RC-2009-007082





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

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VIA FEDERAL EXPRESS

December 30, 2009

Mr. Dane Finerfrock, Executive Secretary Utah Radiation Control Board Utah Department of Environmental Quality 168 North 1950 West P.O. Box 144810 Salt Lake City, UT 84114-4810

Dear Mr. Finerfrock:

Re: White Mesa Uranium Mill, Stipulated Consent Agreement, Docket No. UGW09-03 – Submittal of Nitrate Contamination Investigation Report

Reference is made to the Stipulated Consent Agreement (the "Agreement") between Denison Mines (USA) Corp. ("Denison") and the Utah Water Quality Board, Docket No. UGW09-03, concerning potential violations of the Utah Water Quality Act, including sections 19-5-104, -106, -111 and -115, Utah Code Annotated and in accordance with the Utah Administrative Procedures Act, UCA 63G-4-101 to -601.

Pursuant to paragraph 6A of the Agreement, please find enclosed two copies of the Nitrate Contamination Investigation Report, dated December 30, 2009 (the "Report"), prepared by INTERA, Inc. on behalf of and under the direction of Denison. Also enclosed are two CDs each containing an electronic copy of the Report.

I certify under penalty of law that the Report 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 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.

If you should have any questions or require additional information, please contact the undersigned or David C. Frydenlund, Denison's Vice President, Regulatory Affairs and Counsel at 303 389-4132.

Yours very truly,

DENISON MINES (USA) CORP.

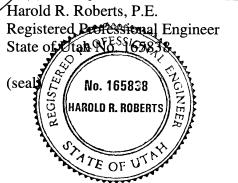
By:

Harold R. Roberts, P.E. Executive Vice President, US Operations

cc: Ron F. Hochstein David C. Frydenlund Steven D. Landau David E. Turk

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER

I hereby certify that the Report has been prepared under my direction, that I have reviewed the Report, that I am familiar with the White Mesa Mill facilities, and attest that the Report has been prepared in accordance with good engineering practices.







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Harold R. Roberts, P.E. Registered Professional Engineer State of Ctah No. 165838 REGISTERED (seal) No. 165838 HAROLD R. ROBERTS ATEOF AFFFFFFFFFFFF



Nitrate Contamination Investigation Report

White Mesa Uranium Mill Site Blanding, Utah

Prepared for:



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

Prepared by:



6000 Uptown Blvd. NE, Suite 100 Albuquerque, New Mexico 87110

December 30, 2009

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LIST OF ATTACHMENTS

- Attachment 1 Request for Voluntary Plan and Schedule to Investigate and Remediate Nitrate Contamination at the White Mesa Mill Site, Near Blanding, dated September 30, 2008.
- Attachment 2 Source Review Report for Nitrate and Chloride in Groundwater at the White Mesa Mill (Tischler, 2009)
- Attachment 3 White Mesa Uranium Mill Ground Water Monitoring Quality Assurance Plan (QAP) State of Utah Groundwater Discharge Permit No. UGW370004. Revision 4.0, Denison Mines (USA) Corp. April 16, 2009.
- Attachment 4 Initial Nitrate Monitoring Report, dated December 2009
- Attachment 5 Site Hydrogeology and Estimation of Groundwater Pore Velocities in the Perched Zone White Mesa Uranium Mill Site near Blanding, Utah (Hydro Geo Chem, 2009)
- Attachment 6 Calculation to Evaluate Potential Tailings Cell Source

LIST OF ACRONYMS AND ABBREVIATIONS

Board	Utah Water Quality Board
CAP	Corrective Action Plan
CIR	Contamination Investigation Report
cms	centimeters per second
DUSA	Denison Mines (USA) Corp.
EPA	U.S. Environmental Protection Agency
Executive Secretary	Co-Executive Secretary of the Utah Water Quality Board
ft/yr	foot/feet per year
gpm	gallons per minute
GWDP	Groundwater Discharge Permit No. UGW370004
GWQS	Groundwater Quality Standard
HGC	Hydro Geo Chem, Inc.
INTERA	INTERA, Incorporated
mg/L	milligrams per liter
Mill	White Mesa Mill Site
QA/QC	quality assurance/ quality control
QAP	Quality Assurance Plan
Request	Request for Voluntary Plan and Schedule to Investigate and
	Remediate Nitrate Contamination at the White Mesa Mill
RfD	reference dose
Site	White Mesa Mill Site
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality

1.0 INTRODUCTION

Denison Mines (USA) Corp. (DUSA) received a Request for Voluntary Plan and Schedule to Investigate and Remediate Nitrate Contamination at the White Mesa Mill (the "Mill") Site, near Blanding, Utah (the "Request") (Attachment 1). The Request was dated September 30, 2008 and was received from the Co-Executive Secretary (the "Executive Secretary") of the Utah Water Quality Board, of the Utah Department of Environmental Quality (UDEQ). In the Request, the Executive Secretary noted that groundwater nitrate levels have exceeded the State water quality standard of 10 milligrams per liter (mg/L) in certain monitoring wells at the Mill Site. Figure 1 is a regional map showing the location of the Mill Site.

As a result of the Request, DUSA agreed to submit a plan of action and a schedule for Executive Secretary approval for completion of a Contamination Investigation Report (CIR) to determine the physical cause(s), location(s), transfer mechanism(s) and characteristics of all source(s) of the nitrate contamination in order to form a basis for and facilitate later submittal of a groundwater Corrective Action Plan (CAP) that meets the requirements of Utah Administrative Code (UAC) R317-6-6.15D, or to demonstrate conclusively that DUSA did not cause or contribute to the nitrate contamination in any manner and that, as a result, such a CAP is not necessary. DUSA retained INTERA, Incorporated (INTERA) to develop a plan and schedule for completing this CIR and, if necessary, a CAP. A Plan and Schedule for Nitrate Contamination Investigation Report and Groundwater Corrective Action Plan (The Plan) (INTERA, 2008) was submitted to the Executive Secretary on November 19, 2008. A Stipulated Consent Agreement (Agreement) between DUSA and the Utah Water Quality Board (Board) was entered into in January, 2009. Subsequently, in a letter dated December 1, 2009, UDEQ noting that elevated chloride concentrations exist, apparently coincident with elevated nitrate concentrations, recommended that DUSA also address and explain the elevated chloride concentrations in this Report. Therefore, this Report will serve as a CIR for both nitrate and chloride at the Mill Site.

The purpose of this Report is to characterize nitrate and chloride contamination in groundwater at the Mill Site. The contamination investigation activities follow The Plan, as amended by the Agreement and the requirements found in UAC R317-6-6.15(D). As will be discussed in detail in Sections 2 and 3, the following conclusions are reached in this CIR:

- 1. The nitrate and chloride are extensive and appear to originally come from the same source.
- 2. That source is upgradient of the Mill property more than 1.2 miles from the Mill facilities, is not the result of Mill activities and was not caused or contributed to in any manner by Mill activities.

As a result, DUSA has concluded that it should not be required to prepare a CAP for nitrate/chloride contamination that is from an off-site source.

1.1 Documents Incorporated by Reference

The Mill has been the subject of numerous studies. According to UAC R317-6-6.15 (C), this CIR may incorporate by reference information already provided to the Executive Secretary. As described in more detail below, DUSA will summarize and incorporate by reference in this CIR information from a number of documents, which may include the following:

- White Mesa Uranium Mill; Environmental Report in Support of License Renewal Application, February 28, 2007, prepared by DUSA (DUSA, 2007);
- Environmental Report, White Mesa Uranium Project San Juan County, Utah, dated January 1978, prepared by Dames & Moore;
- Final Environmental Statement for the Mill prepared by the Nuclear Regulatory Commission, 1979;
- 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");
- Revised Background Groundwater Quality Report; Existing Wells For Denison Mines (USA) Corp.'s White Mesa Mill Site, San Juan County, Utah, Prepared by INTERA, October 2007 (the "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 White Mesa Mill Site, San Juan County, Utah, prepared by INTERA, November 16, 2007;

- Revised Addendum: Background Groundwater Quality Report: New Wells For Denison Mines (USA) Corp.'s White Mesa Mill Site, San Juan County, Utah, prepared by INTERA, April 30, 2008;
- Utah Division of Radiation Control, 2004, Statement of Basis for a Uranium Milling Facility South of Blanding, Utah, Owned and Operated by Denison Mines (USA) Corporation, Permit No. UGW37004 (Statement of Basis);
- DUSA Quarterly Groundwater Reports;
- DUSA Quarterly Chloroform Reports;
- Site Hydrogeology and Estimation of Groundwater Pore Velocities in the Perched Zone, White Mesa Uranium Mill Site, Near Blanding, Utah, dated December 29, 2009, prepared by Hydro Geo Chem, Inc.;
- Source Review Report for Nitrate and Chloride in Groundwater at the White Mesa Mill, dated December 30, 2009, prepared by Jo Ann Tischler;
- Initial Nitrate Monitoring Report, dated December, 2009, prepared by DUSA; and
- the Reclamation Plan, White Mesa Mill Blanding Utah, Radioactive Materials License No. UT1900479, Revision 4.0, November 2009 (the "Reclamation Plan, Rev. 4.0").

2.0 CONTAMINATION INVESTIGATION ACTIVITIES

All potential contributing surficial sources that could generate nitrate and chloride in the perched aquifer that have been identified to date, have been described in Sections 2, 3, 4 and 5 of the Source Review Report for Nitrate and Chloride in Groundwater at the White Mesa Mill dated December 30, 2009, prepared by Ms. Jo Ann Tischler (the Source Report), a copy of which is appended to this CIR as Attachment 2.

