listed on Table 5 of the April 13, 2012 Plan and Time Schedule, regardless of the results of visual examination and XRF screening. Each such cutting and/or core sample will be collected from within the vertical portion corresponding to the screened interval of the well. All other provisions of the April 13, 2012 Plan and Time Schedule remain unchanged, except for certain modifications of deliverable timelines as detailed below.

2. **DUSA** will submit a source assessment report for all activities outlined in the **DUSA** June 13, 2011, Plan and Time Schedule to the **DIRECTOR** within 90 calendar days of the effective date of this **AGREEMENT.** The source assessment report will detail the results of all analysis performed and the conclusions drawn from the analyses, including any proposed revisions to existing GWCL's. The source assessment report will also identify any further studies that the analysis indicates should be performed, and will propose, for **DIRECTOR** review and approval a plan and time schedule for completion of any such additional studies (*per the June 13, 2011, **DUSA** Plan and Time Schedule, with modification as to time for submittal).*

3. **DUSA** will submit a source assessment report for all activities outlined in the **DUSA** September 7, 2011 Plan and Time Schedule to the **DIRECTOR** within 90 calendar days following the effective date of this **AGREEMENT**. The source assessment report will detail the results of all analysis performed and the conclusions drawn from the analyses, including any proposed revisions to existing GWCL's. The source assessment report may be combined with the source assessment report required for the June 13, 2011, Plan and Time Schedule (Agreement 2 above). The source assessment report will also identify any further studies that the analysis indicates should be performed, and will propose for

DIRECTOR review and approval a plan and time schedule for completion of any such additional studies (*per the September 7, 2011, **DUSA** Plan and Time Schedule, with modification as to time for submittal).*

4. During the pH investigation activities, **DUSA** will provide a written notice to the **DIRECTOR** at least 14 calendar days prior to all collection of core and/or cuttings samples for pyrite analysis. **DUSA** will allow the **DIRECTOR** the opportunity to inspect the collection of these samples.
5. **DUSA** will submit a report to the **DIRECTOR** within 150 calendar days following the effective date of this **AGREEMENT** which describes the screening, selection and submission of samples, the results of the sample screening process and the visual and analytical methods employed. The report will provide the visual and analytical results and will include an assessment of the results with regard to the potential for pyrite oxidation to affect pH at site perched monitoring wells (*per the April 13, 2012, **DUSA** Plan and Time Schedule, with modification as to time for submittal).*
6. **DUSA** will submit a report to the **DIRECTOR** within 120 calendar days of the effective date of this **AGREEMENT** which provides statistical analysis of pH in all wells at the Mill site which will quantify the decreasing trends in pH at the site as a whole and indicate which monitoring wells have significant decreasing trends in pH. **DUSA** will follow the *Groundwater Data Preparation and Statistical Process Flow Chart for Calculating Groundwater Protection Standard, White Mesa Mill Site, San Juan County, Utah*, included as figure 17 in the New Wells Background Report (*per the April 13, 2012, **DUSA** Plan and Time Schedule, with modification as to time for submittal).*
7. If it is determined by the **DIRECTOR** that further analysis is required after **DIRECTOR** review of the Source Assessment Reports, required by parts 2 and 3 above, **DUSA** will conduct the additional assessments in a timely manner and as approved by the **DIRECTOR**.

E. STIPULATED PENALTIES

DUSA agrees to pay stipulated penalty amounts for not complying with this **AGREEMENT**. If **DUSA** fails to comply with the agreements above, DUSA agrees to pay the stipulated amounts set forth below:

1. If **DUSA** fails to meet any of the agreed upon timelines for submissions of reports or field work notification mandated by this **AGREEMENT**, **DUSA** agrees to pay stipulated penalties in the amount of $500 per calendar day per violation.
2. If the **DIRECTOR** determines that any of the required reports listed in the **AGREEMENT** above have omitted any information or content requirements or failed to provide any of the study elements, performance standards or objectives mandated by the **AGREEMENT,** (e.g. failure to provide full statistical analysis for revised GWCL's where applicable), the **DIRECTOR** will advise **DUSA** by written notice and **DUSA** will be required to remedy such omissions or failures on or before a due date as determined appropriate by the **DIRECTOR**. If **DUSA** fails to remedy such omissions or failures on or before the due date, **DUSA** agrees to pay stipulated penalties in the amount of $500 per

calendar day for every day a required report remains incomplete.

3. **DUSA** agrees to pay any required penalties within 30 calendar days of written notice from the **DIRECTOR**, in the form of a check, made payable to the State of Utah, and delivered or mailed to:

   Division of Radiation Control
   Utah Department of Environmental Quality
   P.O. Box 144850
   195 North 1950 West
   Salt Lake City Utah, 84114-4850

F. NOTICE

Compliance with the provisions of this **ORDER** is mandatory. Providing false information may subject **DUSA** to further civil penalties or criminal fines.

UCA § 19-5-115 provides that a violation of the ACT or a related order may be subject to a civil penalty of up to $10,000 per day of violation. Under certain circumstances of willfulness or gross negligence, violators may be fined up to $25,000 per day of violation.

AGREED to this 12th day of July, 2012.

DENISON MINES (USA) CORP.

By _____
David C. Frydenlund
Vice President and Counsel
Denison Mines (USA) Corp.

UTAH DIVISION OF RADIATION CONTROL

By _____
Rusty Lundberg
Director

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Attachment A:

DUSA Transmittal of Plan and Time Schedule under Utah Ground Water Discharge Permit UGW370004 Part I.G.4(d), June 13, 2011

WHITE MESA MILL

State of Utah Ground Water Discharge Permit UGW370004

Plan and Time Schedule

Under Part I.G.4 (d)

For

Violations of Part I.G.2 for Constituents in the First, Second, Third and Fourth Quarters of 2010 and First Quarter of 2011.

Denison Mines (USA) Corp.

1050 17th St., Suite 950

Denver, CO 80265

June 13, 2011

1. INTRODUCTION

Denison Mines (USA) Corp. ("Denison") operates the White Mesa Uranium Mill (the "Mill"), located near Blanding Utah, under State of Utah Ground Water Discharge Permit UGW370004 (the "Permit").

This is the plan and time schedule (the "Plan") required under Part I.G.4(c) of the Permit relating to violations of Part I.G.2 of the Permit for the 1st, 2nd, 3rd and 4th quarters of 2010 and the first quarter of 2011. Part I.G.2 of the Permit provides that out-of-compliance status exists when the concentration of a pollutant in two consecutive samples from a compliance monitoring point exceeds a ground water compliance limit ("GWCL") in Table 2 of the Permit.

The Permit was originally issued in March, 2005, at which time GWCLs were set on an interim basis, based on fractions of State Ground Water Quality Standards or the equivalent, without reference to natural background at the Mill site. The Permit also required that Denison prepare a background groundwater quality report to evaluate all historic data for the purposes of establishing background groundwater quality at the site and developing GWCLs under the Permit.

As required by then Part I.H.3 of the Permit, DUSA submitted the following to the Co-Executive Secretary (the "Executive Secretary") of the State of Utah Water Quality Board:

- A *Revised Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah*, October 2007, prepared by INTERA, Inc. (the "Existing Wells Background Report");

- A *Revised Addendum: -- Evaluation of Available Pre-Operational and Regional Background Data, Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah*, November 16, 2007, prepared by INTERA, Inc. (the "Regional Background Report"); and

- A *Revised Addendum: -- Background Groundwater Quality Report: New Wells For Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah,* April 30, 2008, prepared by INTERA, Inc. (the "New Wells Background Report, and together with the Existing Wells Background Report and the Regional Background Report, the "Background Reports").

Based on a review of the Background Reports and other information and analyses the Executive Secretary re-opened the Permit and modified the GWCLs to be equal to the mean concentration of background for each constituent on an intrawell basis plus two standard deviations or the equivalent. The modified GWCLs became effective on January 20, 2010.

The Executive Secretary issued a Notice of Violation and Compliance Order, Docket No. UGW11-02 (the "Notice"), dated May 9, 2011, based on the State of Utah Department of Environmental Quality ("UDEQ"), Division of Radiation Control ("DRC") findings from the review of the Mill's 1st, 2nd and 3rd quarter 2010 Groundwater Monitoring Reports. The Notice

cited five violations of the Permit, including a violation under Utah Water Quality Act (UC 19-5-107) and Parts I.C.1 of the Permit for failing to protect the waters of the state in that six contaminants have exceeded their respective GWCLs in Table 2 of the Permit for two consecutive sampling events.

Section E.4 of the Notice orders Denison to prepare and submit within 30 calendar days of receipt of the Notice, a written plan and time schedule, for Executive Secretary approval, to fully comply with the requirements of Part I.G.4(c) of the Permit, including, but not limited to:

(i) submittal of a written assessment of the source(s) of the six contaminants and multiple wells listed in Table 3 of the Notice, including: Cadmium, Manganese, Selenium, Thallium, Uranium , and Total Dissolved Solids ("TDS");

(ii) submittal of a written evaluation of the extent and potential dispersion of said groundwater contamination; and

(iii) submittal of a written evaluation of any and all potential remedial actions to restore and maintain ground water quality at the facility, for the point of compliance wells and contaminants in question, to ensure that: 1) shallow groundwater quality at the facility will be restored and 2) the contaminant concentrations in said point of compliance wells will be returned to and maintained in compliance with their respective GWCLs.

On February 14, 2011 Denison submitted a notice (the "4th Quarter 2010 Exceedance Notice") to the Executive Secretary under Part I.G.1(a) of the Permit providing notice that the concentrations of specific constituents in the monitoring wells at the Mill exceeded their respective GWCLs for the 4th quarter of 2010 and indicating which of those constituents had two consecutive exceedances during that quarter

On May 13, 2011 Denison submitted a notice (the "1st Quarter 2011 Exceedance Notice") to the Executive Secretary under Part I.G.1(a) of the Permit providing notice that the concentrations of specific constituents in the monitoring wells at the Mill exceeded their respective GWCLs for the 1st quarter of 2011 and indicating which of those constituents had two consecutive exceedances during that quarter. Some constituents had two consecutive exceedances during the 1st quarter of 2011 that had not already been properly identified as having had two consecutive exceedances in the 1st, 2nd or 3rd quarters of 2010, as identified in the Notice, or in the 4th quarter of 2010, as identified in the 4th Quarter 2010 Exceedance Notice.

Although not subject to the Notice, this Plan also covers the constituents in violation of Part I.G.2 of the Permit that were identified as being in violation in the 4th Quarter 2010 Exceedance Notice and/or the 1st Quarter 2011 Exceedance Notice.

2. CONSTITUENTS AND WELLS SUBJECT TO THIS PLAN

The following constituents and wells have been identified in the Notice, the 4th Quarter 2010 Exceedance Notice and/or the 1st Quarter 2011 Exceedance Notice as being in out-of-compliance status under Part I.G.2 of the Permit[1]:

Table 1
Constituents and Wells Subject to this Plan

Constituent	Monitoring Event	POC Well	GWCL	Result
Cadmium	2nd Qtr, 2010 (5/6/2010) 3rd Qtr 2010 (9/21/2010) 4th Qtr 2010 (11/17/2010) 1st Qtr 2011 (2/10/2011)	MW-24	2.5 µg/L	4.28 µg/L 5.06 µg/L 3.22 µg/L 2.78 µg/L
Manganese	1st Qtr 2010 (2/10/2010) 2nd Qtr 2010 (4/28/2010) October 2010 (10/20/2010) 4th Qtr 2010 (11/11/2010) December 2010 (12/15/2010)	MW-11	131 µg/L	134 µg/L 137 µg/L 141 µg/L 133 µg/L 158 µg/L
Selenium	2nd Qtr 2010 (4/27/2010) 3rd Qtr 2010 (9/20/2010) 4th Qtr 2010 (11/19/2010) 1st Qtr 2011 (2/15/2011)	MW-12	25 µg/L	25.7 µg/L 31.9 µg/L 27.6 µg/L 39 µg/L
	2nd Qtr 2010 (4/27/2010) August 2010 (8/24/2010) January 2011 (1/10/2011) 1st Qtr 2011 (2/1/2011)	MW-30	34 µg/L	35.3 µg/L** 35.6 µg/L** 36.2 µg/L 34.7 µg/L
	4th Qtr 2010 (11/19/2010) 1st Qtr 2011 (2/15/2011)	MW-3	37 µg/L	38.8 µg/L 40.5 µg/L
	4th Qtr 2010 (11/22/2010) 1st Qtr 2011 (2/16/2011)	MW-3A	89 µg/L	94.8 µg/L 99 µg/L
Thallium	January 2010 (1/27/2010)* March 2010 (3/22/2010)* 2nd Qtr 2010 (5/4/2010) 3rd Qtr 2010 (9/15/2010) 4th Qtr 2010(11/18/2010) 1st Qtr 2011 (2/15/2011)	MW-18	1.95 µg/L	3.32 µg/L* 3.91 µg/L* 3.73 µg/L 3.64 µg/L 3.57 µg/L 3.49 µg/L
	2nd Qtr 2010 (5/6/2010) 3rd Qtr 2010 (9/21/2010) 4th Qtr 2010 (11/17/2010) 1st Qtr 2011 (2/10/2011)	MW-24	1.0 µg/L	1.3 µg/L 1.57 µg/L 1.09 µg/L 1.42 µg/L
Uranium	1st Qtr 2010 (2/2/2010)	MW-26	41.8 µg/L	58.7 µg/L

[1] Table 1 includes the results indicated on the Notice for the constituents in question plus any additional consecutive exceedances generated from the 4th quarter 2010 and/or the 1st quarter 2011 results. It does not include every exceedance of the GWCLs for those periods.

	2nd Qtr 2010 (4/22/2010)			66.7 µg/L
	4th Qtr 2010 (11/11/2010) 1st Qtr 2011 (2/14/2011)	MW-5	7.5 µg/L	11.6 µg/L 29.5 µg/L
TDS	1st Qtr 2010 (3/15/2010)* 2nd Qtr 2010 (5/3/2010) 4th Qtr 2010 (11/12/2010) 1st Qtr 2011 (2/9/2011)	MW-27	1,075 mg/L	1,080 mg/L* 1,160 mg/L 1,110 mg/L 1,090 mg/L
Sulfate	4th Qtr 2010 (11/9/2010) 1st Qtr 2011 (2/1/2011)	MW-31	532 mg/L	539 mg/L 538 mg/L
	4th Qtr 2010 (11/22/2010) 1st Qtr 2011 (2/16/2011)	MW-3A	3,640 mg/L	3,850 mg/L 3,730 mg/L
Fluoride	4th Qtr 2010 (11/19/2010) 1st Qtr 2011 (2/15/2011)	MW-3	0.68 mg/L	0.77 mg/L 0.69 mg/L

* Samples that were not required to be taken under the Permit and hence were incorrectly relied upon in the Notice to determine compliance status under Part I.G.2 of the Permit. However, for all of those constituents and wells, consecutive exceedances in subsequent quarters have resulted in the need to include those constituents and wells in this Plan.