Contamination investigation activities included the above referenced analysis of possible sources at the Facility, installation of new perched groundwater wells, sampling of groundwater in the new wells, and analyses of groundwater in all wells and wildlife ponds.

Installation of 19 new monitoring wells (Figure 2) has allowed the nitrate and chloride plumes to be fully bounded at the Site (Figures 3 and 4). On Figure 3, nitrate iso-contours start at 5 mg/L because that value appears to separate the plume from background. However, as evident from Figure 3, the 10 mg/L contour that defines the groundwater compliance limit for nitrate at a number of wells at the Site as specified in the Groundwater Discharge Permit No. UGW370004 (GWDP) is completely closed and defined at the Site. Per discussions with UDEQ, the nitrate plume is considered to have been bounded when the concentrations of nitrate in monitoring wells upgradient, downgradient, and in both crossgradient directions are less than 10 mg/L. There is no groundwater standard for chloride but the iso-contours start at 100 mg/L because that value appears to separate the plume from background.

A feature of the plume maps is that the nitrate (Figure 3) and chloride plumes (Figure 4) are co-located geographically. Almost all locations that have elevated nitrate concentrations also have elevated chloride concentrations, implying that the nitrate and chloride impacts to groundwater had the same source. However, the nitrate plume shows a lobe extending to the southeast coincident with the chloroform plume (Figure 5) but the chloride plume does not. This indicates that elevated nitrate was present in the chloroform plume but chloride was not. The chloride plume demonstrates that there are two distinct plumes; a nitrate-chloride plume and the chloroform plume with distinctly different sources.

2.1 Possible Sources of the Pollution at the Facility

As discussed in detail in Section 3, based on new well installation and recent groundwater sampling, the source of nitrate and chloride contamination is off the DUSA

property to the northeast (see Figures 6 and 7). However, the Source Report, which is appended to this Report (Attachment 2), identified the following possible sources of nitrate and/or chloride in groundwater at the Site:

- The septic leach fields at the site;
- The municipal sewage plant discharge water used historically as Mill water makeup;
- Livestock activities at the wildlife ponds;
- Livestock activities at the Historic Pond;
- Agricultural activities;
- The former Fly Ash Pond;
- Potential historic spills of ammonia-bearing and/or chloride-bearing process chemicals;
- Potential breach in the Mill circuit floor drains or tailings transfer lines; and
- A potential leak in the Mill's tailings cells.

As will be discussed in more detail below, the municipal sewage plant discharge water used historically as Mill water makeup is the best candidate for the source of both elevated nitrate and elevated chloride in groundwater. However the following sections will review potential sources and compare their potential for contributing nitrate and chloride to groundwater based on data collected during this study.

2.1.1 Potential Tailings Cell Source

Elevated nitrate and chloride concentrations at TWN-3 are clearly a part of the plume. This monitoring well is more than 1,000 feet upgradient of the tailings cells. It is unlikely that tailings solutions could travel this distance horizontally in the vadose zone. Further the plume at TWN-3 is clearly spatially and chemically related to the plume at TWN-19 which is more than 7,200 feet upgradient of any tailings cell.

Other suggested possibilities include a groundwater mound from the tailings cells that might cause elevated nitrate and chloride concentrations upgradient. A quick 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 size of the nitrate plume above 20 mg/L is approximately 40 acres, or 1,800,000 square feet in map area (Figure 3). Assuming 45 feet of saturation (Chloroform Investigation Report) and a porosity of 0.2, there are 16,200,000 cubic feet or 121,176,000 gallons of groundwater in that area. Eleven percent of that is 13,329,360 gallons (approximately 41 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.

That amount of seepage from the tailings cells would certainly generate a groundwater mound. Such a mound would have to be on the order of 5 feet on average over the entire 40 acres, but would likely be much higher than that at the centroid of the plume and would taper off toward the edges of the plume. However, no such mounding exists under the tailings cells. While groundwater mounding can be observed towards the eastern portion of the site, away from the tailings cells, it is clearly related to the wildlife ponds and not the tailings cells (See Figure 8). As a final point, if the concentration of nitrate in tailings documented in the Statement of Basis (24 mg/L) were used in the calculation, no amount of tailings solution would bring the plume concentration to 30 mg/L.

Based on the results of the nitrate investigation, the discussion above, and recent studies by the University of Utah (Solomon and Hurst, 2008) indicating that the Mill's tailings cells have not leaked, the tailings cells have been removed from the list of potential sources of nitrate and chloride at the Site.

2.1.2 Potential Mill Circuit Source

The Mill circuit is located downgradient of elevated nitrate and chloride concentrations at TWN-3, and the same argument advanced for the tailings cells applies. The plume at TWN-3 is clearly spatially and chemically related to the plume at TWN-19 which is more than 6,900 feet upgradient of TWN-3. Additionally, there is no known history of leaks or spills of the magnitude required to supply the mass of nitrate currently observed in groundwater. Further, as noted in the Source Report, spills of these materials are too finite a phenomenon to account for an ongoing plume on their own. Therefore, a Mill circuit source has been removed from the list of potential sources of nitrate and chloride at the Site. Similar arguments rule out a Mill laboratory source from the list of potential sources of nitrate and chloride at the site.

2.1.3 Potential Fly Ash Pond Source

As with the potential tailings cell and Mill circuit the former Fly Ash Pond is also considerably downgradient of demonstrated elevated levels of nitrate and chloride in groundwater in samples from TWN-3 and TWN-19. The contents of the Fly Ash Pond were removed and the pond was covered and closed in 1989. The Fly Ash Pond was called a pond because it was located at a low point that collected storm run-off water. However, standing water in the pond was pumped regularly to the tailings cells thereby reducing the pond's ability to drive any recharge to groundwater. Further, a component of fly ash is lime (CaO). This chemical reacts with water (H₂O) to form calcium hydroxide [Ca(OH)₂]. This property of fly ash leads to the formation of a kind of natural cement that would tend to form a barrier to infiltration (Scott and Thomas, 2007), favoring evaporation of pond solutions rather than groundwater recharge. Therefore, a Fly Ash Pond source, while possible, is less likely than potential sources upgradient of TW4-25. This potential source has been removed from the list of potential sources of nitrate and chloride at the Site.

2.1.4 Potential Septic System Sources

As above, this potential source cannot explain the nitrate and chloride plume far to the north of the Mill Site. However, a number of septic leach fields exist at the Mill Site, and septic systems have caused regional nitrate contamination in many areas (McQuillan, 2004). Figure 7 shows five separate leach fields at the Mill Site along with associated piping. Two of the Site leach fields, the Former Office Leach Field and the Scale House Leach Field, apparently gave rise to the chloroform plume that is currently under remediation. It is worth noting that the nitrate and chloride plume is chemically distinct from the chloroform plume in that the chloroform plume has distinctly lower levels of chloride. Therefore, this potential source has been removed from the list of potential sources of nitrate and chloride at the Site. Any nitrate in the chloroform plume that has resulted from these leach fields will be remediated under the chloroform investigation.

2.1.5 Potential Frog Pond Water Sources

Until the early 1990s, process water for the Mill was limited to the deep water supply wells on Site, and the Mill sought additional sources of process water. Recapture Reservoir was not constructed until 1988-1989, and the pipeline from Recapture Reservoir to the Mill was not completed until around 1991-1992. From the mid 1980s until the Recapture Reservoir water was first piped to the Mill in 1991-1992, the Frog Pond served as an additional water source for Mill operations.

Nitrate Contamination Investigation Report White Mesa Mill Site

This source is considered to be the most likely explanation for the distribution of the nitrate and chloride plume. The waste water treatment facility described in the Source Report is located several miles upgradient of the Mill Site (Figure 6) but discussions with Mill staff indicate that effluent from that facility was allowed to flow to a pond (Frog Pond) near the Mill boundary where it was subsequently piped to the northern-most Wildlife Pond at the Site and to another holding pond on Site for Mill makeup water (Lawzy Lake, see Figures 6 and 7). The Mill staff reports that this water had a bad odor and may have had a high sludge content. Nitrate and chloride are commonly associated with wastewater treatment effluent (McQuillan, 2004).

At the Frog Pond an electric pump carried the water for use at the Mill via underground pipe to ponds at the rate of about 200 gallons per minute (gpm). Just north of the Mill's restricted area, the water could be diverted to either the northern most wildlife pond or to a secondary pond, referred to as "Lawzy Lake". At the wildlife pond a diesel pump was activated when water was needed in the Mill. Water was then pumped from the northern wildlife pond to the Mill's pre-leach tanks, which acted as water storage for the Mill. The water in Lawzy Lake was gravity fed to a sump (the "Lawzy Sump") within the restricted area. Once the water reached the sump, it was pumped to the pre-leach tanks for water storage (Figure 7). Neither the wildlife pond nor Lawzy Lake is lined.

This potential source term was a high priority during this contamination investigation for several reasons. The period of Mill use of water from the waste water treatment plant was from the mid 1980s to about 1991 or 1992 when it was replaced with water from Recapture Reservoir. As documented in the Background Report (INTERA, 2007), groundwater levels at the Site have been influenced by the Wildlife Ponds so we know that the head in those ponds has been sufficient to drive infiltration to the water table.