** The Notice incorrectly states these as two consecutive exceedances. However, there was an intervening sample result taken in July 2010 of 33.5 µg/L that was less than the GWCL. Therefore, the indicated sample results were incorrectly relied upon in the Notice to determine compliance status under Part I.G.2 of the Permit. However, consecutive exceedances in subsequent quarters have resulted in the need to include selenium in MW-30 in this Plan.

It should be noted that the Notice, the 4th Quarter 2010 Exceedance Notice and 1st Quarter 2011 Exceedance Notice identify a number of wells with consecutive exceedances of Nitrate + Nitrite and/or Chloride (MW-26, MW-27, MW-28, MW-30 and MW-31), Chloroform and Dichloromethane (MW-26), and pH (less than the respective GWCLs for pH in a number of wells). However, none of those constituents are included in this Plan, for the reasons stated in the Notice. That is, Chloroform and Dichloromethane are associated with the Chloroform Plume, and the August 23, 1999 DRC Notice of Violation and Groundwater Corrective action Order. Nitrate + Nitrite and Chloride are associated with the Nitrate/Chloride plume, and are currently being investigated by Denison pursuant to a January 28, 2009 Stipulated Consent Agreement. With respect to pH, Denison notified DRC in a letter dated February 1, 2011 that explained the existing GWCLs for groundwater pH are in error due to reliance on historical laboratory values instead of field measurements, and proposed a plan to submit revised descriptive statistics for Field pH to be used as revised GWCLs.

The following observations can be made from Table 1:

- Consecutive exceedances have been observed for Manganese in MW-11, Thallium in MW-18, Selenium in MW-30 and TDS in MW-27 in the 4th Quarter 2010 and/or the 1st Quarter 2011. This justifies inclusion of these constituents on Table 1, but at later dates than indicated by DRC in the Notice, based on later data than the data used by DRC, as discussed in Denison's June 13, 2011 response to the Notice; and

- The following new constituents and wells have demonstrated consecutive exceedances, based on the 4th Quarter 2010 and/or the 1st Quarter 2011 results: Selenium in MW-3 and MW-3A, Uranium in MW-5, Sulfate in MW-3 and MW-31 and Fluoride in MW-3.

3. CATEGORIES FOR ANALYSIS

The constituents and wells listed in Table 1 can be separated into a number of different categories, as follows:

3.1. Constituents in Wells With Previously Identified Rising Trends

The following constituents were identified in the Background Reports as having statistically significant rising trends, due to natural background influences:

Table 2
Constituents with Previously Identified Rising Trends

Constituent	Well	Reference
Manganese	MW-11	Table 16, Existing Wells Background Report
Selenium	MW-12	Table 16, Existing Wells Background Report
	MW-3	Table 16, Existing Wells Background Report
Thallium	MW-18	Table 16, Existing Wells Background Report
Uranium	MW-26	Table 16, Existing Wells Background Report

It is worth noting that, although a rising trend in sulfate has not been previously identified in MW-3A, a rising trend in Sulfate has previously been identified in MW-3, which is right beside MW-3A.

3.2. Constituents in Pumping Wells

Of the constituents listed in Table 1 above, Uranium in MW-26 is the only constituent in a pumping well.

3.3. Constituents Potentially Impacted by Decreasing pH Trends Across the Site

Denison has observed a decreasing trend in pH in a number of monitoring wells across the Mill site. See the discussion in Section 2.5.6 of the New Wells Background Report, where INTERA noted that as at the date of that report there were statistically significant decreasing trends in pH in MW-25, MW-27, MW-28, MW-3A, MW-3, MW-12, MW-14 and MW-17. INTERA also noted that, while not statistically significant, on a review of the pH time plots in all existing wells, there appeared to be a general decreasing trend in pH in all wells.

The mobility in groundwater of the following constituents is sensitive to decreases in pH:

Table 3
Constituents Potentially Impacted by Decreasing Trends in pH

Constituent	Well
Cadmium	MW-24
Manganese	MW-11
Selenium	MW-12
	MW-30
	MW-3
	MW-3A
Thallium	MW-18
	MW-24
Uranium	MW-5
	MW-26

3.4. Other Constituents and Wells

The following constituents in Table 1 do not fall within one of the previous three categories:

Table 4
Other Constituents

Constituent	Well
TDS	MW-27
Sulfate	MW-3A
	MW-31
Fluoride	MW-3

4. PLAN

4.1. General

This Plan is a plan and time schedule for assessment of the sources, extent and potential dispersion of the contamination, and an evaluation of potential remedial action to restore and maintain groundwater quality to ensure that Permit limits will not be exceeded at the compliance monitoring point and that, to the extent applicable, discharge minimization technology and best available technology will be reestablished.

Given the recent analyses in the Background Reports and other recent information relating to the Chloroform and Nitrate/Chloride investigations at the site, Denison believes that all of the exceedances are likely due to background influences (including a natural decreasing trend in pH across the site, rising water levels in some wells and other factors), disruption of the aquifer by pumping and/or the geochemical influences of the existing chloroform and nitrate/chloride plumes.

Therefore, the first step in the analysis will be to perform an assessment of the potential sources for each exceedance to determine whether the exceedance is due to background influences or Mill activities. If an exceedance is determined to be due to background influences then it will not be necessary to perform any further evaluations on the extent and potential dispersion of the contamination or to perform an evaluation of potential remedial actions. Monitoring will continue, and where appropriate revised GWCLs will be proposed to reflect changes in background conditions at the site.

However, if any of the exceedances are determined to be caused by Mill activities, then Denison will proceed to the next step and will consider the extent and potential dispersion of the contamination, and will perform an evaluation of potential remedial actions to restore and maintain groundwater quality to insure that Permit limits will not be exceeded at the compliance monitoring point.

This two-step approach is necessary, because, in light of the varied background conditions at the site and previously identified background trends, it can't be assumed that consecutive exceedances of a constituent in a well represents contamination that has been introduced to the groundwater. It is first necessary to establish whether or not the exceedances represent background influences.

4.2. Assessment for each Category

The approach and scope of review for each of the different categories described above, is described in more detail below.

4.2.1. Constituents With Pre-Existing Rising Trends

It was well known at the time of setting the current GWCLs that certain constituents had rising trends. On page 3 of the Existing Well Background Report, INTERA concluded:

> "There are numerous cases of both increasing and decreasing trends in constituents in upgradient, far downgradient, and Mill site wells, which provide evidence that there are natural forces at work that are impacting groundwater quality across the entire site.
>
> In almost all cases where there are increasing trends in constituents in wells at the site, there are increasing trends in those constituents in upgradent wells. Furthermore, and more importantly, in no case is there any evidence in the wells in question of increasing trends in chloride, which is considered the most mobile and best indicator of potential tailings cell leakage at the site. We consider the combination of these factors to be conclusive evidence that all increasing trends at the site are caused by natural forces and not by Mill activities".

The Groundwater Data Preparation and Statistical Process Flow for Calculating Groundwater Protection Standards, White Mesa Mill Site, San Juan County, Utah, which was approved by the Executive Secretary, included as Figure 19 to the Existing Wells Background Report, states in

the final decision box, for circumstances where the data indicated an increasing trend (decreasing in the case of pH), the following:

> "Consider modified Approach to GWCL
> (Use Post Second Quarter 2005 Data only?)
> (Re-evaluate on Renewal?)"

The rising trends in each of the constituents listed in Table 2 above were analyzed by INTERA in Section 11 of the Existing Wells Background Report. Additional analysis relating to rising uranium trends in various wells at the site, which includes a discussion on possible causes of the trends, is found in Section 12 of the Existing Wells Background Report.

Further, a study entitled *Summary of Work Completed, Data Results, Interpretations and Recommendations For the July 2007 Sampling Event at the Denison Mines, USA, White Mesa Uranium Mill Near Blanding, Utah* was prepared by T. Grant Hurst and D. Kip Solomon, Department of Geology and Geophysics, University of Utah, May 2008 (the "University of Utah Study").

On pages (ii) and (iii) of the Executive Summary to the University of Utah Study, Hurst and Solomon note that:

> "Increasing and elevated trace metal concentrations in monitoring wells at a uranium processing facility near Blanding, UT, may indicate leakage from tailings cells is occurring. To investigate this potential problem, a groundwater study was done to characterize groundwater flow, chemical composition, noble gas composition, and age.
>
> . . .
>
> "The data show that groundwater at the Mill is largely older than 50 years, based on apparent recharge dates from chlorofluorocarbons and tritium concentrations. Wells exhibiting groundwater that has recharged within the last 50 years appears to be a result of recharge from wildlife ponds near the site. Stable isotope fingerprints do not suggest contamination of groundwater by tailings cell leakage, evidence that is corroborated by trace metal concentrations similar to historically-observed concentrations."

Included in the University of Utah Study sampling and analysis were the following wells listed in Table 1 above: MW-3, MW-3A, MW-5, MW-11, MW-18, MW-27, MW-30 and MW-31.

It has been established, then, that continued rising trends in the wells listed in Table 2 above are not inconsistent with natural background, and in fact were accepted as natural background for purposes of setting the revised GWCLs in January 2010. The primary focus of the source assessment for the wells listed in Table 2 above will therefore be to determine whether or not there is any new information that would suggest that the previous analysis conducted in the

Existing Wells Background Report has changed since the date of that Report. This analysis will include the following for each constituent listed in Table 2:

(i) A geochemical analysis that will evaluate the behavior of all of the constituents in the well in question to determine if there are any changes in the behavior of indicator constituents, such as Chloride, Sulfate, Fluoride and Uranium since the date of the Existing Wells Background Report that may suggest a change in the behavior of that well since the date of that Report;

(ii) A mass balance analysis that will evaluate the observed concentrations of the constituent in light of the concentrations in Mill tailings and the presence or absence of any mounding at the location of the well in question; and

(iii) In cases where the wells in question are distant from the Mill's tailings cells, a hydrogeologic analysis will be performed to determine the plausibility of impact from Mill tailings.

The foregoing analysis will be included in a report (the "Source Assessment Report") to be prepared by an independent engineering consultant.

If no significant changes are identified that would suggest that the previous analysis conducted in the Background Reports for the constituents in question has changed, then Denison will propose changes to the GWCLs for those wells to better reflect background concentrations at the site.

If significant changes are identified that cannot be attributed to background influences, then Denison will propose to the Executive Secretary further analysis that may be required in order to identify the source and the extent and potential dispersion of the contamination, as well as potential remedial actions.

The United States Environmental Protection Agency ("EPA") has recognized the need to update compliance limits periodically to reflect changes to background conditions.

In 2009 guidance, EPA states:

> "We recommend that other reviews of background also take place periodically.
>
> These include the following situations:
>
> - When periodically updating background, say every 1-2 years
> - When performing a 5-10 year permit review
>
> During these reviews, all observations designated as background should be evaluated to ensure that they still adequately reflect current natural or baseline groundwater conditions. In particular, the background samples should be investigated for apparent trends or outliers. Statistical outliers may need to be removed, especially if an error or discrepancy can be identified, so that subsequent compliance tests can be

improved. If trends are indicated, a change in the statistical method or approach may be warranted."

and

"Site-wide changes in the underlying aquifer should be identifiable as similar trends in both upgradient and compliance wells. In this case, it might be possible to remove a common trend from both the background and compliance point wells and to perform interwell testing on the trend residuals."

(EPA 530/R-09-007, March 2009, *Statistical Analysis Of Groundwater Monitoring Data At RCRA Facilities Unified Guidance*, Environmental Protection Agency, Office Of Resource Conservation And Recovery.)

In that Guidance, EPA further states:

"5.3.4 UPDATING WHEN TRENDS ARE APPARENT

An increasing or decreasing trend may be apparent between the existing background and the newer set of candidate background values, either using a time series plot or applying **Chapter 17** trend analyses. Should such trend data be added to the existing background sample? Most detection monitoring tests assume that background is stationary over time, with no discernible trends or seasonal variation. A mild trend will probably make very little difference, especially if a Student-*t* or Wilcoxon rank-sum test between the existing and candidate background data sets is non-significant. More severe or continuing trends are likely to be flagged as SSIs by formal intrawell prediction limit or control chart tests.

With interwell tests, a stronger trend in the common upgradient background may signify a change in natural groundwater quality across the aquifer or an incomplete characterization of the full range of background variation. If a change is evident, it may be necessary to delete some of the earlier background values from the updated background sample, so as to ensure that compliance testing is based on current groundwater conditions and not on outdated measures of groundwater quality."

4.2.2. Constituents in Pumping Wells

MW-26 is a pumping well. In Section 7.3.1 of the Existing Wells Background Report, INTERA concluded that:

". . . chloroform pumping wells are being manipulated and the impact on the quality of the water in those wells from the pumping is uncertain and cannot be predicted with enough certainty to establish compliance standards under the GWDP. For example, pumping wells are intended to pull water in from areas of

the perched aquifer that would normally flow into other wells. In fact, the pumping wells are having the effect of drawing down water levels in other wells (see for example Figure 2 of Appendix D of the second quarter 2007 Chloroform Monitoring report). This water may be associated with its own background quality that will impact the water quality in the pumping well. Any increasing or decreasing trends in constituent in chloroform pumping wells, such as MW-26, are therefore not unexpected and should be given little, if any, weight in analyzing potential impacts to groundwater from Mill activities. These impacts should be subject to the chloroform NOV and not result in parallel out-of-compliance situations under the GWDP.

For this reason, we believe that MW-26 should continue to be monitored under the GWDP, but that DUSA should not be subject to any out of compliance situation under the GWDP relating to MW-26."

This concern was acknowledged by the Executive Secretary in the September 2009 Statement of Basis issued in connection with approval of the revised GWCLs. On page 23 of that document, the Executive Secretary stated that:

"It should be noted that, because MW-26 is a pumping well for chloroform removal, concentrations of all constituents in that well are subject to potential variation over time as a result of the pumping activity. This will be taken into account by the Executive Secretary in determining compliance for this well."

MW-26 is included on Table 1 above because of consecutive exceedances of the GWCL for uranium in the 1st and 2nd quarters of 2010. Subsequent data show that the concentrations of uranium in MW-26 in the sampling events in 2010 and through the first quarter of 2011 range from 29.6 µg/L to 72.7 µg/L, with eight of the thirteen sample results being less than the GWCL of 41.8 µg/L. The most recent result was 31.8 µg/L for the March 2011 monthly sampling event.

This erratic behavior is not unexpected for a pumping well such as MW-26, and is not inconsistent with natural background. The primary focus of the source assessment for uranium in MW-26 will therefore be to determine whether or not there is any new information that would suggest that the previous analysis conducted in the Existing Wells Background Report, has changed since the date of that Report. This analysis will include the following:

(i) A geochemical analysis that will evaluate the behavior of all of the constituents in MW-26 to determine if there are any changes in the behavior of indicator constituents, such as Chloride, Sulfate, Fluoride and Uranium since the date of the Existing Wells Background Report that may suggest a change in the behavior of that well since the date of that Report. However, it is not expected that this analysis will yield any conclusive findings, given the dynamic nature of the well; and

(ii) A mass balance analysis that will evaluate the observed concentrations in light of the concentrations in Mill tailings.

The foregoing analysis will be included in the Source Assessment Report.

If no significant changes are identified that would suggest that the previous analysis conducted in the Background Reports for the constituents in question has changed, then Denison will continue to pump and monitor that well. Since GWCLs for pumping wells have no meaning, for the reasons discussed above, Denison does not intend to propose revised GWCLs for MW-26.

If significant changes are identified in the Source Assessment Report, that cannot be attributed to the pumping itself or to background influences, then Denison will propose to the Executive Secretary further analysis that may be required in order to identify the source and the extent and potential dispersion of the contamination. Denison will also evaluate potential remedial actions that may be appropriate. However, continued pumping is probably the best remedial action at this time.

4.2.3. Constituents Potentially Impacted by Decreasing Trends in pH across the Site.

As mentioned above, Denison has observed a decreasing trend in pH in a number of monitoring wells across the Mill site. The mobility in groundwater of a number of constituents listed in Table 1 is sensitive to decreases in pH. Those constituents are listed in Table 3 above.

It should be noted that a number of the wells listed in Table 3 are also wells that were included in the University of Utah Study. Those are wells MW-3, MW-3A, MW-5, MW-11, MW-18 and MW-30. This gives further support to the possibility that increases in concentrations of these constituents in those wells are due to natural influences, such as natural changes in pH, rather than to Mill activities.

The primary focus of the source assessment for the wells listed in Table 3 above will be two-fold. First, Denison will determine whether or not there is any new information that would suggest that the previous analysis conducted in the Existing Wells Background Report has changed since the date of that Report. This analysis will include the following for each constituent listed in Table 3:

(i) A geochemical analysis that will evaluate the behavior of all of the constituents in the well in question to determine if there are any changes in the behavior of indicator constituents, such as Chloride, Sulfate, Fluoride and Uranium since the date of the Existing Wells Background Report that may suggest a change in the behavior of that well since the date of that Report;

(ii) A mass balance analysis that will evaluate the observed concentrations in light of the concentrations in Mill tailings and the presence or absence of any mounding at the location of the well in question; and

(iii) In cases where the well in question is distant from the Mill's tailings cells, a hydrogeologic analysis will be performed to determine the plausibility of impact from Mill tailings.

Second, a pH analysis will be performed for each constituent that will:

(iv) Review the behavior of pH in the well in question to determine if there has been a significant decrease in pH in the well; and

(v) Analyze the expected impact from any such decrease in pH on the concentration of the constituent in question in the well, based on currently available information.

The foregoing analyses (both steps) will be included in the Source Assessment Report.

If no significant changes are identified that would suggest that the previous analysis conducted in the Background Reports for the constituents in question has changed, other than what would be expected from decreasing trends in pH, then Denison will propose changes to the GWCLs for those wells to better reflect background concentrations at the site.

If significant changes are identified that cannot be attributed to changes in pH or other natural phenomena, then Denison will propose to the Executive Secretary further analysis that may be required in order to identify the source and the extent and potential dispersion of the contamination, as well as potential remedial actions.

4.2.4. Other Constituents and Wells

Table 4 sets out other constituents that do not fall within the categories considered in Sections 4.2.1, 4.2.2 and 4.2.3 above. However, all of those constituents are in wells that were included in the University of Utah Study.

The primary focus of the source assessment for the wells listed in Table 4 above will again be to determine whether or not there is any new information that would suggest that the previous analysis conducted in the Existing Wells Background Report has changed since the date of that Report. This analysis will include the following for each constituent listed in Table 4:

(i) A geochemical analysis that will evaluate the behavior of all of the constituents in the well in question to determine if there are any changes in the behavior of indicator constituents, such as Chloride, Sulfate, Fluoride and Uranium since the date of the Existing Wells Background Report that may suggest a change in the behavior of that well since the date of that Report;

(ii) A mass balance analysis that will evaluate the observed concentrations in light of the concentrations in Mill tailings and the presence or absence of any mounding at the location of the well in question;

(iii) In cases where the well in question is distant from the Mill's tailings cells, a hydrogeologic analysis will be performed to determine the plausibility of impact from Mill tailings;

(iv) An analysis of the extent, if any, to which the constituents listed in Table 4 may be influenced by geochemical changes caused by migrating nitrate and/or chloride or chloroform from the existing plumes; and

(v) An analysis of the extent, if any, to which the constituents listed in Table 4 may be influenced by changes in other constituents in ground water that have resulted from changes in pH or any other natural phenomenon.

The foregoing analysis will be included in the Source Assessment Report.

If no significant changes are identified that would suggest that the previous analysis conducted in the Background Reports for the constituents in question has changed, then Denison will propose changes to the GWCLs for those wells to better reflect background concentrations at the site.

If significant changes are identified that are attributable to geochemical changes caused by either the nitrate/chloride plume or the chloroform plume, then the constituents in Table 4 should be considered in connection with the applicable plume.

If significant changes are identified that cannot be attributed to one of the existing plumes, or other background influences, then Denison will propose to the Executive Secretary further analysis that may be required in order to identify the source and the extent and potential dispersion of the contamination, as well as potential remedial actions.

4.3. Experts Reports to be Prepared

The Source Assessment Report will detail the results of all of the analysis to be performed and the conclusions to be drawn from such analyses, including any proposed revisions to existing GWCLs. The Source Assessment Report will also identify any further studies that the analysis indicates should be performed, and will propose, for Executive Secretary review and approval, a plan and schedule for completion of any such additional studies.

If further analysis is required after completion of the Source Assessment Report, Denison and the Executive Secretary will agree on the scope of that analysis, based on the findings in the Source Assessment Report, including any further reports that will need to be prepared.

5. TIME SCHEDULE

The Source Assessment Report will be submitted to the Executive Secretary within 60 days after approval of this Plan.

Any further studies that are identified in the Source Assessment Report or otherwise identified by the Executive Secretary as being required in order to fulfill the requirements of Part I.G.4(c) of the Permit or the Notice, will be prepared and submitted by Denison in accordance with a schedule to be approved by the Executive Secretary.

6. CONCLUSION

Background at the Mill site was recently thoroughly studied in the Background Reports and in the University of Utah Study. Both the Background Reports and the University of Utah Study concluded that groundwater at the site has not been impacted by Mill operations. Both of those studies also acknowledged that there are natural influences at play that have given rise to increasing water trends and general variability of background groundwater at the site.

Given the varied background groundwater quality at the site, previously identified rising trends in some wells and other factors, it cannot be assumed that consecutive exceedances of a constituent in a monitoring well means that contamination has been introduced to groundwater in that well. The exceedances may very well be the result of background influences. The approach in this Plan therefore is to first determine if the recent exceedances are the result of background influences. If they are determined to be the result of background influences, then no remedial actions are required. If, however, they are determined to not be the result of natural background influences, then further analyses will be required.

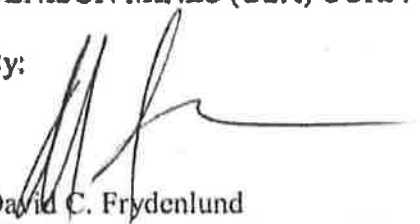
In determining whether or not an exceedance is the result of background influences, it is not practicable to redo the Background Reports and University of Utah Study each time a monitoring well shows consecutive exceedances, particularly where the exceedance is consistent with those recent analyses. The focus should therefore be on identifying any changes in the circumstances identified in those studies.

Based on the information available at this time, Denison believes that the exceedances observed are the result of natural influences and reflect the need to adjust some of the GWCLs for the site.

SIGNATURE AND CERTIFICATION

This document was prepared by Denison Mines (USA) Corp. on June 13, 2011.

DENISON MINES (USA) CORP.

By: 

David C. Frydenlund
Vice President, Regulatory Affairs and Counsel

Certification:

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

David C. Frydenlund
Vice President, Regulatory Affairs and Counsel
Denison Mines (USA) Corp.

Attachment B:

DUSA Transmittal of Plan and Time Schedule under Utah Ground Water Discharge Permit UGW370004 Part I.G.4(d), September 7, 2011

WHITE MESA MILL

State of Utah Ground Water Discharge Permit UGW370004

Plan and Time Schedule

Under Part I.G.4 (d)

For

Violations of Part I.G.2 for Constituents in the Second Quarter of 2011

Denison Mines (USA) Corp.

1050 17th St., Suite 950

Denver, CO 80265

September 7, 2011

1. INTRODUCTION

Denison Mines (USA) Corp. ("Denison") operates the White Mesa Uranium Mill (the "Mill"), located near Blanding Utah, under State of Utah Ground Water Discharge Permit UGW370004 (the "Permit").

This is the plan and time schedule (the "Plan") required under Part I.G.4(c) of the Permit relating to violations of Part I.G.2 of the Permit for the 2nd quarter of 2011. Part I.G.2 of the Permit provides that out-of-compliance status exists when the concentration of a pollutant in two consecutive samples from a compliance monitoring point exceeds a groundwater compliance limit ("GWCL") in Table 2 of the Permit.

The Permit was originally issued in March, 2005, at which time GWCLs were set on an interim basis, based on fractions of State Ground Water Quality Standards or the equivalent, without reference to natural background at the Mill site. The Permit also required that Denison prepare a background groundwater quality report to evaluate all historic data for the purposes of establishing background groundwater quality at the site and developing GWCLs under the Permit.

As required by then Part I.H.3 of the Permit, DUSA submitted the following to the Co-Executive Secretary (the "Executive Secretary") of the State of Utah Water Quality Board:

- A *Revised Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah*, October 2007, prepared by INTERA, Inc. (the "Existing Wells Background Report");

- A *Revised Addendum: -- Evaluation of Available Pre-Operational and Regional Background Data, Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah*, November 16, 2007, prepared by INTERA, Inc. (the "Regional Background Report"); and

- A *Revised Addendum: -- Background Groundwater Quality Report: New Wells For Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah,* April 30, 2008, prepared by INTERA, Inc. (the "New Wells Background Report, and together with the Existing Wells Background Report and the Regional Background Report, the "Background Reports").

Based on a review of the Background Reports and other information and analyses the Executive Secretary re-opened the Permit and modified the GWCLs to be equal to the mean concentration plus two standard deviations or the equivalent. The modified GWCLs became effective on January 20, 2010.

Section I.G.4(c) of the permit requires that DUSA submit a written plan and time schedule, for Executive Secretary approval, including, but not limited to:

(i) submittal of a written assessment of the source(s);

(ii) submittal of a written evaluation of the extent and potential dispersion of said groundwater contamination; and

(iii) submittal of a written evaluation of any and all potential remedial action to restore and maintain ground water quality at the facility, for the point of compliance wells and contaminants in question, to ensure that: 1) shallow groundwater quality at the facility will be restored and 2) the contaminant concentrations in said point of compliance wells will be returned to and maintained in compliance with their respective GWCLs.

On August 8, 2011 Denison submitted a notice (the "2nd Quarter 2011 Exceedance Notice") to the Executive Secretary under Part I.G.1(a) of the Permit providing notice that the concentrations of specific constituents in the monitoring wells at the Mill exceeded their respective GWCLs for the 2nd quarter of 2011 and indicating which of those constituents had two consecutive exceedances as of that quarter.

This Plan covers the constituents in violation of Part I.G.2 of the Permit that were identified as being in violation in the 2nd Quarter 2011 Exceedance Notice for the first time beginning in the 2nd quarter of 2011 (the "Q2 2011 Consecutive Exceedances").

2. CONSTITUENTS AND WELLS SUBJECT TO THIS PLAN

The following Q2 2011 Consecutive Exceedances have been identified as being in out-of-compliance status under Part I.G.2 of the Permit in the 2nd Quarter 2011 Exceedance Notice:

Table 1
Constituents and Wells Subject to this Plan

Constituent	Monitoring Event	POC Well	GWCL	Result
TDS	1st Qtr 2011 (2/15/2011) 2nd Qtr, 2011 (4/6/2010)	MW-18	3198.77 mg/L	3250 mg/L 3250 mg/L
Uranium	May 2011 (5/11/2011) June 2011 (6/20/2011)	MW-25	6.5 µg/L	6.72 µg/L 7.06 µg/L
	1st Qtr 2011 (2/15/2011) 2nd Qtr 2011 (4/12/2011)* 2nd Qtr 2011 (6/7/2011)	MW-35	7.5 µg/L	12.7 µg/L 19.9 µg/L 21.7 µg/L
Manganese	1st Qtr 2011 (2/15/2011) 2nd Qtr 2011 (4/12/2011)* 2nd Qtr 2011 (6/7/2011)	MW-35	200 µg/L	248 µg/L 580 µg/L 369 µg/L

* An additional sample was collected in this well during the second quarter 2011 as described in the Q2 2011 Groundwater Report submitted under separate cover on August 31, 2011. Both results are included.

It should be noted that the Notice of Violation and Compliance Order, Docket No. UGW11-02 (the "Notice"), dated May 9, 2011 and the 2nd Quarter 2011 Exceedance Notice identify a number of wells with consecutive exceedances of Nitrate + Nitrite and/or Chloride (MW-26, MW-27, MW-28, MW-30 and MW-31), Chloroform and Dichloromethane (MW-26), and pH (less than the respective GWCLs for pH in a number of wells). However, none of those

constituents are included in this Plan, for the reasons stated in the Notice. That is, Chloroform and Dichloromethane are associated with the Chloroform Plume, and the August 23, 1999 DRC Notice of Violation and Groundwater Corrective action Order. Nitrate + Nitrite and Chloride are associated with the Nitrate/Chloride plume, and are currently being investigated by Denison pursuant to a January 28, 2009 Stipulated Consent Agreement. Denison notified DRC in a letter dated February 1, 2011 that explained the existing GWCLs for groundwater pH are in error due to reliance on historical laboratory values instead of field measurements, and proposed a plan to submit revised descriptive statistics for Field pH to be used as revised GWCLs.

It should also be noted that a number of wells had exceedances of GWCLs in the 2nd quarter 2011 that also had consecutive exceedances in previous quarters (MW-3, MW-11, MW-18 (thallium), MW-24, MW-26, MW-27, and MW-30. This report covers only the Q2 2011 Consecutive Exceedances; that is, those exceedances which were consecutive beginning in the 2nd quarter 2011. Consecutive exceedances which occurred in previous reporting periods are discussed in the previous Plan and Time Schedule Under Part I.G.4 (d), submitted on June 13, 2011.

3. CATEGORIES FOR ANALYSIS

The constituents and wells listed in Table 1 can be separated into a number of different categories, as follows:

3.1. Constituents Potentially Impacted by Decreasing pH Trends Across the Site

Denison has observed a decreasing trend in pH in a number of monitoring wells across the Mill site. See the discussion in Section 2.5.6 of the New Wells Background Report, where INTERA noted that as at the date of that report there were statistically significant decreasing trends in pH in MW-25. INTERA also noted that, while not statistically significant, on a review of the pH time plots in all existing wells, there appeared to be a general decreasing trend in pH in all wells.