The "slug" like character of the nitrate and chloride plume is consistent with a source that has been removed. The distances from the northern-most Wildlife Pond and Lawzy Lake to the centroid of the nitrate plume are approximately 2,300 feet and 2,100 feet, respectively. Assuming 26 years since nitrate/chloride laden water entered the system, groundwater would have had to travel at an average velocity of 88 feet per year (ft/yr) from the northern-most Wildlife Pond and 81 ft/yr from Lawzy Lake to account for the current distribution of nitrate concentrations. The velocity of 88 ft/yr from the northern-most Wildlife Pond is a relatively high velocity compared to other values that have been calculated for the Site, but possible given the high gradient in this limited portion of the Site is

known to have higher permeability than the western portion (see the Preliminary Contamination Investigation Report [HGC, 2007]). The Lawzy Sump is even closer to the plume. The Frog Pond was constructed prior to Mill operations, by creation of a dike to capture surface water, by local ranchers in order to capture available surface waters. The Mill was not involved in any way in the construction of the Frog Pond.

For the above reasons Lawzy Lake, the Lawzy Sump, and the northern-most Wildlife Pond are likely infiltration points for Frog Pond water. These potential infiltration points have been addressed by installation of two monitoring wells. One (TWN-3) was installed half way along a line between the north end of the Mill building and Lawzy Lake. Analytical results of samples of groundwater from well TWN-3 (29 mg/L nitrate and 106 mg/L chloride) indicate that this well may be near a potential source. The other monitoring well (TWN-4) was installed on a line approximately half way between the north end of the Mill building and the northern-most Wildlife Pond. Groundwater samples from TWN-4 contained 0.4 mg/L nitrate and 11 mg/L chloride.

Another possible explanation for the distribution of nitrate and chloride using the Frog Pond water source is that the pipeline from the Frog Pond to the northern wildlife pond and Lawzy Lake may have leaked. However, it seems likely that leaks would have been noticed, particularly leaks of enough volume to travel to groundwater and add the observed mass of nitrate and chloride.

2.1.6 Livestock Activity at Wildlife Ponds and Historic Pond

The northern-most Wildlife Pond was a stock watering pond for years prior to construction of the Mill. The Historic Pond, which no longer exists, but was located where the Mill's sulfuric acid tank is currently located, (Figure 7) pre-existed construction of the Mill by several decades, tracing back possibly to the 1920s.

Livestock can generate nitrate in and around stock watering ponds and salt licks for livestock can generate chloride, and the water head in the ponds could potentially drive those nitrates into the groundwater. However these mechanisms alone would be unlikely to generate enough mass to account for the current mass of nitrate and chloride observed in groundwater.

2.1.7 Agricultural Sources

The Mill is located south of Blanding, Utah in a rural agricultural region of the state. Land uses proximal to the Mill include farming, ranching, cattle grazing and feed and grain silos. Those activities could generate both nitrate and chloride to groundwater. While it is possible that agricultural practices on neighboring properties that occurred at some time in the past (but which no longer occur) could have contributed a slug of both nitrate and chloride contamination to groundwater, this is difficult to quantify and appears much less likely than the Frog Pond source discussed above.

2.2 New Wells

TWN-1 through TWN-19, were drilled, completed, and developed in the same manner as the chloroform investigation wells as specified under UAC R 317-6-6.3 (I) (6) and the Mill's State of Utah Division of Water Quality GWDP. The locations of the new wells are shown in Figure 2.

2.3 Groundwater Sampling

Groundwater in all groundwater wells on Site, including groundwater in the 19 new TWN wells was collected and analyzed for nitrate and chloride as part of the contamination investigation. The rationale behind the groundwater sampling plan is described below.

2.3.1 Sampling Design

New sampling locations have been determined based on concentrations of nitrate and chloride from previous analytical results, including quarterly groundwater and chloroform reports and an analysis of potential sources (see Section 2.1 above). Groundwater samples were collected according to Section 6 "Ground Water Sampling and Measurement of Field Parameters" of the White Mesa Uranium Mill Groundwater Monitoring Quality Assurance Plan (the QAP) (DUSA, 2009, Attachment 3). Sample locations, parameters, and rationale are listed in Table 1 of this Report.

Table 1 of the QAP presents the analytical method, reporting limit, maximum holding time, and sample preservation requirements (including temperature) for nitrate and chloride samples.

2.3.2 Sampling Quality Assurance/Quality Control

Sample collection, handling, identification, and shipping were performed according to the QAP. See the Initial Nitrate Monitoring Report included as Attachment 4, for a QA/QC analysis and for identification of any deviations from the requirements of the QAP.

2.3.3 Laboratory QA/QC and Reporting

To ensure quality of laboratory analysis, the Mill's contract analytical laboratory (Energy Laboratories, Inc.) was required to analyze quality assurance/quality control (QA/QC) samples as specified by the analytical method. This QA/QC was performed in the same manner as the quarterly groundwater and chloroform analysis, and according to the QAP. See the Initial Nitrate Monitoring Report included as Attachment 4.

Laboratory analytical reports were submitted to DUSA and INTERA in the form of an Electronic Data Deliverable, which was verified by INTERA.

3.0 CHARACTERIZATION OF POLLUTION

The following sections describe the characterization of pollution as required by R317-6-6.15 D 1.

3.1 Characteristics of Contaminants in Groundwater and Contributing Surficial Contaminants

The contaminants of concern have been identified as nitrate and chloride in the perched aquifer at the Mill Site. Characteristics of nitrate and chloride in groundwater are described in the following sections.

3.1.1 Amount, Form, Concentration, and Toxicity of Contaminants

Based on Figure 3 and Figure 4, elevated concentrations of nitrate and chloride appear to be co-located across the Site, suggesting derivation from the same source.

3.1.1.1 Nitrate

Groundwater from Site monitoring wells has been sampled and nitrate has been measured as nitrate+nitrite and reported as nitrogen. Nitrate (NO³⁻) and nitrite (NO²⁻) are naturally occurring inorganic ions that are part of the nitrogen cycle. Because nitrite is easily oxidized to nitrate, nitrate is the compound predominantly found in groundwater. Nitrates themselves are relatively nontoxic. However, when swallowed, they are converted to nitrites that can react with hemoglobin in the blood, oxidizing its divalent iron to the trivalent form and creating methemoglobin. This methemoglobin cannot bind oxygen, which decreases the capacity of the blood to transport oxygen, so less oxygen is transported from the lungs to the body tissues, thus causing a condition known as methemoglobinemia (Argonne National Laboratory, 2005).

The U.S. Environmental Protection Agency (EPA) has developed toxicity values to estimate the risk of non-cancer health effects from ingesting nitrates and nitrites. The toxicity value used to estimate a non-cancer effect following ingestion is called a reference dose (RfD). An RfD is an estimate of the highest dose that can be taken in every day without causing an adverse effect. The RfD for nitrate was developed considering the concentration at which methemoglobinemia was indicated at levels above 10% for 0- to 3-month-old infants. This was based on a daily intake of formula made with water containing 10 mg/L of nitrate as nitrogen. This reflects the amount of nitrogen within a nitrate molecule, where 1 mg nitrate as nitrogen = 4.4 mg nitrate as measured in the water.

Most cases of infant methemoglobinemia are associated with exposure to formula prepared with drinking water at nitrate-nitrogen levels at least two times higher, or exceeding 20 mg/L nitrate-nitrogen. For nitrite, the RfD is based on a 10-kilogram (22-pound) child drinking 1 liter, or about 1 quart, of water every day. The RfD represents a "safe daily dose" and so is compared to the amount an individual is estimated to take in every day, as a ratio (Argonne National Laboratory, 2005). Thus the EPA Standard for nitrate in groundwater is 10 mg/L as nitrogen.

With respect to the amount and concentration of nitrate in the plume, the highest nitrate level that has been detected at the Site is 45.3 mg/L in monitor well TW4-24 in a sample collected on June 25, 2008. Nitrate levels in that well have declined and the most recently measured value in a sample of groundwater, taken on September 15, 2009, is 30.7 mg/L. Typical concentrations in the area of the nitrate plume range from 5 mg/L to 25 mg/L. The areal extent of the plume is depicted on Figure 3. The vertical extent is the perched groundwater zone within the area of the plume.

3.1.1.2 Chloride

Chloride is considered to be a major element that occurs in almost all groundwater (Hem, 1992) and occurs as a chloride ion (Cl⁻). There is no human health standard for chloride in groundwater. The EPA Standard for chloride in drinking water (250 mg/L) is an aesthetic standard related to the salty taste of water with chloride concentrations in excess of that amount. The recommended EPA criterion for the propagation of wildlife is 1,500 mg/L.

With respect to the amount and concentration of chloride in the plume, the highest chloride level that has been detected at the Site is 1,180 mg/L, again in monitor well TW4-24 in a sample collected on September 10, 2008. Chloride levels in that well have declined and the most recently measured value in a sample of groundwater, taken on September 15, 2009, is 618 mg/L. Typical concentrations in the area of the nitrate plume range from 100 mg/L to 300 mg/L. The areal extent of the plume is depicted on Figure 4. The vertical extent is the perched groundwater zone within the area of the plume.

3.1.2 Environmental Fate and Transport

Nitrate and chloride behave in a similar way in many groundwater systems. With some exceptions described below, both are non-reactive and conservative constituents whose concentrations are diminished in groundwater only by diffusion and dispersion with travel distance.

3.1.2.1 Nitrate

Since it is very soluble and does not bind to soils, nitrate has a high potential to migrate to ground water. Because it does not evaporate, nitrate/nitrite is likely to remain in water until consumed by plants or other organisms (http://www.epa.gov/safewater/ contaminants/dw_contamfs/nitrates.htm). The retardation factor (R) is one of the coefficients that describe the migration abilities of particular components in groundwater. It shows how many times the migration of the substance subjected to adsorption is slower than the actual speed of water flow in pores. The average intensity of nitrate adsorption is described as low, and the retardation factor ranges between 1 and 2 (Deutch, 1997). However, if nitrate is discharged into anoxic ground water, or if oxic ground water containing nitrate either migrates into anoxic conditions or is made anoxic by anthropogenic discharges, de-nitrification can occur, converting nitrate to nitrogen gas (N²) (McQuillan, 2004).

3.1.2.2 Chloride

Chloride ions do not significantly enter into oxidation or reduction reactions and they form no important solute complexes with other ions unless the chloride concentration is extremely high. Chloride ions do not form salts of low solubility, are not significantly adsorbed on mineral surfaces, and play few vital biochemical roles. Thus, the attenuation of chloride ions in the hydrologic cycle is largely through the physical processes of hydrodynamic dispersion and diffusion (Hem, 1992).

3.2 The Areal and Vertical Extent of the Contaminant Concentration, Distribution and Chemical Make-Up

Groundwater at the Mill has been monitored for the past 30 years; therefore, certain characteristics of nitrate and chloride contamination have already been determined. Prior to the contamination investigation activities, the nitrate and chloride plumes were well constrained in the downgradient direction. They had clear boundaries to the west and to the south.

On the east side, apparently nitrate partially comingles with nitrate associated with the chloroform plume. Groundwater extraction for remediation of chloroform may have caused additional comingling in this area obscuring any relationship that may have existed between the two plumes. New wells have defined an elongated plume extending over a mile to the northeast from the northern-most wildlife pond to DUSA's property boundary (Figures 3 and 4). Sampling has confirmed the association of nitrate with chloride in this plume. The plume exists in two distinct parts divided by a zone of low concentrations in the vicinity of the northern-most wildlife pond.

3.2.1 New Wells

The new monitoring wells were installed according to UAC R317-6-6.3(I)(6). Initially, DUSA installed four new monitoring wells (TWN-1 through TWN-4) in late January, 2009 as described in the Plan (INTERA, 2008). Sampling of those wells revealed that elevated nitrate and chloride concentrations exist north of the Mill Site proper and north of the ore pads (in TWN-3). Based on this information, an additional six monitoring wells were installed in July 2009 (TWN-5 through TWN-10). Sampling of those wells revealed that elevated nitrate and chloride concentrations exist still further north at TWN-9. Therefore, an additional nine monitoring wells were installed (TWN-11 through TWN-19) in late September and early October, 2009 to further bound the plume.

Figures 3 and 4 present nitrate and chloride data, respectively, from November 2009 and contoured by the krieging routine in SURFER 8. On Figure 3, nitrate iso-contours start at 5 mg/L because that value appears to separate the plume from background. However, as evident from Figure 3, the 10 mg/L contour that defines the groundwater compliance limit for nitrate at a number of wells at the Site as specified in the GWDP is completely closed and defined at the Site. Above the 10 mg/L contour, nitrate contours increase in 10 mg/L increments. There is no groundwater standard for chloride but the iso-contours start at 100 mg/L because that value appears to separate the plume from background and thereafter chloride contours increase in 100 mg/L increments.

These figures demonstrate that a plume exists in groundwater that is clearly unrelated to the tailings cells and other Mill facilities and is apparently moving southwest with groundwater flow from a source northeast of the Mill Site. This plume is distinctive in its association of nitrate with chloride and, as described in Section 2, can be distinguished from the chloroform plume based on its distinctive chemistry. The most upgradient location within the nitrate-chloride plume is the new monitoring well TWN-19, approximately 1.4 miles upgradient of the tailings cells and at the north east boundary of the Mill property, where nitrate concentrations are 7.4 mg/L and chloride concentrations are 125 mg/L. Currently, the centroid of the plume is downgradient of the Mill office building, at TW4-24 where current nitrate concentrations in groundwater are near 30 mg/L and chloride concentrations are near 600 mg/L.

The current plume configuration appears to approximate "plug-flow" behavior, where a "slug" of contamination moves as a mass with groundwater. If so, the distribution of nitrate and chloride concentrations suggest a point source of nitrate contamination

upgradient of the Mill property that contributed to groundwater for a finite period of time and has subsequently been removed.

3.2.2 Hydrogeological Report of New Wells

Hydraulic testing of new monitoring wells TWN-1 through TWN-19 was conducted to estimate perched zone hydraulic properties in the vicinity of each new well. The complete Perched Nitrate Monitoring Well Hydraulic Tests report (HGC, 2009) is included in this Report as Attachment 5.

Slug test data were collected and analyzed using AqtesolvTM software. Estimates of hydraulic conductivity range from 3.6 x 10 -7 centimeters per second (cm/s) at TWN-7 to 0.0142 cm/s at TWN-16. Except for the hydraulic conductivity estimate at TWN-16, values are within the range previously reported for the Site. Pore zone velocities along hypothetical pathways through elevated nitrate areas have been calculated as approximately 0.55 ft/yr to 7 ft/yr in the northeast area plume. Pore velocity for the Mill area plume is 23 ft/yr.

These values are lower than might be expected. However, coupling the fact that the highest conductivity ever measured at the Site is located in this area and the relatively small number of measurement locations (19 over an approximately one square mile area) it is unlikely that these are accurate estimates of actual pore velocities. Note that wells installed at a higher density in a smaller area for the chloroform investigation (Hydro Geo Chem, 2007) confirmed higher hydraulic conductivities in that area.

Another line of evidence that hydraulic conductivities in the area of the nitrate and chloride plume might be higher than the sample would indicate lies in the shape of the water table surface (Figure 8). Note that southwest of the Mill Facility itself, groundwater flow directions change to more westerly and the gradient steepens. This is a classic example of flow crossing a boundary from a zone of higher permeability to a zone of lower permeability.

The gradient steepens to accommodate the lower permeability and flow is refracted into a new direction. This is known as the tangent refraction law. Analytically, a refraction of flow lines occur such that the permeability ratio of the two zones equals the ratios of the tangents of the angles the flow lines make with the normal to the boundary (Domenico and Schwartz, 1990). The nitrate and chloride plume occurs in the area of high conductivity where the water table is behaving in a similar way to the area of known higher conductivities associated with the chloroform plume (Figure 5).

3.2.3 Groundwater Analysis of New Wells

The Sampling Plan submitted to the Executive Secretary as part of The Plan (INTERA, 2008) sets out a plan to define the north and northeast boundary of the nitrate plume. The following activities have been completed according to the Plan and the following deliverables have been prepared and will be submitted to the Executive Secretary along side this Report:

- Drilled, installed, and completed 19 new monitoring wells (TWN-1 through TWN-19);
- A recovery test and aquifer testing to determine hydraulic conductivity was performed on each of the new monitoring wells;
- The 19 new monitoring wells were developed and sampled for nitrate and chloride;
- A hydrogeological report ("Site Hydrogeology and Estimation of Groundwater Pore Velocities in the Perched Zone, White Mesa Uranium Mill Site Near Blanding, Utah" [HGC, 2009]) including the results from the recovery tests and aquifer testing on the new monitoring wells was prepared (Attachment 5); and
- A QA/QC analysis was performed on all nitrate and chloride sample results for the 19 new wells, as contained in the Initial Nitrate Report (Attachment 4).

The results of groundwater sampling for nitrate and chloride are presented in Table 2.

3.3 Contaminant Migration

As stated above, calculated pore zone velocities along hypothetical pathways are approximately 0.55 ft/yr to 7 ft/yr in the northeast area plume. Calculated pore velocity for the Mill area plume is 23 ft/yr. These travel times are not long enough to have transported nitrate and chloride from the upgradient to the downgradient portions of the two areas within a reasonable time frame. Assuming the 23 ft/year pore velocity and a source just upgradient of the DUSA property boundary in the vicinity of TWN-19, it would take over 300 years for nitrate and chloride to arrive at monitor well TW4-24. Yet the plume at TW4-24 is clearly spatially and chemically related to the plume at TW4-19. Spatially, it can be traced on a trajectory from TWN-19 to MW-19 where it is separated from the Mill area plume by only a few hundred feet. Chemically, the areas of elevated nitrate correspond to the areas of elevated chloride suggesting a common source for the two constituents and both plume areas.

Possible explanations for the above observations include: 1) actual pore velocities are higher than calculated pore velocities, 2) each nitrate area has resulted from multiple localized sources that have the same water type, or 3) some combination of the above. The following discussions will examine each of these possibilities in detail.

3.3.1 Velocities

Pore velocities are calculated by multiplying the measured hydraulic conductivity times the hydraulic gradient and dividing the result by the effective porosity of the aquifer matrix. The measured hydraulic conductivities are the average of conductivities in the various sedimentary facies over the entire saturated thickness at the well where testing is done. This means that if sandstone and claystone are both within the saturated thickness at a well, the resulting measured hydraulic conductivity is an average of the conductivity of both aquifer matrix types. However, the bulk of groundwater flow will be in the sandstone that could result in an underestimate of hydraulic conductivity.

Fluvial environments such as those represented by the Burro Canyon Formation comprise lens-like interfingering of the following deposit types (sedimentary facies):

- Channel floor deposits comprising coarse sand or gravel;
- Point bar deposits of fine-grained sand; and
- Flood plain deposits comprising silt and mud.

As sediment deposition occurs over time, these deposit types are distributed back and forth across the larger stream channel, producing the characteristic discontinuous lens-like nature of a fluvial geologic unit. In general, groundwater moves relatively quickly through the coarse channel sand and gravel but much more slowly through silt and clay flood plain deposits. Hydraulic heads can be maintained within the unit but the bulk of groundwater flow will be restricted to the gravel and sand facies.