The mobility in groundwater of the following Q2 2011 Consecutive Exceedance constituent is sensitive to decreases in pH:

Table 2
Constituents Potentially Impacted by Decreasing Trends in pH

Constituent	Well
Uranium	MW-25

3.2. Newly Installed Wells with Interim GWCLs

MW-35 was installed in August/September 2010 as required by the Permit, and sampling commenced in 4th quarter 2010. As required by Part I.H.5 c) of the Permit, after the completion of eight consecutive quarters of groundwater sampling and analysis, Denison will submit a background report for Executive Secretary approval. As an interim measure, GWCLs have been set by the Executive Secretary at one-quarter of the State Groundwater Quality Standards

(GWQSs). Manganese and uranium exceeded the interim GWCLs in MW-35. However, since background has not been established in MW-35, the exceedances of these interim GWCLs do not represent exceedances of background values.

3.3. Other Constituents and Wells

The following Q2 2011 Consecutive Exceedance constituent does not fall within one of the previous two categories:

Table 3
Other Constituents

Constituent	Well
TDS	MW-18

TDS in MW-18 has been identified as having a rising trend, although it was not statistically significant at the time of the publication of the Background Reports. However, MW-18 was identified in the Background Reports as having a statistically significant rising trend in sulfate, which is a component of TDS. MW-18 was also reviewed, and determined not to have been impacted by Mill activities, in the study entitled *Summary of Work Completed, Data Results, Interpretations and Recommendations For the July 2007 Sampling Event at the Denison Mines, USA, White Mesa Uranium Mill Near Blanding, Utah,* prepared by T. Grant Hurst and D. Kip Solomon, Department of Geology and Geophysics, University of Utah, May 2008 (the "University of Utah Study"). Further, MW-18 is located far upgradient of the Mill facility.

4. PLAN

4.1. General

This Plan is a plan and time schedule for assessment of the sources, extent and potential dispersion of the contamination, and an evaluation of potential remedial action to restore and maintain groundwater quality to assure that Permit limits will not be exceeded at the compliance monitoring point and that, to the extent applicable, discharge minimization technology and best available technology will be reestablished.

Given the recent analyses in the Background Reports and other recent analyses and investigations at the site, Denison believes that all of the Q2 2011 Consecutive Exceedances, other than the exceedances in MW-35, are likely due to background influences (including a natural decreasing trend in pH across the site and other factors). For MW-35, background has not yet been set, so the exceedance of the interim GWCLs in MW-35 is not unexpected, and does not represent exceedances of natural background values. With respect to MW-18, it is far upgradient of the Mill site and could not have been impacted by Mill activities. Therefore, Denison does not propose to perform any further assessments relating to the TDS exceedances at MW-18. It is proposed that accelerated monitoring for TDS continue at MW-18 while Denison prepares, and the Executive Secretary evaluates, an application for a revised GWCL for TDS in that well.

The first step in the analysis will therefore be to perform an assessment of the potential sources for the uranium in MW-25 to determine whether the exceedances are due to background influences or Mill activities. If the exceedances are determined to be due to background influences then it will not be necessary to perform any further evaluations on the extent and potential dispersion of the contamination or to perform an evaluation of potential remedial actions. Monitoring will continue, and if appropriate a revised GWCL will be proposed to reflect changes in background conditions at the site.

However, if the uranium exceedances in MW-25 are determined to be caused by Mill activities, then Denison will proceed to the next step and will consider the extent and potential dispersion of the contamination, and/or will perform an evaluation of potential remedial actions to restore and maintain groundwater quality to insure that Permit limits will not be exceeded at the applicable point of compliance.

This two-step approach is necessary, because, in light of the varied background conditions at the site and previously identified background trends, it cannot be assumed that consecutive exceedances of any constituent in a well represents contamination that has been introduced to the groundwater. It is first necessary to establish if the exceedance represents background influences or not.

4.2. Assessment for each Category

The approach and scope of review for each of the different categories described above, is described in more detail below.

4.2.1. Constituents Potentially Impacted by Decreasing Trends in pH across the Site.

As mentioned above, Denison has observed a decreasing trend in pH in a number of monitoring wells across the Mill site, including MW-25. The mobility in groundwater of uranium is sensitive to decreases in pH.

The primary focus of the source assessment for uranium in MW-25, listed in Table 2 above, will be two-fold. First, Denison will determine whether or not there is any new information that would suggest that the previous analysis conducted in the Background Reports, on the basis of which the GWCL for uranium in that well was set, has changed since the date of the Background Reports. This analysis will include the following:

(i) A geochemical analysis that will evaluate the behavior of all of the constituents in MW-25 to determine if there are any changes in the behavior of indicator constituents, such as Chloride, Sulfate, Fluoride and Uranium since the date of the Background Reports that may suggest a change in the behavior of that well since the date of the Background Reports; and

(ii) A mass balance analysis that will evaluate the observed concentrations in light of the concentrations in Mill tailings and the presence or absence of any mounding at the location of MW-25.

Second, a pH analysis will be performed that will:

(iii) Review the behavior of pH in MW-25 to determine if there has been a significant decrease in pH in the well; and

(iv) Evaluate the expected impact from any such decrease in pH on the concentration of uranium in the well, based on currently available information.

The foregoing analyses (both steps) will be included in the Source Assessment Report.

If no significant changes are identified over the analysis performed to date for uranium in MW-25, other than what would be expected from decreasing trends in pH, then Denison will propose changes to the GWCL for uranium in that well to better reflect background concentrations at the site.

If significant changes are identified that cannot be attributed to changes in pH or other natural phenomena, then Denison will propose to the Executive Secretary further analysis that may be required in order to identify the source and the extent and potential dispersion of the contamination, and/or potential remedial actions, including the potential application for alternate corrective action concentration limits under UAC R317-6-6.15(G).

4.2.2 Newly Installed Wells with Interim GWCLs

As previously noted, the GWCLs for MW-35 have been set at one-quarter of the respective GWQSs, pending determination of background for the well, and are not based on eight quarters of data from that well. A background report for MW-35 will be completed after the collection of eight quarters of data. In the interim, MW-35 will be sampled monthly for those constituents which exceeded the interim GWCLs. No other action is planned for MW-35 until completion of the background report.

4.2.3 Other Constituents and Wells

Table 3 sets out a constituent, TDS in MW-18, that does not fall within the other categories considered in the above Sections.

MW-18 is far upgradient of the Mill site, and could not have been impacted by Mill activities. Statistically significant rising trends in some constituents in MW-18, such as sulfate, which is a component of TDS, have been observed in the Background Reports as being consistent with natural background values. MW-18 was also analyzed in the University of Utah Study and determined not to have been influenced by Mill activities. Therefore, Denison believes that the increases in TDS concentrations in that well are also due to natural background influences and have not been caused or contributed to by Mill activities. Therefore, Denison proposes to

continue accelerated monitoring of TDS in MW-18, while it is preparing an application for a revised GWCL for TDS in MW-18, which reflects these natural changes in background.

As mentioned in Denison's June 13, 2011 response to the Notice, the United States Environmental Protection Agency ("EPA") has recognized the need to update compliance limits periodically to reflect changes to background conditions.

In 2009 guidance, EPA states:

> "We recommend that other reviews of background also take place periodically.
>
> These include the following situations:
>
> - When periodically updating background, say every 1-2 years
> - When performing a 5-10 year permit review
>
> During these reviews, all observations designated as background should be evaluated to ensure that they still adequately reflect current natural or baseline groundwater conditions. In particular, the background samples should be investigated for apparent trends or outliers. Statistical outliers may need to be removed, especially if an error or discrepancy can be identified, so that subsequent compliance tests can be improved. If trends are indicated, a change in the statistical method or approach may be warranted."
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> and
>
> "Site-wide changes in the underlying aquifer should be identifiable as similar trends in both upgradient and compliance wells. In this case, it might be possible to remove a common trend from both the background and compliance point wells and to perform interwell testing on the trend residuals."

(EPA 530/R-09-007, March 2009, *Statistical Analysis Of Groundwater Monitoring Data At RCRA Facilities Unified Guidance*, Environmental Protection Agency, Office Of Resource Conservation And Recovery.)

In that Guidance, EPA further states:

> "5.3.4 UPDATING WHEN TRENDS ARE APPARENT
>
> An increasing or decreasing trend may be apparent between the existing background and the newer set of candidate background values, either using a time series plot or applying **Chapter 17** trend analyses. Should such trend data be added to the existing background sample? Most detection monitoring tests assume that background is stationary over time, with no discernible trends or seasonal variation. A mild trend will probably make very little difference, especially if a Student-*t* or Wilcoxon rank-sum test between the existing and

candidate background data sets is non-significant. More severe or continuing trends are likely to be flagged as SSIs by formal intrawell prediction limit or control chart tests.

With interwell tests, a stronger trend in the common upgradient background may signify a change in natural groundwater quality across the aquifer or an incomplete characterization of the full range of background variation. If a change is evident, it may be necessary to delete some of the earlier background values from the updated background sample, so as to ensure that compliance testing is based on current groundwater conditions and not on outdated measures of groundwater quality."

4.3. Experts Reports to be Prepared

The Source Assessment Report will detail the results of all of the analysis to be performed and the conclusions to be drawn from such analyses, including any proposed revisions to existing GWCLs. The Source Assessment Report will also identify any further studies that the analysis indicates should be performed, and will propose, for Executive Secretary review and approval, a plan and schedule for completion of any such additional studies.

If further analysis is required after completion of the Source Assessment Report, Denison and the Executive Secretary will agree on the scope of that analysis, based on the findings in the Source Assessment Report, including any further reports that will need to be prepared.

5. TIME SCHEDULE

The Source Assessment Report will be submitted to the Executive Secretary within 60 days after approval of this Plan. The Source Assessment Report contemplated by this submission, may be combined with the Source Assessment Report required by the previous Plan and Schedule dated June 13, 2011.

Any further studies that are identified in the Source Assessment Report or otherwise identified by the Executive Secretary as being required in order to fulfill the requirements of Part I.G.4(c) of the Permit, will be prepared and submitted by Denison in accordance with a schedule to be approved by the Executive Secretary.

6. CONCLUSION

Given the varied background groundwater quality at the site, previously identified rising trends in some wells and other factors, it cannot be assumed that consecutive exceedances of a constituent in a monitoring well means that contamination has been introduced to groundwater in that well.

With respect to the Q2 2011 Consecutive Exceedances observed at MW-35, background has not yet been set for that well. The exceedances therefore do not represent exceedances of natural background at the site. With respect to MW-18, which is far upgradient of the Mill site, the Q2

2011 Consecutive Exceedance of TDS should be considered to represent natural variation in background, without further assessment. Rising trends in other constituents, including sulfate, which is a component of TDS, have already been analyzed in the Background Reports and University of Utah Study, and determined to be the result of natural background influences.

With respect to the Q2 2001 Consecutive Exceedances of uranium in MW-25, the exceedances may very well be the result of background influences. The approach in this Plan therefore is to first determine if the recent exceedances of uranium in MW-25 are the result of background influences. If they are determined to be the result of background influences, then no remedial actions are required. If, however, they are determined to not be the result of natural background influences, then further analyses will be required.

Background at the Mill site was recently thoroughly studied in the Background Reports and in the University of Utah Study. Both the Background Reports and the University of Utah Study concluded that groundwater at the site has not been impacted by Mill operations. Both of those studies also acknowledged that there are natural influences at play at the site that have given rise to increasing water trends and general variability of background groundwater at the site.

It is not practicable to redo those studies each time a monitoring well shows consecutive exceedances, particularly where the exceedances are consistent with those recent analyses. The focus should therefore be on identifying any changes in the circumstances identified in those studies.

Based on the information available at this time, Denison believes that the exceedances observed are the result of natural influences and reflect the need to adjust some of the GWCLs for the site.

Attachment C:

DUSA Transmittal of Plan and Time Schedule under Utah Ground Water Discharge Permit UGW370004 Part I.G.4(d), April 13, 2012

PLAN TO INVESTIGATE pH EXCEEDANCES IN PERCHED GROUNDWATER MONITORING WELLS WHITE MESA URANIUM MILL BLANDING, UTAH

April 13, 2012

Prepared for:

DENISON MINES (USA) CORP.
1050 17th Street, Suite 950
Denver, Colorado 80265

Prepared by:

HYDRO GEO CHEM, INC.
51 West Wetmore Road, Suite 101
Tucson, Arizona 85705
(520) 293-1500

Project Number 7180000.00-2.0

HYDRO GEO CHEM, INC.
Environmental Science & Technology

PLAN TO INVESTIGATE
pH EXCEEDANCES IN PERCHED
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WHITE MESA URANIUM MILL
BLANDING, UTAH

Prepared for:

DENISON MINES (USA) CORP.
1050 17th Street, Suite 950
Denver, Colorado 80265

Prepared, Reviewed, and Approved by:

Stewart J. Smith, UT P.G. No. 5336166-2250
Associate Hydrogeologist

April 13, 2012

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APPENDICES

1. INTRODUCTION

This document presents the pH Plan and Time Schedule (pH Plan) to address dual exceedances of pH in eleven perched groundwater monitoring wells at the White Mesa Mill (the Mill) and to provide information related to the overall decline in groundwater pH that has been observed in site wells. Sections 1 and 2 were prepared primarily by Denison Mines (USA) Corp (Denison); Section 3.1 was prepared primarily by INTERA, Inc (INTERA); and Section.3.2 was prepared primarily by Hydro Geo Chem, Inc (HGC).

The eleven wells currently in out-of-compliance (OOC) status are listed in Table 1. The Groundwater Discharge Permit UGW370004 (GWDP), Part I.G.2 states that "out-of-compliance status exists when the concentration of a pollutant in two consecutive samples from a compliance monitoring point exceeds a GWCL in Table 2 of this Permit". The GWDP provides an acceptance range for field pH GWCLs. In all instances, the field pH measurements discussed herein are slightly below the lower limit of the GWCLs specified in the GWDP. E-mail correspondence from DRC dated March 13, 2012 provided a list of wells in OOC status that was partially incorrect. Table 1 lists the wells that are currently in OOC (as of 4th Quarter 2011) and the consecutive quarters in which those measurements were noted. Table 1 also lists the groundwater wells which are currently in accelerated monitoring for field pH measurements but are not in OOC. Accelerated monitoring would be the result of field pH excursions that are one-time or non-consecutive measurements below the field pH GWCL. The OOC status is limited to those wells which have experienced two consecutive monitoring periods outside the GWCLs range.

The decline in pH has been noted in perched wells located upgradient, cross-gradient, and downgradient of the Mill and tailings cells. This phenomenon may have any number of causes; however, the widespread nature of the declining pH indicates that, whether recent or longer-term, it results from a natural phenomenon unrelated to Mill operations.

Reference is made to the following previously submitted documents:

- *Plan and Time Schedule Under Part I.G.4(d) for Violations of Part I.G.2 for Constituents in the First, Second, Third and Fourth Quarters of 2010 and First Quarter of 2011* dated June 13, 2011 (Initial Plan and Schedule);
- *Plan and Time Schedule Under Part I.G.4(d) for Violations of Part I.G.2 for Constituents in the Second Quarter of 2011* dated September 7, 2011 (Q2 2011 Plan and Schedule); and

- *Letter* dated January 20, 2012 regarding the *Plan and Time schedule Under Utah Groundwater Discharge Permit UGW370004 Part I.G.4(d.)*
- *Revised Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah.* October 2007, (Existing Wells Background Report)
- *Revised Addendum: -- Evaluation of Available Pre-Operational and Regional Background Data, Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah.* November 16, 2007, prepared by INTERA, Inc. (Regional Background Report)
- *Revised Background Groundwater Quality Report: New Wells for Denison Mines (USA) Corp.'s White Mesa Uranium Mill, San Juan County, Utah.* Published in April, 2008 prepared by INTERA, Inc. (New Wells Background Report)

The latter three reports are collectively referred to as the "Background Reports".