In general, measured hydraulic conductivities are higher to the north and east of the Mill tailings impoundments and lower to the south and west. The plume is in the north and east where some of the highest conductivities have been measured, so it may be appropriate to assume an increased hydraulic conductivity and a corresponding increased pore velocity. However, given the distance of 1.4 miles from TWN-19 to TW4-24, it would take 60 years for contamination to make the trip assuming a pore velocity of 120 ft/yr. This value is almost five times higher than any calculated and not consistent with Site observations, for example at MW-30 downgradient of the highest plume

concentrations where chloride concentrations of 128 mg/L in 2005 have declined to 113 mg/L in February 2009.

3.3.2 Multiple Sources

Nitrate and chloride in monitor well TWN-19 clearly have their source off of DUSA's property to the north indicating that the ultimate source of contamination lies off of the DUSA property. Potential sources to the north include extensive agricultural irrigation just to the north of the property boundary that is plainly visible on aerial photographs (Figure 6) and the Frog Pond to the northeast.

Nitrate contamination from the use of fertilizers during agricultural irrigation is well documented (Hem, 1992; McQuillan, 2005) and Hem cites an example in Arizona where 83 mg/L nitrate in groundwater was accompanied by 205 mg/L chloride, which is in the general range observed in the plume at White Mesa. Furthermore, water table contours (Figure 8) show what may be the toe of a groundwater mound located directly north of TWN-12 where mounding from irrigation might be expected. However, nitrate and chloride contamination appears to be coming from the east of TWN-12, suggesting the Frog Pond as a potential source.

The presence of associated nitrate and chloride in septic and wastewater treatment systems is well documented (McQuillan, 2005). Currently, the Frog Pond does not contain elevated levels of nitrate and chloride. However, anecdotal evidence suggests that water in the pond has exhibited a septic/sewage odor in the past (which could have been mistaken for a marshy smell). Furthermore, there is a wastewater treatment facility located 1.2 miles north of the Frog pond. Effluent from the water treatment plant overflows into an arroyo that leads to Corral Canyon, just east of the Mill Site. This overflow was dammed by local ranchers prior to construction of the Mill to form the Frog Pond. DUSA has no information on current or past operating practices at the treatment facility.

If either agricultural irrigation or the Frog Pond is the ultimate source of the nitrate and chloride plume, the dilemma of the long travel times required to move the plume to its current location remains to be explained.

3.3.3 Combination of Faster Travel Times and an Off-Site Source

A plausible explanation that would account for the observed spatial and chemical relationships that characterize the plume relies on water from the Frog Pond transported to secondary storage at the Mill Site. Until the early 1990s, process water for the Mill

was limited to the deep water supply wells on Site, and the Mill sought additional sources of process water. Recapture Reservoir was not constructed until 1988-1989, and the pipeline from Recapture Reservoir to the Mill was not completed until around 1991-1992. From the mid 1980s until the Recapture Reservoir water was first piped to the Mill in 1991-1992, the Frog Pond served as an additional water source for Mill operations.

The timing of these events suggests the following scenario: The unlined Frog Pond contained nitrate and chloride, which entered the groundwater and began migrating to the southwest. Meanwhile, DUSA pumped nitrate and chloride laden Frog Pond water to the northern-most wildlife pond and Lawzy Lake during the period from the early 1980's to the early 1990's where it began to seep into groundwater aided by the artificial head maintained on those ponds. The artificial head created a groundwater mound (notably still present under the wildlife ponds) and began driving elevated concentrations of nitrate and chloride west from the wildlife pond and south from Lawzy Lake, but also northeast toward TWN-9 due to circular gradients away from the mound. This nitrate and chloride laden water could also have reached the perched zone from the Lawzy Sump.

When Recapture Reservoir water replaced the Frog Pond in the early 1990's, Lawzy Lake was abandoned and the wildlife ponds were refilled with clean Recapture Reservoir water. The groundwater mound beneath Lawzy Lake dissipated and contamination from that infiltration point continued to migrate south, meanwhile the clean groundwater mound beneath the wildlife ponds continued to push already contaminated groundwater to the north where it impinged upon and joined with the plume traveling southwest from the Frog Pond. The wildlife pond's groundwater mound is also still pushing contamination to the west and the slug that is now centered on TW4-24 is moving southwest away from the stagnant zone in groundwater that results from the mound upgradient of TWN-12 impinging on the wildlife mound.

Hydro Geo Chem concludes (HGC, 2009) that the presence of higher permeability horizons within the nitrate/chloride plume (by analogy with the area near MW-4 in the chloroform plume) would allow greater spreading of perched zone nitrate/chloride within the applicable time frames. Hydro Geo Chem notes that the high hydraulic conductivity estimated at TWN-16 indicates the possible existence of such a horizon, although such a horizon does not appear to be penetrated by other TWN-series wells. However, Hydro Geo Chem notes that additional data might reveal the presence of a zone

analogous to the chloroform plume near MW-4 that may have transported nitrate and chloride over longer distances.

This scenario would explain the co-located nitrate and chloride in both the upper and lower plumes. INTERA considers this to be the best explanation for the nitrate and chloride plume that has been observed on and up-gradient of the Mill site.

3.3.4 Expected Future Migration

The nitrate and chloride are already being removed by pumping from the chloroform remediation. The extent of future migration of the nitrate and chloride will depend upon factors that include: 1) the rate of future mass removal by pumping, 2) perched zone hydraulic gradients, 3) perched zone permeabilities downgradient of the nitrate and chloride plume, and 4) natural attenuation processes including denitrification of nitrate and hydrodynamic dispersion of both nitrate and chloride. Pumping of MW-4, MW-26 (TW4-15), TW4-19, and TW4-20 for chloroform remediation, directly removes nitrate and chloride mass from the perched zone, and reduces the magnitude of the hydraulic gradients in the downgradient portions of the plume. As a result of this pumping, nitrate and chloride concentrations are reduced within the plume and the rate of downgradient migration is slowed.

Figure 9 is a map showing the nitrate/chloride plume boundary superimposed over the estimated combined chloroform capture zones of MW-26 (TW4-15), TW4-19, and TW4-20, and the estimated capture zone for MW-4 (from HGC, 2009). A portion of the southern half of the plume is currently outside the estimated capture zone. Although the extent of the capture zone is expected to increase over time, including expansion to the south, it is unlikely that complete hydraulic capture of the plume is achievable with the current pumping scheme. However, pumping in the southern (downgradient) extremity of the plume is impractical due to low permeability and low saturated thickness (HGC, 2005), as discussed below.

The estimated range of perched zone permeabilities over much of the area of the nitrate and chloride plume is one to two orders of magnitude greater than estimates for areas downgradient of the nitrate and chloride plume and the tailings cells as discussed above. This reduction in permeability to the south and southwest is interpreted as a "pinching out" of a coarser-grained, higher permeability zone identified during installation of many of the temporary wells (HGC, 2005). The pinching out of this zone is important in limiting the rate of downgradient migration of nitrate and chloride, in stabilizing the plume boundaries, and in allowing natural attenuation to be more effective in limiting plume migration.

The combination of relatively high permeability and relatively large saturated thickness in the upgradient portions of the plume that make the productivity of the perched zone high and allow relatively high nitrate and chloride mass removal rates via interim pumping, is absent at downgradient wells such as TW4-4 and TW4-6. The combination of relatively low permeability and small saturated thickness near these downgradient wells makes pumping at these wells impractical. Because low permeability conditions to the south and southwest, and flattening hydraulic gradients resulting from upgradient pumping will reduce rates of downgradient migration, natural attenuation will likely be effective in treating that portion of the plume that will remain outside hydraulic capture (Attachment 2). Natural attenuation processes that will reduce concentrations are primarily limited to denitrification and hydrodynamic dispersion that relies on mixing with recharge and waters outside the plume lowering concentrations with distance.

As a result of ongoing nitrate and chloride mass removal by pumping, and natural attenuation processes, the plume at present appears to be relatively stable. However it will be necessary to collect additional data to assess stability over time.

4.0 CHARACTERIZATION OF THE FACILITY

As required by UAC R317-6-6.15 D 1. b., the characterization of the facility includes a description of the following items.

4.1 Contaminant Substance Mixtures Present and Media of Occurrence

The contamination has been identified as a nitrate and chloride plume in the perched aquifer at the Mill Site. The Source Report has analyzed potential contaminant substance mixtures at the Mill Site and surrounding properties, identified to date, that could have generated nitrate and/or chloride in the perched aquifer. The Source Report summarizes nitrate and chloride compounds or sources that are present at the Site, the uses of the compound, if the compound can generate nitrate and chloride, and if there are off-Site sources.

4.2 Hydrogeologic Conditions Underlying and, Upgradient and Downgradient of the Facility

Hydraulic testing of new monitoring wells TWN-1 through TWN-19 was conducted to estimate perched zone hydraulic properties in the vicinity of each new well. This information is detailed in an updated *Site Hydrogeology and Estimation of Groundwater Pore Velocities in the Perched Zone, White Mesa Uranium Mill Site near Blanding, Utah* (HGC, 2009) included in this Report as Attachment 5.

Slug test data were collected and analyzed using AqtesolvTM software. Estimates of hydraulic conductivity range from 3.6 x 10 -7 cm/s at TWN-7 to 0.0142 cm/s at TWN-16. Except for the hydraulic conductivity estimate at TWN-16, values are within the range previously reported for the Site. Pore zone velocities along hypothetical pathways through elevated nitrate/chloride areas have been calculated as approximately 0.55 ft/yr to 7 ft/yr in the northeast area plume. Pore velocity for the Mill area plume is 23 ft/year.