During conference calls held on December 5, December 19, 2011, and March 12, 2012 Utah Division of Radiation Control (DRC) staff discussed issues related to pH and the Denison actions necessary to address DRC's concerns.

This document sets out the Plan and Schedule to address the issues related to pH at the Mill site that was agreed upon in principle during those conference calls.

1.1 Purpose

The purpose of this pH Plan is to describe the activities that will be completed by Denison to address the eleven wells in OOC status for pH and to determine whether the decline in pH in the perched groundwater at the Mill is the result of a natural phenomenon unrelated to Mill operations.

1.2 Previously Submitted Plans

As noted above, Denison has submitted two Plans (the Initial Plan and Schedule and the Q2 2011 Plan and Schedule) to address analytes other than pH in OOC status. Those plans were submitted June 13, and September 7, 2011.

The assessments for OOC constituents other than pH, proposed by Denison and described in Section 4 of the Initial Plan and Schedule and Section 4 of the Q2 2011 Plan and Schedule, will continue to be performed as proposed and in the timeframes set out in those Plans and Schedules.

Those assessments are intended to determine if the exceedances in question are due to background influences or Mill activities. If the exceedances are determined to be due to background influences then, as contemplated by those Plans and Schedules and this pH Plan, it will not be necessary to perform any further evaluations on the extent and potential dispersion of the contamination or to perform any evaluation of potential remedial actions. Monitoring will continue and, if appropriate, revised groundwater compliance limits (GWCLs) will be proposed to reflect changes in background conditions at the site. Specifics related to these assessments are discussed in the respective plans referenced above. Similar logic applies to the GWCLs for pH at the site.

2. HISTORY

A brief discussion of the history and previous activities is provided in Sections 2.1 and 2.2.

2.1 Summary of pH Activities

During the completion of the 4th Quarter 2010 Quarterly Groundwater Monitoring Report, Denison noted eleven perched groundwater monitoring wells with pH measurements below the GWCLs. These wells are located upgradient, cross-gradient, and downgradient of the Mill and tailings cells. Investigation into the eleven pH GWCLs in question indicated that the GWCLs for groundwater pH in all wells established in the January 20, 2010 GWDP were erroneously based on historic laboratory results instead of field measurements as contemplated by Table 2 of the GWDP. Denison notified DRC in a letter dated February 1, 2011 that the existing GWCLs for groundwater pH were incorrectly based on laboratory results rather than field measurements and proposed to submit revised descriptive statistics for field pH to be used as revised pH GWCLs by the end of the second quarter 2011.

Denison received approval from DRC by e-mail on February 14, 2011 to proceed with the revision of the pH GWCLs based on field measurements. Denison's geochemical consultant, INTERA, Inc., completed the data processing and statistical assessments necessary to revise the GWCLs based on historic field pH data. The data processing and statistical assessments completed by INTERA were based on the DRC-approved methods in the logic flow diagram included as Figure 17 of the New Wells Background Report. Following the statistical evaluation of pH data by INTERA., Denison compared the Mill's groundwater pH data from the 2nd Quarter of 2011, including accelerated sampling results through June 2011, and noted that all of the June 2011 groundwater results, and many of the other results from the 2nd Quarter, were already outside the revised GWCLs to be proposed in the June 30, 2011 letter, based on the logic flow diagram.

INTERA further noted that the historical trend of decreasing pH, which was addressed in the Background Study Reports, appeared to be present in nearly all wells throughout the Mill site area, including upgradient, downgradient, and cross-gradient wells in the groundwater monitoring program. Table 2 presents a summary of the results of the statistical evaluation of groundwater pH data performed by INTERA in June 2011. As shown in Table 2, as of June 2011, all groundwater monitoring (MW-series) wells demonstrated a downward trend in the field pH data over time.

Denison notified DRC on June 28, 2011 by telephone and by follow-up letter dated June 30, 2011 that the 2nd Quarter 2011 data exceeded the recalculated GWCLs. Denison advised DRC

that, as a result of these findings, Denison did not believe it was appropriate to continue with its efforts to reset the GWCLs for pH based on field pH data, as originally planned, but instead it appeared that it would be more appropriate to undertake a study to determine whether the decreasing trends in PH are due to natural influences and, if so, to determine a more appropriate way to determine GWCLs. Additionally, Denison requested the opportunity for a meeting with DRC to discuss Denison's findings to date and to agree upon any further investigations to be completed, as well as to agree upon the steps and milestone dates to be incorporated in the pH Plan. The meetings with DRC were conducted via teleconference on December 5, and December 19, 2011. These teleconferences resulted in the January 20, 2012 letter and this revised pH Plan. A subsequent teleconference on March 12, 2012 led to the development of this pH Plan.

2.2 Conclusions from the pH Data Analyses Conducted to Date

The primary conclusion from the activities conducted to date is that the historical trend of decreasing pH, which was addressed in the Background Study Reports, appears to be present in nearly all wells throughout the Mill site area, including upgradient, downgradient, and cross-gradient wells in the groundwater monitoring program, and there seems to be no abatement of the trend. The wide-spread nature of the decrease in pH in upgradient, downgradient and cross-gradient wells, suggests that the pH decrease results from a natural phenomenon unrelated to Mill operations.

2.3 Summary of Agreements and Actions

The following is a summary list of agreements and actions which resulted from the discussion with DRC in teleconferences on December 5, December 19, 2011 and March 12, 2012.

2.3.1 Denison Actions

2.3.1.1 Existing Wildlife Ponds

DRC and Denison acknowledge that recharging the existing wildlife ponds at the site may be adding oxygen to the groundwater, which, on the assumption that sufficient pyrite exists in the formation, may contribute to the decreasing trends in pH at the site, and to exceedances of certain metals in wells possibly as a result of decreases in pH.

The Mill has therefore agreed to stop recharging both upper wildlife ponds immediately. No actions to prevent natural accumulation of water will be taken. However, the ponds are not designed to gather precipitation from the local drainages, so the net evaporation rate should

ensure that the ponds do not accumulate any significant precipitation. Recharge at the two upper wildlife ponds would not resume without approval of the Executive Secretary.

The Mill will continue to recharge the lower wildlife pond (Butch's Bayou).

DRC and Denison acknowledge that stopping the recharge of the two upper wildlife ponds is expected to affect the perched water quality and water levels over time, which could result in the need to reset GWCLs at the site.

2.3.1.2 Statistical Analysis of pH Trends

Denison will provide to DRC a statistical analysis of pH in all wells at the Mill site, which will quantify the decreasing trends in pH at the site as a whole, and indicate which monitoring wells have significant decreasing trends in pH. The analyses are discussed in detail in Section 3.1. In performing this statistical analysis, Denison will follow the *Groundwater Data Preparation and Statistical Process Flow for Calculating Groundwater Protection Standards, White Mesa Mill Site, San Juan County, Utah,* included as Figure 17 in the New Wells Background Report. This statistical analysis report will be submitted to the Executive Secretary within 90 days after execution and delivery of a Stipulated Consent Agreement (the "Stipulated Consent Agreement") relating to the implementation of this pH Plan.

2.3.1.3 Assessments Outlined in the Plans and Schedules

The assessments proposed by Denison and described in Section 4 of the Initial Plan and Schedule and Section 4 of the Q2 2011 Plan and Schedule for OOC constituents except pH, will continue to be performed as proposed and in the timeframes set out in those Plans and Schedules. In addition, the statistical analysis of indicator parameters discussed in Section 3.1.2.1 below will also be performed in all wells that have one or more OOC constituents and for which such analysis is not otherwise being performed under Section 3.1.2.1.

2.3.1.4 Analysis of Pyrite at the Site

The site-wide decline of pH is occurring in perched wells cross-gradient, upgradient, and downgradient of the Mill suggesting that the potential causes are not related to Mill operation. Potential causes of the site-wide decline of pH may be the result of physical interactions, geochemical phenomenon, natural processes, or some combination of all of these factors. Physical interactions such as over-pumping, over-developing, increased sample frequency and the associated increased purging of the perched wells may be contributing factors. A geochemical phenomenon (such as the oxidation of pyrite) is a potential mechanism for the

decline in pH and could be enhanced by increased oxygen transport resulting from the physical interactions listed above. Natural processes such as drought conditions which may increase the rate of oxygen transport in the vadose zone may also be contributing factors. Although not necessarily the only or primary cause, the oxidation of pyrite (or other sulfides) is expected to occur site-wide, because pyrite has been noted in borings across the entire site (including borings located upgradient, cross-gradient, and downgradient of the Mill and tailings cells). Regardless of the outcome of the pyrite investigation specified in this pH Plan, it appears that the pH decline is a site-wide phenomenon resulting from one or more non-Mill related factors.

This pH Plan describes the activities that will be conducted to verify the presence of pyrite as one of the possible causes of the decrease in pH in perched groundwater at the Mill. In summary, the presence of pyrite will be verified using screening, visual and analytical methods.

A report will be prepared that summarizes the sample selection and submission process, the methods employed, and the results. The report will include an assessment of the results with regard to the potential for pyrite oxidation to affect pH at site perched monitoring wells. This report will be submitted to the Executive Secretary within 120 days after execution and delivery of the Stipulated Consent Agreement.

A detailed description of the pyrite investigation is included in Section 3.2 of this pH Plan. Regardless of the results of the pyrite verification study, however, the pH data to date indicate that the pH decline is a site-wide phenomenon and that if oxidation of pyrite or other sulfides is not the cause, then another, natural, site-wide phenomenon must be the cause.

2.4 Regulatory Actions

The January 20, 2012 letter was discussed with DRC in a teleconference on March 12, 2012, and it was agreed that the commitments by Denison and DRC referred to in that letter and the implementation of this pH Plan will be incorporated into the Stipulated Consent Agreement.

3. PH PLAN

The pH plan consists of a statistical and geochemical evaluation and a plan to verify the presence of pyrite as discussed in the following Sections.

3.1 Statistical and Geochemical Evaluation

As discussed in Section 2.1, Denison has been aware of the site wide decline in pH trends for some time. The New Wells Background Report stated:

> *"on a review of the pH time plots in all existing wells (see Appendix D of the Background Report), there appears to be a general decreasing trend in pH in all wells. Figure 18 shows results of linear regression analyses for all site monitoring wells over the same time period used for new wells. Regression lines trend downward in all site monitoring wells and among the existing wells the trends are statistically significant in MW-3, MW-12, MW-14 and MW-17. The fact that pH is trending downward in all site monitoring wells indicates that statistically significant decreasing trends in pH in MW-25, MW-27, MW-28, and MW-3A are not related to any potential tailings seepage impacts. Instead there is a systematic process occurring that affects the site as a whole. This process may be a natural phenomenon related to regional changes or it could be some systematic change in the way that samples are collected or analyzed."*

In INTERA's response to the URS Memorandum: Completeness Review for the *Revised Background Groundwater Quality Report: Existing Wells for Denison Mines (USA) Corp.'s White Mesa Mill Site, San Juan County, Utah,* dated July 2, 2008, INTERA predicted that pH in some wells could fall below GWCLs if methods of calculating GWCLs for pH were not modified. At this time, Denison proposes to perform a statistical analysis of pH in data collected from monitor wells across the site and a geochemical analysis of indicator parameters in the 11 pH wells in question in order to obtain a more complete and up to date understanding of pH trends across the site and any potential relationship to mill operations.

3.1.1 Statistical Analysis of pH Data

Denison will perform a statistical analysis of pH data from all perched monitor wells at the site for which at least eight rounds of data are available in accordance with statistical methods described in the Existing Wells Background Report. A test for trends will be particularly important and will be conducted in accordance with Section 6 (Testing for Trends and Calculating the GWCL) of the Existing Wells Background Report.

3.1.1.1 Linear Regression to Test for Trends

As there are no no-detect values in pH data, linear regression is the best test for normally or log-normally distributed data. The correlation coefficient (R) represents the linear relationship between two variables. R Square (R^2) shows how closely X and Y are related. By taking the square of the R value, all values of R^2 are positive (values of R can range from -1 to +1), and fall between 0 (no correlation) and 1 (perfect correlation). The R^2 value is a measure of the strength of the predictive capability of the regression line. An R^2 value of 0 indicates that the regression line has no predictive ability at all. An R^2 value of 1 indicates that the regression line fits the data perfectly and, therefore, has the highest possible predictive capability. Generally, an R^2 value less than 0.5 is considered to be a poor correlation, and the linear regression line is not considered to be a reliable representation of the data (i.e., it explains less than half of the data).

The significance of a correlation coefficient of a particular strength or fit will change depending on the size of the sample from which it was computed. In this document, linear regression trends are considered to be statistically-significant if there are enough data points to make a determination and enough of those points fall within the calculated variance of the data set. Least squares regression analysis of the data will be performed in order to determine whether the association between the variables is statistically significant at the 95 percent level.

The statistical significance (p-level) of a result is an estimated measure of the degree to which it is "true" (in the sense of "representative of the population"). More technically, the value of the p-level represents a decreasing index of the reliability of a result. The higher the p-level, the less we can believe that the observed relation between variables in the sample is a reliable indicator of the relation between the respective variables in the population. Specifically, the p-level represents the probability of error that is involved in accepting our observed result as valid, that is, as "representative of the population." For example, the p-level of .05 (i.e.,1/20) indicates that there is a 5 percent probability that the relation between the variables found in our sample is a "fluke." In other words, assuming that in the population there was no relation between those variables whatsoever, and we were repeating experiments like ours one after another, we could expect that in approximately every 20 replications of the experiment there would be one in which the relation between the variables in question would be equal or stronger than in ours. In many areas of research, the p-level of .05 is customarily treated as a "border-line acceptable" error level (StatSoft, Inc, 2005. STATISTICA [data analysis software system], version 7.1. www.statsoft.com).

3.1.1.2 Data Exploration

Some monitor wells at the site have data extending from 1979 to the present while others have barely eight recent data rounds. To date, decreasing pH trends have been observed most strongly in data collected from 2005 to the present. Therefore, Denison proposes to explore data sets to ascertain if there are any particular time periods during which pH data have shown a site wide decline and if such declines have happened in the past. If such declines have happened in the past or if they can be tied to a particular period, it may provide evidence for a process or cause of the declines.

3.1.1.3 Updating Compliance Limits

As mentioned in Denison's June 13, 2011 response to the *Notice of Violation and Compliance Order, Docket No. UGW11-02*, the United States Environmental Protection Agency (EPA) has recognized the need to update compliance limits periodically to reflect changes to background conditions.