4.3 Surface Waters in the Area

The Mill is located on White Mesa, a gently sloping (1 percent SSW) plateau that is physically defined by the adjacent drainages which have cut deeply into regional sandstone formations. There is a small drainage area of approximately 62 acres (25 ha) above the Site that could yield surface runoff to the Site. Runoff from the mesa discharges into an unnamed branch of Cottonwood Wash. Surface runoff from 624 acres of the Mill Site drains westward and is collected by Westwater Creek. Runoff from another 384 acres drains east into Corral Creek, while the remaining southern portions

of the Site drain indirectly into Cottonwood Wash. Total runoff from the mesa is estimated to be less than 0.5 inch annually (Dames & Moore, 1978).

With the exception of the wildlife ponds, which were made or maintained by DUSA to divert birds and other animals from the tailings cells, there are no perennial surface waters on or in the vicinity of the Mill Site. This is due to the gentle slope of the mesa on which the Site is located. Sampling of these ephemeral surface waters in the vicinity is possible only during major precipitation events (DUSA, 2007).

See Section 1.4 of the Reclamation Plan, Rev. 4.0 for further details on surface waters in the area of the Mill.

4.4 Climatologic and Meteorologic Conditions in the Area of the Facility

The climate of southeastern Utah is classified as dry to arid continental. Climate in the vicinity of the Mill can be considered semi-arid with average annual precipitation of approximately 13.32 inches. The area receives two separate rainfall seasons: one from August to October and the other from December to March. The mean annual relative humidity is about 44 percent and is normally highest in January and lowest in July. The weather in Blanding is typified by warm summers and cold winters and the mean annual temperature is about 50.3 degrees Fahrenheit.

The predominant wind directions during 2008 were north-northeasterly. Northerly winds are drainage winds occurring during the nighttime. The southerly winds are upslope winds occurring during daytime hours. The annual mean wind speed was 3.5 m/s (McVehil-Monnett Associates, Inc., 2009).

See Section 1.1 of the Reclamation Plan, Rev. 4.0 for further details on the climatologic and meteorologic conditions in the area of the Mill.

4.5 Possible Sources of the Pollution at the Facility: Type, Location, and Description

As discussed in Section 3, based on new well installation, the source of nitrate and chloride contamination is believed to be off the DUSA property to the northeast. At this point the municipal sewage plant discharge water used historically as Mill water makeup appears to be the best candidate for the source of elevated nitrate and chloride in groundwater.

The waste water treatment facility described in the Source Report is located several miles upgradient of the Mill Site but discussions with Mill staff indicate that effluent from

that facility was allowed to flow to a pond (Frog Pond) near the Mill boundary where it was subsequently piped to the northern-most Wildlife Pond at the Site and to another holding pond on Site for Mill makeup water (Lawzy Lake, see Figures 6 and 7). The Mill staff reports that this water had a bad odor and may have had a high sludge content. Nitrate and chloride are commonly associated with wastewater treatment effluent (McQuillan, 2004).

This potential source term was a high priority during this contamination investigation for several reasons. The period of Mill use of water from the Frog Pond was from the mid 1980s to about 1991 or 1992 when it was replaced with water from Recapture Reservoir. As documented in the Background Report (INTERA, 2007), groundwater levels at the Site have been influenced by the Wildlife Ponds so we know that the head in those ponds has been sufficient to drive infiltration to the water table.

The "slug" like character of the nitrate and chloride plume is consistent with a source that has been removed. The distances from the northern-most Wildlife Pond and Lawzy Lake to the centroid of the nitrate and chloride plume are approximately 2300 feet and 2100 feet, respectively. Assuming 26 years since nitrate/chloride laden water entered the system, groundwater would have had to travel at an average velocity of 88 ft/yr from the northern-most Wildlife Pond and 81 ft/yr from Lawzy Lake to account for the current distribution of nitrate concentrations. The velocity of 88 ft/yr from the northern-most Wildlife Pond is high relative to other values that have been calculated for the Site, but possible given the high gradient in this limited portion of the Site due to mounding at the wildlife ponds. Further, the eastern portion of the Site is known to have higher permeability (consistent with the 88 ft/yr velocity required) than the western portion (see the Chloroform Contaminant Investigation Report). The Lawzy Sump is even closer to the plume.

For the above reasons Lawzy Lake, the Lawzy Sump, and the northern-most Wildlife Pond are likely potential infiltration points for Frog Pond water. These potential infiltration points have been addressed by installation of two monitoring wells. One (TWN-3) was installed half way along a line between the north end of the Mill building and Lawzy Lake. Analytical results of samples of groundwater from well TWN-3 show 29 mg/L nitrate and 106 mg/L chloride, indicate that this well may be near a potential infiltration point. The other monitoring well (TWN-4) was installed on a line approximately half way between the north end of the Mill building and the northern-most Wildlife Pond. Groundwater samples from TWN-4 contained 0.4 mg/L of nitrate and 11 mg/L chloride.

The northern-most Wildlife Pond was a stock watering pond for years prior to construction of the Mill. The Historic Pond, which no longer exists, but was located where the Mill's sulfuric acid tank is currently located, pre-existed construction of the Mill by several decades, tracing back possibly to the 1920s. Livestock can generate nitrate in and around stock watering ponds as salt licks for livestock can generate chloride, and the water head in the ponds could potentially drive those nitrates into the groundwater. Therefore, livestock activity at these ponds had the potential to contribute nitrate and chloride to groundwater but these mechanisms alone would be unlikely to generate enough mass to account for the current mass of nitrate and chloride observed in groundwater.

4.6 Groundwater Withdrawals, Pumpage Rates, and Usage Within a 5-Mile Radius of the Mill

Two hundred sixty one groundwater appropriation applications, within a five-mile radius of the Mill site (which includes a 2-mile radius from the nitrate/chloride plume), are on file with the Utah State Engineer's office. A summary of the applications is presented in Table 1.5-4 and shown on Figure 1.5-8 of the Reclamation Plan, Rev. 4.0. The majority of the applications are by private individuals and for wells drawing small, intermittent guantities of water, less than eight gpm, from the Burro Canyon formation. For the most part, these wells are located upgradient (north) of the Mill site. Domestic water, stock watering, and irrigation are listed as primary uses of the majority of the wells. It is important to note that no wells completed in the perched groundwater of the Burro Canyon formation exist directly downgradient of the site within the five-mile radius. Two water wells, which available data indicate are completed in the Entrada/Navajo sandstone, exist approximately 4.5 miles southeast of the site on the Ute Mountain Ute Reservation. These wells supply domestic water for the Ute Mountain Ute White Mesa Community, situated on the mesa along Highway 191. Data supplied by the Tribal Environmental Programs Office indicate that both wells are completed in the Entrada/Navajo sandstone, which is approximately 1,200 feet below the ground surface. Insufficient data are available to define the groundwater flow direction in the Entrada/Navajo sandstone in the vicinity of the Mill.

The well yield from wells completed in the Burro Canyon formation within the White Mesa site is generally lower than that obtained from wells in this formation upgradient of the site. For the most part, the documented pumping rates from on-site wells completed in the Burro Canyon formation are less than 0.7 cubic feet per second. Even at this low rate, the on-site wells completed in the Burro Canyon formation are typically pumped dry within a couple of hours.

This low productivity suggests that the Mill is located over a peripheral fringe of perched water; with saturated thickness in the perched zone discontinuous and generally decreasing beneath the site, and with conductivity of the formation being very low.

See Section 1.5.6 of the Reclamation Plan, Rev. 4.0

5.0 DATA USED AND DATA GAPS

Data used for this CIR consists of existing data and new data collected specifically for the nitrate and chloride investigation. Data collected for use in this CIR, are included in the Initial Nitrate Monitoring Report (Attachment 3). The Initial Nitrate Monitoring Report includes laboratory analytical reports and QA/QC reports.

Data gaps were encountered as drilling and field sampling began. These gaps were addressed by installing additional wells as needed.

6.0 ENDANGERMENT ASSESSMENT

As discussed above, the nitrate/chloride contamination appears to be from a source (the Frog Pond) upgradient of the Mill property, which was not caused or contributed to by Mill activities. DUSA has taken the position that the responsibility for the contamination should not be attributed to the Mill, and DUSA should not be required to prepare a CAP for contamination resulting from a source off of its property.

However, were a CAP to be required, and were such a CAP to propose standards under UAC R317-6-6.15F.2 or Alternate Corrective Action Concentration Limits that are higher than the applicable State of Utah Groundwater Quality Standards, an endangerment assessment would be performed. The endangerment assessment would contain any risk evaluation necessary to support a proposal for a standard under UAC R317-6-6.15F.2 or Alternate Corrective Action Concentration Limits that are higher than the groundwater quality standards. The schedule for completion of any such endangerment analysis would be agreed upon prior to commencement of the analysis.

7.0 PROPOSED CORRECTIVE ACTION PLAN UAC R317-6-6.15 (D)

As discussed above, the nitrate/chloride contamination appears to be from a source (the Frog Pond) upgradient of the Mill property, which was not caused or contributed to by Mill activities. DUSA has taken the position that the responsibility for the contamination should not be attributed to the Mill, and DUSA should not be required to prepare a CAP for contamination resulting from a source off of its property.