As stated in EPA 530/R-09-007, March 2009 *Statistical Analysis Of Groundwater Monitoring Data At RCRA Facilities Unified Guidance*, Environmental Protection Agency, Office Of Resource Conservation And Recovery:

> *"We recommend that other reviews of background also take place periodically.*
>
> *These include the following situations:*
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> *During these reviews, all observations designated as background should be evaluated to ensure that they still adequately reflect current natural or baseline groundwater conditions. In particular, the background samples should be investigated for apparent trends or outliers. Statistical outliers may need to be removed, especially if an error or discrepancy can be identified, so that subsequent compliance tests can be improved. If trends are indicated, a change in the statistical method or approach may be warranted."*
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> *"Site-wide changes in the underlying aquifer should be identifiable as similar trends in both upgradient and compliance wells. In this case, it might be possible to remove a common trend from both the background and compliance point wells and to perform interwell testing on the trend residuals."*

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>
> *With interwell tests, a stronger trend in the common upgradient background may signify a change in natural groundwater quality across the aquifer or an incomplete characterization of the full range of background variation. If a change is evident, it may be necessary to delete some of the earlier background values from the updated background sample, so as to ensure that compliance testing is based on current groundwater conditions and not on outdated measures of groundwater quality."*

3.1.2 Geochemical Analysis of Wells with Significantly Declining pH

If the pH trend data from a monitor well is determined to be statistically significant, a geochemical analysis will be performed to determine if the declining pH trends can be related to potential mill processes. The geochemical analysis will consist of:

- an analysis of indicator parameters,
- a mass balance analysis, and
- an analysis of potential for transport.

3.1.2.1 Analysis of Indicator Parameters

Seepage from the tailings impoundments would be indicated by rising concentrations of chloride, sulfate, fluoride, and uranium because: 1) these constituents are abundant in tailings wastewater (see Table 15 of the Revised Background Report), and 2) these constituents are relatively mobile and conservative in the groundwater environment. In contrast, many other constituents are either not present in relatively high concentrations in tailings wastewater and/or are reactive in the subsurface environment. Denison will prepare time concentration plots of these four parameters from data taken from all monitor wells on site that have one or more OOCs, including OOCs for pH (where such indicator parameter data is available) to determine if there is evidence that concentrations of any of the OOC parameters can be related to potential mill processes.

Regression or Mann Kendall analysis will be performed to determine if any such indicator parameter has a significant upward trend. If a monitor well has a significant upward trend in some, but not all, indicator parameters, then a further analysis will be performed to determine whether or not the increasing trends can be related to potential mill processes.

3.1.2.2 Mass Balance Analysis

After the analysis of indicator parameters, if any indicator parameter shows a significant upward trend, a mass balance calculation will also be performed to determine if there is evidence that concentrations can be related to potential mill processes. It is possible to estimate the mass of each indicator parameter in the groundwater beneath the millsite by assuming a saturated thickness of groundwater in the aquifer matrix, a porosity of the aquifer matrix, an average concentration of constituents in groundwater, and an area to which the average concentration applies. Any potential source of indicator parameters will be evaluated to determine if it has the potential to have caused the mass of the indicator observed in the groundwater beneath the Mill site. First, the potential source must have a means to reach groundwater such as sufficient water or other fluid to travel through the vadose zone. Second there must have been sufficient concentrations of the indicator parameter in the source to account for the mass of indicator parameter observed in the groundwater. Both conditions can be evaluated by mass balance calculations.

An example of a mass balance calculation was presented in INTERA, Inc. 2009. *Nitrate Contamination Investigation Report, White Mesa Uranium Mill Site, Blanding Utah,* where one of the suggested possibilities was a groundwater mound from the tailings cells that might cause elevated nitrate and chloride concentrations upgradient in the area of the nitrate and chloride plume. A calculation for nitrate to evaluate this possibility (a calculation for chloride would be similar) suggests that on the order of eleven percent tailings solution (assuming the highest recently observed nitrate concentration in the tailings of 290 mg/L) would have to mix with unimpacted groundwater (assuming 1 mg/L) in order to account for the observed mass of nitrate in groundwater, assuming an average nitrate concentration in the plume above the 20 mg/L isopleth of 30 mg/L. The details of this example calculation based on nitrate are provided below.

The size of the nitrate plume above 20 mg/L is approximately 40 acres, or approximately 1,740,000 square feet in map area. Assuming 45 feet of saturated thickness (based on Hydro Geo Chem, Inc 2007. *Preliminary Contamination Investigation Report. White Mesa Uranium Mill Site Near Blanding, Utah. November 20, 2007*) and a porosity of 0.2, there are approximately 15,700,000 cubic feet or 117,000,000 gallons of groundwater in that area. Eleven percent of that is approximately 12,900,000 gallons (approximately 40 acre feet) which is a conservative

estimate of the volume of tailings solution that would have to be mixed with groundwater to account for the mass of nitrate in the portion of the plume above 20 mg/L nitrate. The following calculations support these estimates:

Assume:

- Nitrate Concentration in Tailings Solution 290 mg/L
- Nitrate Concentration in un-impacted Groundwater 1 mg/L
- Average Plume Concentration 30 mg/L

Mixing Equation: $C_t*V_t + C_g*V_g = C_m*V_m$ (eq1)

Where: C_t = Concentration of nitrate in tailings solutions
V_t = Volume of tailings solutions
C_g = Concentration of nitrate in unimpacted groundwater
V_g = Volume of unimpacted groundwater
C_m = Concentration of nitrate in mixture of groundwater and tailings solutions
V_m = Volume of mixture of groundwater and tailings solutions

Another Equation: $V_t + V_g = V_m$ (eq2)

Substituting eq2 in eq1: $C_t*V_t + C_g*V_g = C_m* (V_t + V_g)$ (eq3)

Substitute Nitrate Concentrations in eq3

$$290*V_t + 1*V_g = 30*(V_t + V_g)$$

$$290*V_t + 1*V_g = 30*V_t + 30*V_g$$

$$260*V_t = 29*V_g$$

$$V_t = 29/260*V_g = 0.11*V_g$$

Based on the above, the volume of tailings solution would have to be approximately eleven percent of the volume of un-impacted groundwater in the mixture.

The above mass balance is an example of calculations that would be prepared for, and the reasoning that would be applied to, indicator parameters in data from wells that are OOC for pH,

if those wells have rising trends in the indicator parameters. In the case of the indicator parameters their concentrations would be used instead of nitrate in the above equation(s). These calculations would provide one line of evidence to test the possibility that any potential rising trend in indicator parameters and the decreasing pH (in wells that are OOC for pH) could or could not be related to mill operations.

3.1.2.3 Potential Transport Analysis

In cases where data from OOC wells that have statistically significant decreasing pH trends and increasing indicator trends, are distant from the Mill's tailings cells, a transport analysis will be performed to determine the plausibility of impact from mill related processes. The transport analysis will consider the geochemical transport properties of each indicator parameter with a significantly increasing trend and an analytical calculation of potential travel times to the well from potential mill related sources will be performed to determine if there is evidence that the indicator parameter could plausibly have arrived at the well during the life of the mill.

3.1.3 Reporting

The Statistical and Geochemical Evaluation Report will detail the results of all of the analysis to be performed and the conclusions to be drawn from such analyses. Denison will work with DRC to reset GWCLs to properly reflect the decreasing pH trends. The report will also identify any further studies that the analysis indicates should be performed, and will propose, for Executive Secretary review and approval, a plan and schedule for completion of any such additional studies.

If further analysis is required after completion of the Statistical and Geochemical Evaluation Report, Denison and the Executive Secretary will agree on the scope of that analysis, based on the findings in the report, including any further reports that will need to be prepared. The report will be submitted to the Executive Secretary within 90 days after execution and delivery of the Stipulated Consent Agreement

3.2 Pyrite Analysis Plan

As discussed in Section 2.3.1.4, oxidation of pyrite (or other sulfides) is a potential cause of the site-wide decline in pH. Pyrite has been noted in the majority of the borings at the site having detailed lithologic logs (including borings located upgradient, cross-gradient, and downgradient of the millsite and tailings cells). The occurrence of the declining pH trend over the entire site indicates that the trend is not the result of site operations. Otherwise the decreases in pH would occur primarily within the area of the millsite and tailings cells.

Although pyrite has not been noted in every boring at the site having a detailed lithologic log, it has been noted in sufficient borings for pyrite oxidation to be considered a plausible mechanism for decreasing pH. The lack of visually detected pyrite in the lithologic log of any specific boring does not necessarily indicate that pyrite is not present in or near that boring nor that pyrite is not present in close enough proximity to that boring to influence pH in the well completed in that boring. Verification of the pyrite noted in existing drill cuttings samples from a subset of borings installed across the entire site is considered sufficient to demonstrate the site-wide occurrence of pyrite and to support the oxidation of pyrite (or other sulfides) as one plausible mechanism for the decreasing pH.

The purpose of the Pyrite Analysis Plan is therefore to verify the presence of pyrite as one of the possible causes of the decrease in pH. Existing drill cuttings and/or core samples stored at the site will be used for this purpose. The data quality objectives are as follows.

1. To verify the existence of pyrite reported in existing boring logs from a sample of site borings. The sample will include borings located across the entire site (upgradient, cross-gradient, and downgradient of the millsite and tailings cells).
2. To verify the existence of and analyze for pyrite in MW-series wells which are in accelerated monitoring for pH or OOC for pH and which have drill cuttings and/or core stored onsite.

3.2.1 Background

The 97 perched monitoring wells, temporary perched monitoring wells, and piezometers shown in Figure 1 are screened in a relatively shallow perched water zone hosted primarily by the Burro Canyon Formation. Where saturated thicknesses are greater, the perched water rises into the overlying Dakota Sandstone. The Burro Canyon is underlain by the Brushy Basin Member of the Morrison Formation, a bentonitic shale that essentially forms the base of the perched water zone. The permeability of the Burro Canyon is generally low, with a geometric average hydraulic conductivity on the order of 10^{-5} centimeters per second (cm/s), but with a range of approximately 10^{-8} cm/s to 10^{-2} cm/s.

Lithologic logs reveal that iron oxides and pyrite are common within the Burro Canyon and overlying Dakota. Many of the logs indicate the presence of carbonaceous fragments consistent with reduced conditions and the presence of pyrite. The iron oxides present in many of the borings may result from oxidization of pyrite or other sulfides.

Table 3 indicates the presence of visible pyrite, iron oxides, and carbonaceous material from borings at the site for which detailed and moderately detailed logs are available. Logs for many of the older wells at the site (MW-1 through MW-15) are not detailed enough to contain this information and are not included in Table 3. Logs for wells MW-16 through MW-22 are only moderately detailed. Logs for wells MW-3A, MW-23 through MW-37, temporary wells (TW4-series and TWN-series wells), and piezometers (PIEZ-series and DR-series) contain the most detail. Temporary wells and piezometers are included in Table 3 because many of these wells are in the vicinity of MW-series wells lacking detailed logs (for example, upgradient well MW-1) and they demonstrate the site-wide occurrence of pyrite.

Lithologic logs for all borings at the site having detailed logs (MW-3A, MW-23 through MW-37, temporary wells (TW4-series and TWN-series wells), and piezometers [PIEZ-series and DR-series]) are provided in Appendix A. Pyrite has been noted in approximately $^2/_3$ of the borings having detailed lithologic logs.

3.2.2 Pyrite Oxidation as a Potential Mechanism for Decreasing pH

Oxidation of pyrite is one potential mechanism for the decreasing pH measured in perched zone wells. Pyrite oxidizes in the presence of oxygen according to the following equation, producing hydrogen ions and sulfate in the process:

$$2FeS_2 + 7O_2 + 2H_2O = 2Fe^{2+} + 4SO_4^{2-} + 4H^+ \qquad \text{(eq4)}$$

This is the same mechanism that results in acidic drainage from mine tailings or waste rock piles containing pyrite. Oxygen transported into the piles reacts with the pyrite (in the presence of water) releasing acid and sulfate.

The widespread occurrence of visible pyrite in the Burro Canyon Formation (upgradient, cross-gradient, and downgradient of the millsite and tailings cells) makes this mechanism plausible. Sources of oxygen include 1) diffusion through the vadose zone aided by the generally dry condition of the vadose zone and barometric pumping 2) transport of oxygen from the surface directly to the formation via perched monitoring well casings, and 3) infiltration of water containing dissolved oxygen. Significant sources of infiltrating water containing oxygen include the wildlife ponds as discussed in Section 2.3.1.1. Oxygen transport in the vicinity of perched wells is expected to be enhanced by fluctuations in the perched water table caused by routine purging and sampling, the recent redevelopment effort, and changes in pumping. Changes in

purging and sampling methodology and frequency are also expected to impact oxygen transport to perched water.

A low rate of pyrite oxidation is likely taking place over the entire site due to diffusion of oxygen through the vadose zone and via oxygen dissolved in recharge. However, the rates are likely much larger in the vicinity of the perched zone wells where the well casings are a direct conduit for oxygen transport to the groundwater. With each well casing acting as a constant source of oxygen directly to groundwater, gradually expanding volumes of the perched zone near each well are expected to be impacted over time as oxygen spreads out, more pyrite is oxidized, and any neutralization capacity in the formation is consumed.

3.2.3 Rationale

Although pyrite has been noted in approximately $^{2}/_{3}$ of the borings having detailed lithologic logs, the DRC has requested verification of pyrite occurrence before considering oxidation of pyrite as a potential mechanism for decreasing pH.

Drill cuttings and core samples from the installation of numerous perched monitoring wells and borings have been collected, labeled as to the borehole name/number and depth interval, and stored on-site. Pyrite present in these existing samples is expected to have undergone small to negligible degradation since collection. Use of existing samples in the verification process is therefore considered acceptable.

Pyrite has been detected visually in drill cuttings from the site since at least 1999. Visual detection of pyrite in a particular sample suggests that the volumetric content of pyrite in the sample is at least 0.1%. Notations in the logs indicate volumetric pyrite contents may be as high as three percent in some intervals. Visual re-examination by an experienced geologist or mineralogist of drill cuttings samples previously identified as having pyrite is considered sufficient to verify the presence of pyrite. As an additional measure, laboratory analysis of pyrite is also proposed as discussed below.

The presence of visually detectable pyrite in a sample would increase the sulfur and iron contents of that sample and yield total iron and sulfur concentrations that are expected to be noticeably higher than samples without visually detectable pyrite, assuming all other conditions equal. Analysis of total iron and sulfur would likely identify samples with pyrite. However, gypsum has also been identified in drill cuttings from the site and gypsum would contribute to the total sulfur analytical result. Furthermore, high iron content could result from high concentrations of iron oxide minerals which may or may not be indicative of oxidized pyrite. Therefore, analysis of

samples for total iron and sulfur would likely yield results that are ambiguous with respect to pyrite content.

Using an analytical method specific to pyrite is expected to yield more conclusive results. Scanning electron microscopy coupled with energy dispersive x-ray analysis is one method capable of detecting pyrite.

3.2.4 Sampling and Analytical Plan

Verification of the presence of pyrite will be accomplished using visual and analytical methods. Visual verification will rely on examination of samples by an experienced geologist or mineralogist other than the geologist(s) who originally logged the borings. Analytical verification will rely on laboratory analysis of selected samples for pyrite and other sulfides. The locations of borings from which samples are to be submitted for visual or laboratory identification of pyrite, respectively, are provided in Figures 2 and 3. The sample set provides site-wide coverage.

Since 1999 drill cuttings samples were typically collected at 2 $^{1}/_{2}$ foot depth intervals and stored in zip-seal bags labeled with the boring identification (ID) and the depth interval. Smaller samples of the drill cuttings were typically washed and stored in plastic cuttings boxes labeled with the borehole ID and having each sample compartment labeled with the depth interval. When collected, core samples were logged continuously except for intervals where core recovery was not possible. Drill core was stored in cardboard core boxes labeled with the borehole ID and depth interval represented in each box.

Samples to be submitted for visual verification are provided in Table 4. All borings listed in Table 4 had pyrite noted in the drilling logs. Visual verification will rely on examination of drill cuttings and/or core samples from selected depth intervals where pyrite was noted in the drilling logs. The depth intervals will be within the screened intervals of borings completed as wells. Appendix B contains well completion diagrams for all wells listed in Table 4. Samples listed in Table 4 were collected from borings installed since 2002 that were upgradient, cross-gradient, and downgradient of the tailings cells (Figure 2). Borings listed in Table 4 include TWN-19 (the most upgradient boring at the site) and DR-25 (the most downgradient boring at the site.

Samples submitted for visual verification will consist of zip sealed bags of cuttings from the desired borings and depth intervals. These samples will be submitted to an experienced geologist or mineralogist for verification of 1) the presence of, 2) estimated abundance of, and 3) the estimated grain sizes of pyrite (or other visible sulfides) in each sample. Visual examination will include microscopic examination to ensure that pyrite too fine-grained to have been identified

during the logging procedure will be detected. A blank sample consisting of "play sand" placed in a zip seal bag and labeled similarly to the cuttings samples will also be submitted for visual analysis.

Samples to be submitted for laboratory analysis are provided in Table 5. Table 5 includes all MW-series wells under accelerated monitoring with declining pH for which cuttings or core samples are available. Not all borings listed in Table 5 had pyrite noted in the drilling logs. Samples submitted for laboratory analysis will consist of zip sealed bags of cuttings from the desired borings and depth intervals and subsamples of core from the desired borings and depth intervals, All submitted samples will be from depth intervals within the screened intervals of the wells. Appendix B contains well completion diagrams for all wells listed in Table 5. Analytical verification will rely on laboratory analysis for pyrite via scanning electron microscopy coupled with energy dispersive x-ray analysis or another method that is capable of quantifying sulfides.

Pyrite was not noted in the detailed drilling logs for MW-3A, MW-23, MW-24, MW-28, and MW-29, all of which are OOC for pH. Samples from these borings will be selected for laboratory analysis based on a field screening procedure. Existing cuttings and/or core samples from these borings will be screened visually and for iron and sulfur using a portable XRF. The XRF will be used in accordance with manufacturer's instructions. All samples from the screened depth intervals of the wells (Table 5) will be tested.

The results of the visual examination and the XRF screening will be documented in the field notebook. Documentation will include the sample color, whether or not pyrite was visible, and the results of the XRF scan with respect to iron and sulfur.

At least one sample from the screened depth interval of each boring will be submitted for laboratory analysis. If one or more samples from a particular boring have visually identifiable pyrite (presumably missed during the original logging procedure) at least one of those samples will be submitted for analysis. If the XRF screening is unsuccessful at identifying a sample from a particular boring having both iron and sulfur anomalies (and visual pyrite is not present), at least one sample will be selected for analysis based on color. A grayish or greenish color consistent with reduced conditions will be considered favorable for pyrite occurrence.

Each bagged cuttings or core sample selected for laboratory analysis will be photographed. Any core selected for analysis will be photographed within the core box prior to bagging. Cuttings selected for analysis will be photographed within the cutting storage box or zip-sealed bag. The depth interval written on the bag or cuttings storage box must be visible in the photograph.

Cuttings samples submitted for either visual or laboratory analysis will consist of the entire bagged cuttings sample. Subsamples from the existing bagged samples will not be submitted because of the likelihood that subsamples may not be representative due to pyrite having settled out in the original sample bags. If the original sample bag has deteriorated, the entire original bag will be placed inside a new labeled bag and submitted for analysis. A blank sample consisting of "play sand" placed in a zip seal bag and labeled similarly to the cuttings samples will also be submitted for laboratory analysis. The laboratory will be instructed to return unused sample material to the site within the original bags.

Core samples submitted for either visual or laboratory analysis will consist of subsamples of the core from the desired depth interval and placed in zip-sealed bags labeled with the boring number and the depth interval. The laboratory will be instructed to return unused sample material to the site within the original bags.

3.2.5 Reporting

A report will be prepared that describes the screening, selection, and submission of samples, the results of the sample screening process, and the visual and analytical methods employed. The report will provide the visual and analytical results and will include an assessment of the results with regard to the potential for pyrite oxidation to affect pH at site perched monitoring wells. This report will be submitted to the Executive Secretary within 120 days after execution and delivery of the Stipulated Consent Agreement.

4. LIMITATIONS

The information and any opinions, recommendations, and/or conclusions presented in this report are based upon the scope of services and information obtained through the performance of the services, as agreed upon by HGC and the party for whom this report was originally prepared. Results of any investigations, tests, or findings presented in this report apply solely to conditions existing at the time HGC's investigative work was performed and are inherently based on and limited to the available data and the extent of the investigation activities. No representation, warranty, or guarantee, express or implied, is intended or given. HGC makes no representation as to the accuracy or completeness of any information provided by other parties not under contract to HGC to the extent that HGC relied upon that information. This report is expressly for the sole and exclusive use of the party for whom this report was originally prepared and the particular purpose for which it was intended. Reuse of this report, or any portion thereof, for other than its intended purpose, or if modified, or if used by third parties, shall be at the sole risk of the user.

TABLES

TABLE 1

Listing of Groundwater Monitoring Wells Currently in Out-of-Compliance Status and Groundwater Wells in Accelerated Monitoring

Wells in Out-of-Compliance ("OOC") Status for Field pH	
Well	Quarter/Sampling Events of Initial Consecutive Field pH measurements outside of the GWCLs
MW-3	Q2 2010 - Q3 2010
MW-3A	Q2 2010 - Q3 2010
MW-12	Q4 2010 - Q1 2011
MW-14	Q1 2010 - Q2 2010
MW-23	Q4 2010 - Q1 2011
MW-24	Q4 2010 - Q1 2011
MW-25	Q4 2010 - January 2011 Monthly Sample
MW-26	July 2010 Monthly Sample - August 2010 Monthly Sample
MW-28	Q2 2010 - Q3 2010
MW-29	Q4 2010-Q2 2011 (semi-annual sampling frequency)
MW-32	Q2 2010 - Q3 2010
Wells in Accelerated Monitoring for Field pH**	
Well	Quarter/Sampling Events of Initial Field pH measurements outside of the GWCLs
MW-18	Q2 2010, Q3 2011 - Accelerated to quarterly from semi-annual
MW-19	Q2 2010, Q3 2011 - Accelerated to quarterly from semi-annual
MW-27	Q3 2011 - Accelerated to quarterly from semi-annual
MW-30	June 2011 Monthly Sample - Accelerated to monthly from quarterly
MW-31	June 2011 Monthly Sample - Accelerated to monthly from quarterly

** - All wells in OOC status are sampled at an accelerated frequency as required by the Groundwater Discharge Permit UGW370004, Part I.G.1.*

*** - The field pH measurements were outside on the GWCL on the dates listed above, however, the measurements were not outside of the GWCL in consecutive sampling periods. Therefore, these wells are not in out-of-compliance status.*

TABLE 2
Tabulated pH Results from
INTERA 2011 GWCL Evaluation*

Well	Constituent	GWQS	N	% Detected	Distribution	(r2)	Regression Trend	Z-Score	Mann-Kendall Trend	Mean	Standard Deviation (σ)	Lowest observed pH value	Highest observed pH value	Poisson Limit (95%)	Original Permit GWCL	Comments
MW-1	pH	6.5-8.5	21	100	Normal or Log-Normal	0.16	downward			7.27	0.28	6.82	7.86		6.5-8.5	Flow Sheet Method
MW-2	pH	6.5-8.5	14	100	Normal or Log-Normal	0.05	downward			7.02	0.26	6.44	7.48		6.5-8.5	Lowest Observed-Flow Sheet
MW-3	pH	6.5-8.5	24	100	Normal or Log-Normal	0.34	downward			6.46	0.25	5.95	6.99		6.5-8.5	Lowest Observed-Flow Sheet
MW-3A	pH	6.5-8.5	22	100	Normal or Log-Normal	0.42	downward			6.53	0.38	5.90	7.62		6.5-8.5	Flow Sheet Method
MW-5	pH	6.5-8.5	20	100	Normal or Log-Normal	0.37	downward			7.44	0.16	7.15	7.67		6.5-8.5	Flow Sheet Method
MW-11	pH	6.5-8.5	41	100	Normal or Log-Normal	0.13	downward			7.73	0.28	7.22	8.40		6.5-8.5	Flow Sheet Method
MW-12	pH	6.5-8.5	22	100	Non-Parametric	0.14		-2.85	downward	6.70	0.27	5.86	7.15	11.36	6.5-8.5	Lowest Observed-Flow Sheet
MW-14	pH	6.5-8.5	48	100	Normal or Log-Normal	0.14	downward			6.58	0.20	6.15	7.19		6.5-8.5	Lowest Observed-Flow Sheet
MW-15	pH	6.5-8.5	19	100	Non-Parametric	0.08		-1.72	downward	6.79	0.18	6.24	7.01	11.54	6.5-8.5	Lowest Observed-Flow Sheet
MW-17	pH	6.5-8.5	22	100	Normal or Log-Normal	0.08	downward			6.79	0.30	6.03	7.43		6.5-8.5	Lowest Observed-Flow Sheet
MW-18	pH	6.5-8.5	26	100	Normal or Log-Normal	0.17	downward			6.59	0.37	5.82	7.23		6.5-8.5	Lowest Observed-Flow Sheet
MW-19	pH	6.5-8.5	24	100	Normal or Log-Normal	0.26	downward			6.98	0.31	6.09	7.45		6.5-8.5	Lowest Observed-Flow Sheet
MW-20	pH	6.5-8.5	14	100	Normal or Log-Normal	0.25	downward			7.16	0.12	6.95	7.42		6.5-8.5	Flow Sheet Method
MW-22	pH	6.5-8.5	13	100	Normal or Log-Normal	0.37	downward			5.76	0.20	5.53	6.22		6.5-8.5	Lowest Observed-Flow Sheet
MW-23	pH	6.5-8.5	26	100	Normal or Log-Normal	0.25	downward			6.59	0.33	5.74	7.19		6.5-8.5	Lowest Observed-Flow Sheet
MW-24	pH	6.5-8.5	23	100	Normal or Log-Normal	0.34	downward			6.56	0.50	5.73	7.54		6.5-8.5	Flow Sheet Method
MW-25	pH	6.5-8.5	28	100	Normal or Log-Normal	0.06	downward			6.71	0.21	6.36	7.25		6.5-8.5	Flow Sheet Method
MW-26	pH	6.5-8.5	31	100	Non-Parametric	0.18		-1.90	downward	6.70	0.40	6.06	7.88	11.24	6.5-8.5	Flow Sheet Method
MW-27	pH	6.5-8.5	27	100	Normal or Log-Normal	0.04	downward			7.06	0.30	6.40	7.68		6.5-8.5	Lowest Observed-Flow Sheet
MW-28	pH	6.5-8.5	26	100	Normal or Log-Normal	0.36	downward			6.01	0.23	5.39	6.34		6.5-8.5	Lowest Observed-Flow Sheet
MW-29	pH	6.5-8.5	22	100	Normal or Log-Normal	0.09	downward			6.45	0.27	5.78	6.92		6.5-8.5	Lowest Observed-Flow Sheet
MW-30	pH	6.5-8.5	33	100	Normal or Log-Normal	0.17	downward			6.90	0.21	6.53	7.47		6.5-8.5	Flow Sheet Method
MW-31	pH	6.5-8.5	34	100	Normal or Log-Normal	0.04	downward			7.18	0.22	6.65	7.80		6.5-8.5	Lowest Observed-Flow Sheet
MW-32	pH	6.5-8.5	44	100	Normal or Log-Normal	0.25	downward			6.43	0.25	5.82	7.02		6.5-8.5	Lowest Observed-Flow Sheet

Notes:

Proposed Frequency of Re-Evaluation is based on frequency of sampling for each well at the time of this report and EPA guidance (EPA, 2009) suggesting re-evaluation of background after eight additional data points.

** Note: This Table reflects pH data through the 1st Quarter of 2011. Denison is not proposing these GWCLs at this time. This Table is provided for historic information purposes only.*

TABLE 3
Tabulation of Presence of
Pyrite, Iron Oxide, and Carbonaceous Fragments in Drill Logs

Well	Pyrite	C Fragments	Iron Oxide
MW-3A			X
[a]MW-16			X
[a]MW-17			X
[a]MW-18			X
[a]MW-19			X
[a]MW-20			X
[a]MW-21	X		X
[a]MW-22			X
MW-23			X
MW-24			X
MW-25	X		X
MW-26	X		X
MW-27	X		X
MW-28			X
MW-29			X
MW-30	X		X
MW-31	X		X
MW-32	X		X
MW-33			X
MW-34	X	X	X
MW-35	X	X	X
MW-36	X		X
MW-37	X		X
Piez-2			X
Piez-4	X		X
Piez-5	X		X
DR-2	X		X
DR-5	X		X
DR-6	X		X
DR-7			X
DR-8			X
DR-9	X		X
DR-10			X
DR-11	X		X
DR-12	X		X
DR-13			X
DR-14	X		X
DR-15	X		X
DR-16	X		X
DR-17			
DR-18	X		X
DR-19			X
DR-20	X		X
DR-21			X
DR-22			
DR-23	X		X
DR-24	X		X
DR-25	X		X

TABLE 3
Tabulation of Presence of
Pyrite, Iron Oxide, and Carbonaceous Fragments in Drill Logs

Well	Pyrite	C Fragments	Iron Oxide
TW4-1			X
TW4-2	X		X
TW4-3	X	X	X
TW4-4			
TW4-5	X	X	
TW4-6	X	X	X
TW4-7	X	X	X
TW4-8			X
TW4-9	X	X	X
TW4-10	X	X	
TW4-11		X	
TW4-12	X	X	X
TW4-13	X	X	X
TW4-14			X
TW4-15	X		X
TW4-16	X		X
TW4-17	X		X
TW4-18		X	X
TW4-19			X
TW4-20			X
TW4-21	X		X
TW4-22	X		
TW4-23	X	X	X
TW4-24			X
TW4-25	X		X
TW4-26			X
TWN-1			X
TWN-2	X		X
TWN-3	X		X
TWN-4			X
TWN-5	X		X
TWN-6	X		X
TWN-7			X
TWN-8	X		X
TWN-9			X
TWN-10			X
TWN-11	X		X
TWN-12	X		X
TWN-13	X		X
TWN-14	X		X
TWN-15	X		X
TWN-16	X		X
TWN-17			X
TWN-18	X		X
TWN-19	X		X

Notes:

C Fragments = particles of carbonaceous material (plant remains, etc)