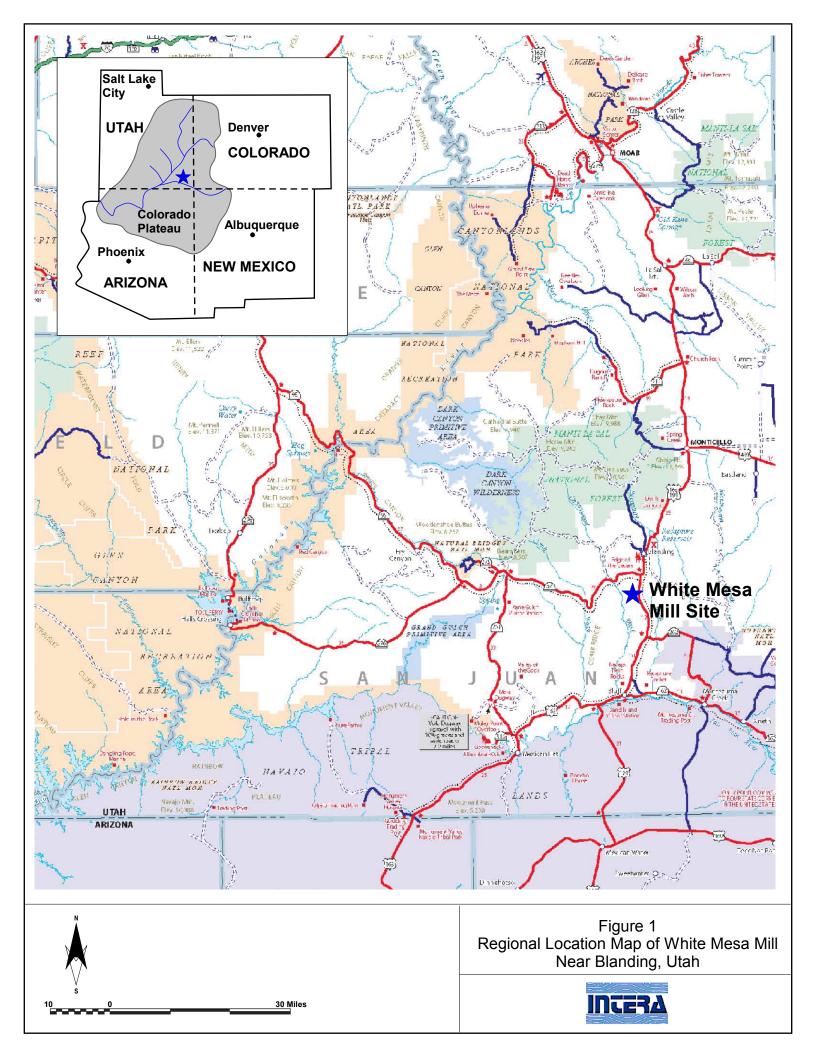
However, were a CAP to be required, such a CAP would include an explanation of the construction and operation of the proposed corrective action, addressing the factors to be considered by the Executive Secretary as specified in R317-6-6.15.E and would include such other information as the Executive Secretary may require. It would also include a proposed schedule for completion of the proposed corrective action.

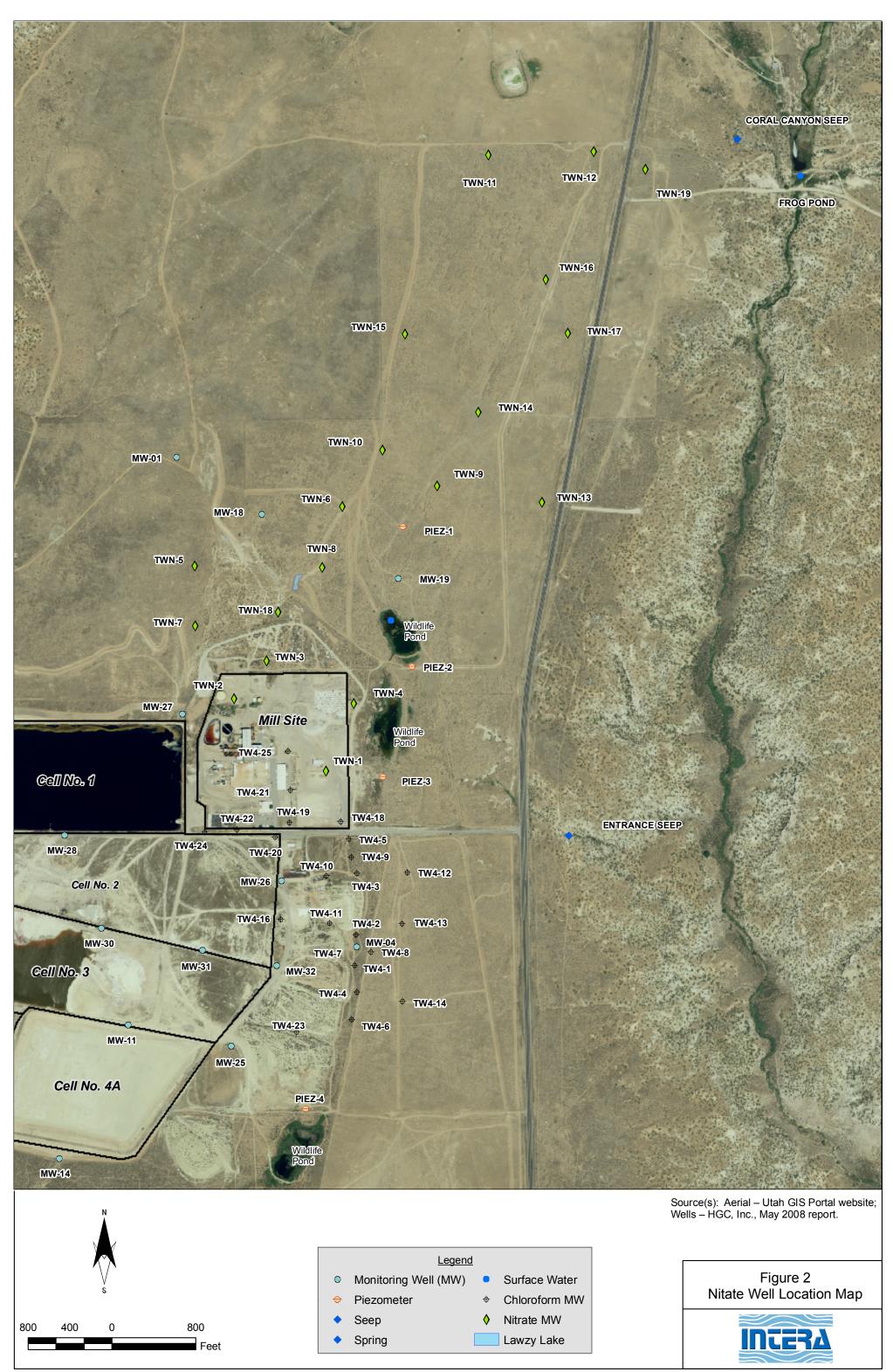
8.0 **REFERENCES**

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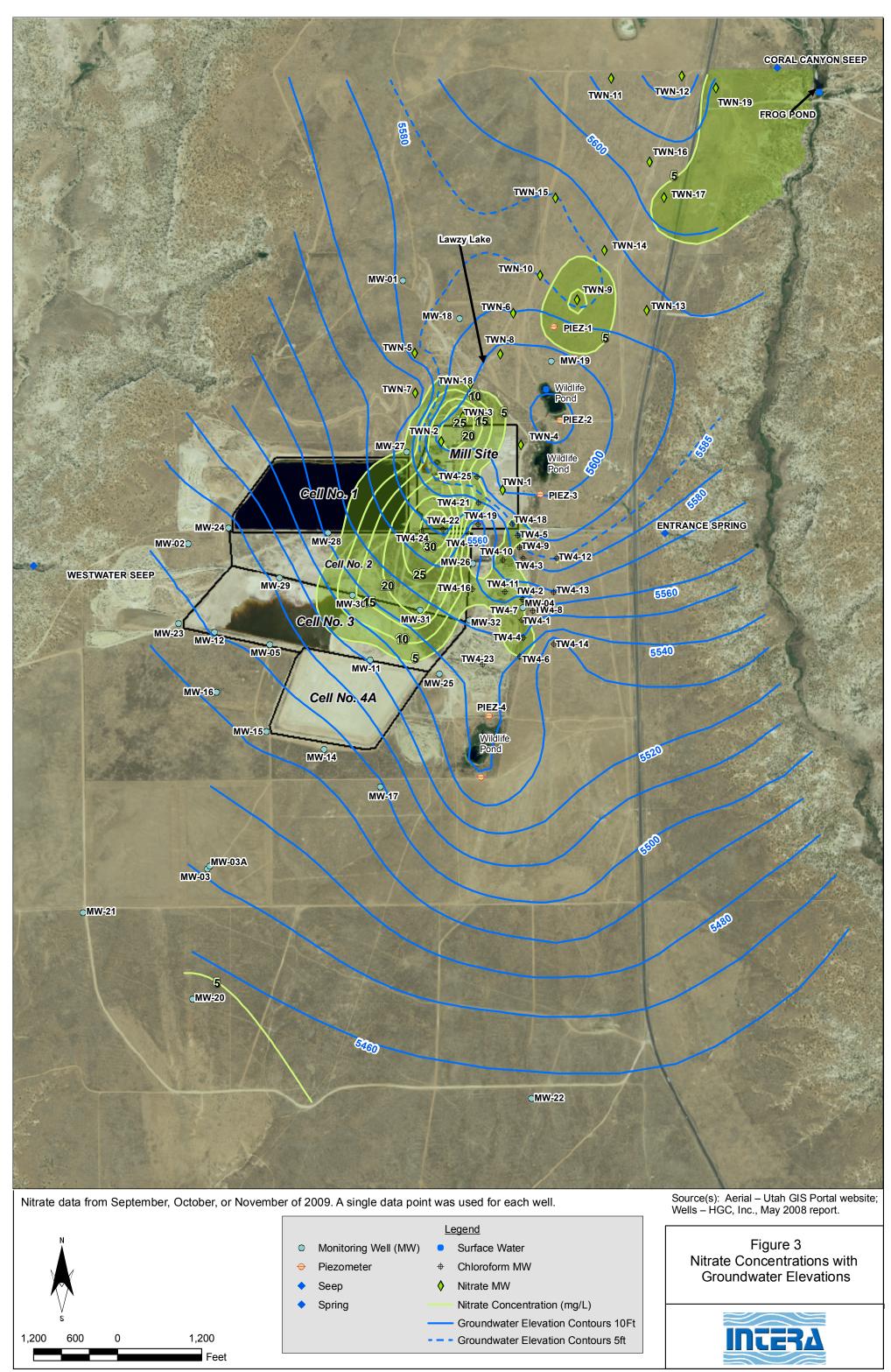
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Figures