[a] = only moderately detailed log available

TABLE 4
Samples to be Submitted for Visual Examination of Pyrite

Well	Pyrite Noted	Cuttings	Core	Depth Interval	Screen Interval
MW-26 (TW4-15)	X	X		92.5 - 95	62.5 - 122.5
MW-26 (TW4-15)	X	X		95 - 97.5	62.5 - 122.5
MW-34	X	X		67.5 - 70	69 - 109
MW-36	X	X		87.5 - 90	79.9 - 119.9
MW-36	X	X		112.5 - 115	79.9 - 119.9
MW-37	X	X		110 - 112.5	80.2 - 120.2
TW4-16	X	X		95 - 97.5	82 - 142
TW4-22	X		X	90 - 92.5	53.5 - 113.5
TW4-22	X	X		102.5 - 105	53.5 - 113.5
TWN-5	X	X		110 - 112.5	80 - 150
TWN-5	X	X		112.5 - 115	80 - 150
TWN-8	X	X		117.5 - 120	75.5 - 145.5
TWN-16	X	X		87.5 - 90	43 - 93
TWN-19	X	X		82.5 - 85	26 - 106
DR-9	X	X		105 - 107.5	82.1 - 112.1
DR-12	X	X		87.5 - 90	73 - 93
DR-16	X	X		97.5 - 100	NA
DR -25	X	X		75 - 77.5	NA

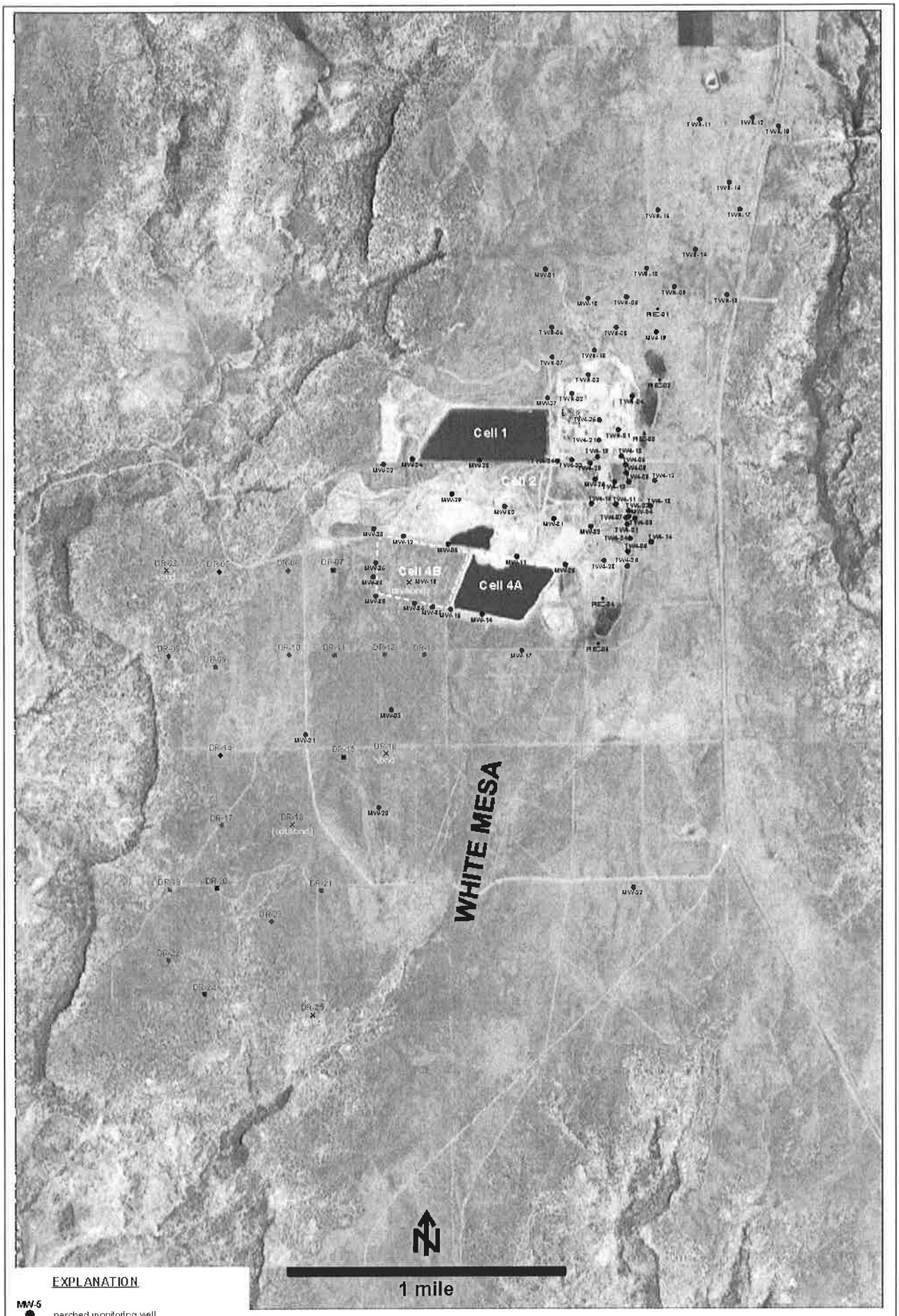
Note:
NA = not applicable (boring not completed as a well)

TABLE 5
Samples to be Submitted for Laboratory Analysis of Pyrite

Well	Pyrite Noted	Cuttings	Core	Depth Interval	Screen Interval
MW-3A		TBD[1]	TBD[1]	TBD[1]	78 - 95
MW-23		TBD[1]	TBD[1]	TBD[1]	109 - 129
MW-24		TBD[1]	TBD[1]	TBD[1]	100 - 120
MW-25	X	X		65 - 67.5	65 - 115
MW-26 (TW4-15)	X	X		90 - 92.5	62.5 - 122.5
MW-27	X	X		80 - 82.5	41 - 91
MW-28		TBD[1]	TBD[1]	TBD[1]	66 - 106
MW-29		X		TBD[1]	95 - 125
MW-30	X	X		65 - 67.5	67 - 107
MW-31	X	X		95 - 97.5	69 - 129
MW-32 (TW4-17)	X	X		105 - 107.5	80 - 130

Note:
TBD[1] = to be determined based on field screening

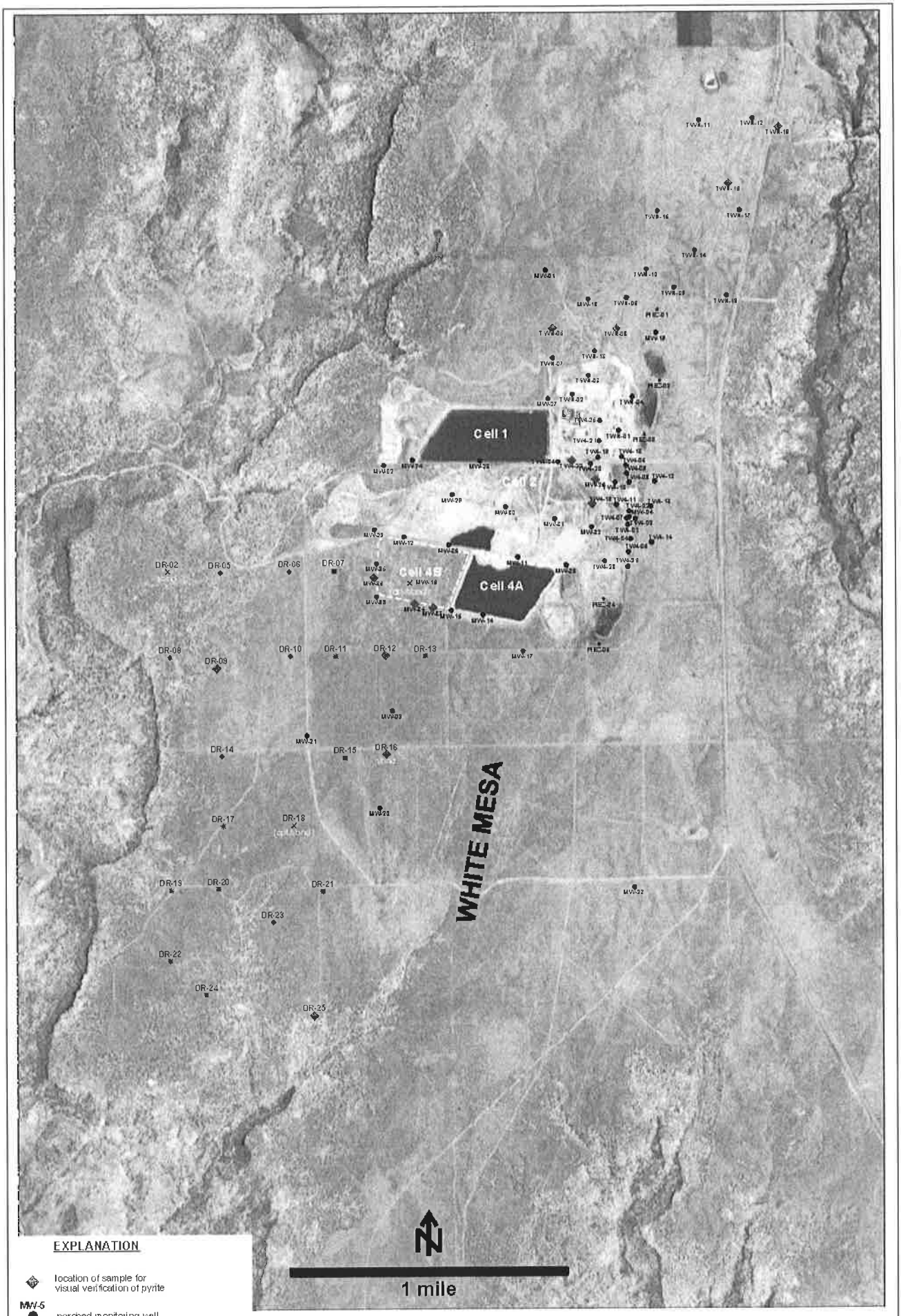
FIGURES



HYDRO GEO CHEM, INC.

WHITE MESA SITE PLAN
SHOWING LOCATIONS OF PERCHED WELLS, PIEZOMETERS, AND BORINGS

APPROVED	DATE	REFERENCE	FIGURE
		H:/716000/pHdecrease/UTMwelloc.srf	1



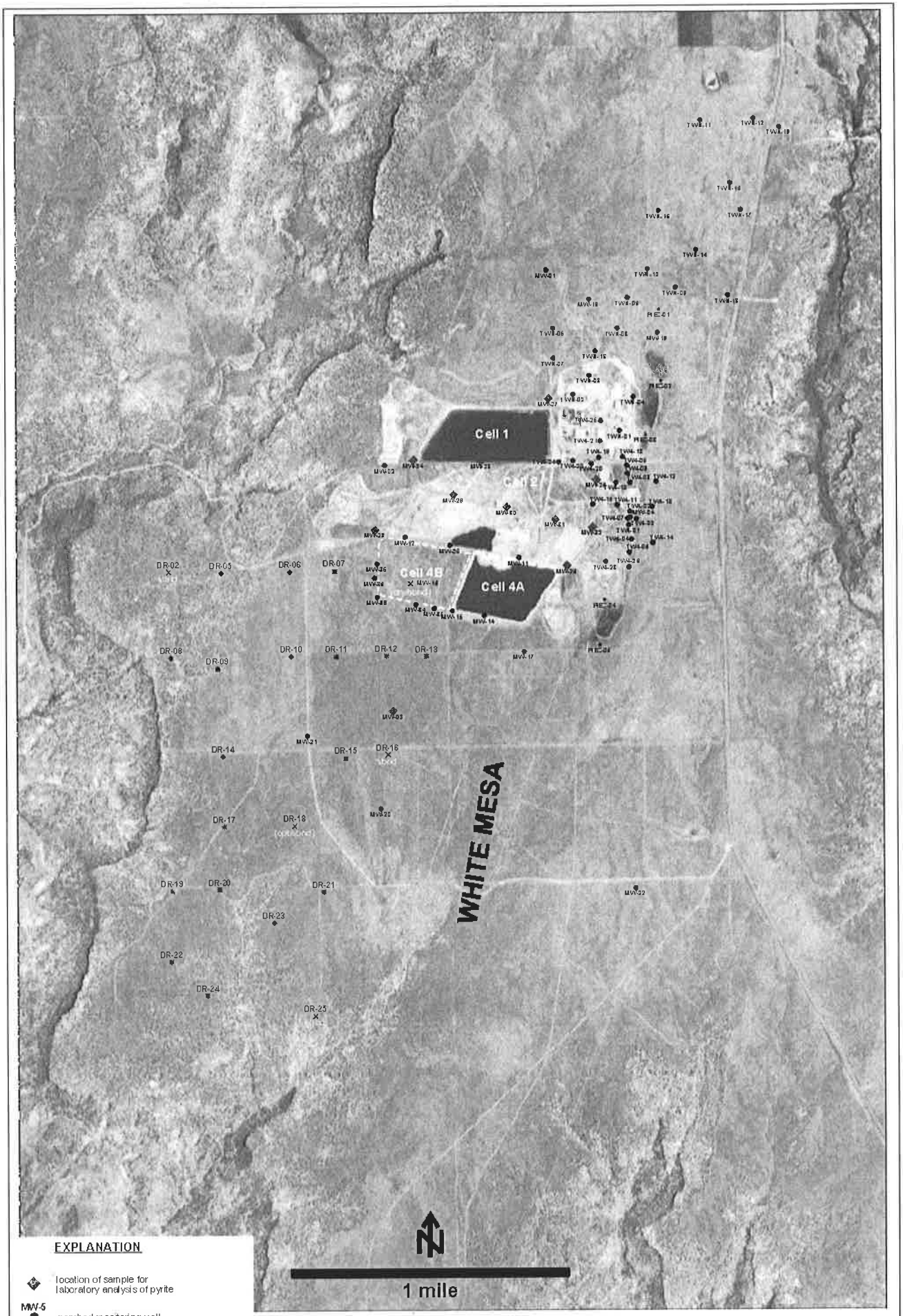
EXPLANATION

- location of sample for visual verification of pyrite
- MW-5: perched monitoring well
- PIEZ-1: perched piezometer
- DR-5: perched piezometer installed May/June, 2011
- abandoned perched well or boring

HYDRO GEO CHEM, INC.

WHITE MESA SITE PLAN
SHOWING LOCATIONS OF SAMPLES TO BE VISUALLY VERIFIED FOR PYRITE

APPROVED	DATE	REFERENCE	FIGURE
		H:/18000/pHdecrease/UTMsamplvis.srf	2



EXPLANATION

- location of sample for laboratory analysis of pyrite
- MW-5 — perched monitoring well
- PIEZ-1 — perched piezometer
- DR-5 — perched piezometer installed May/June, 2011
- × — abandoned perched well or boring

HYDRO GEO CHEM, INC.

WHITE MESA SITE PLAN SHOWING LOCATIONS OF SAMPLES FOR LABORATORY ANALYSIS OF PYRITE

APPROVED	DATE	REFERENCE	FIGURE
		H:\716000\pHdecrease\UTMsampllab.srf	3