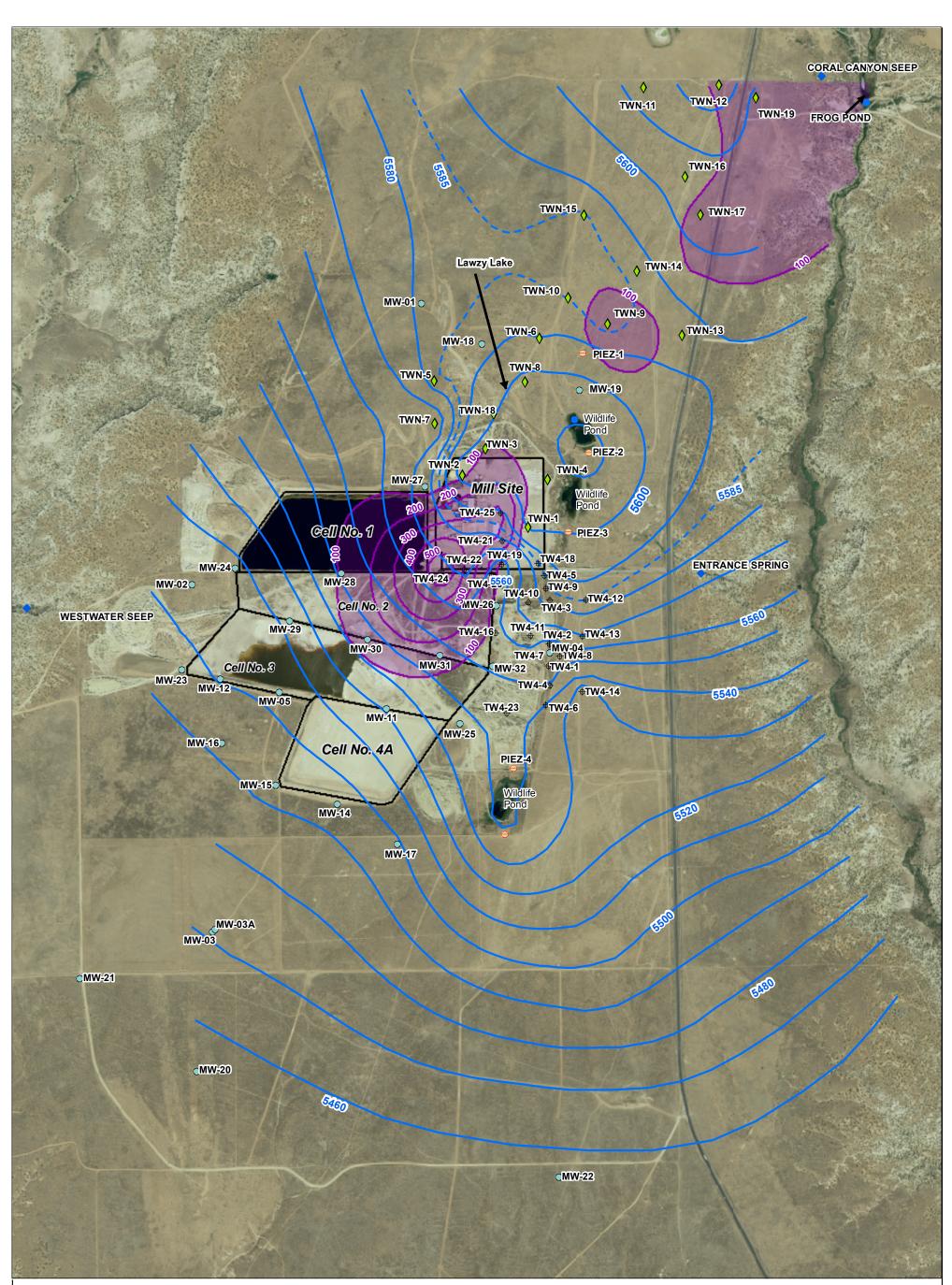




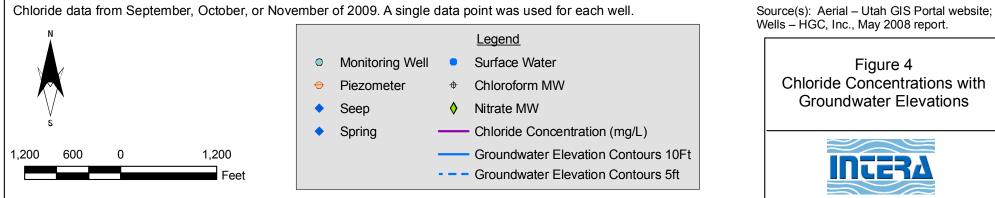
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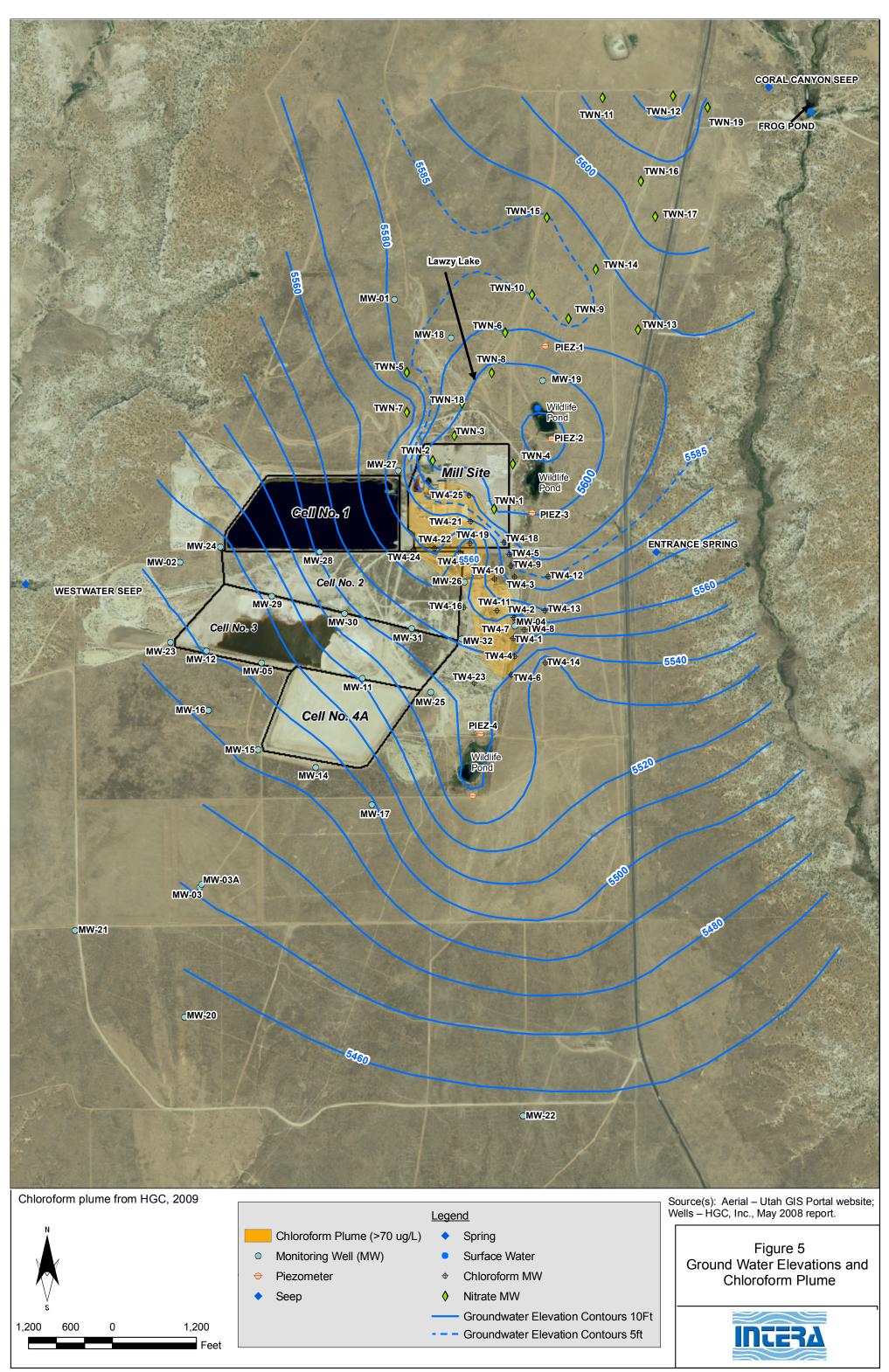
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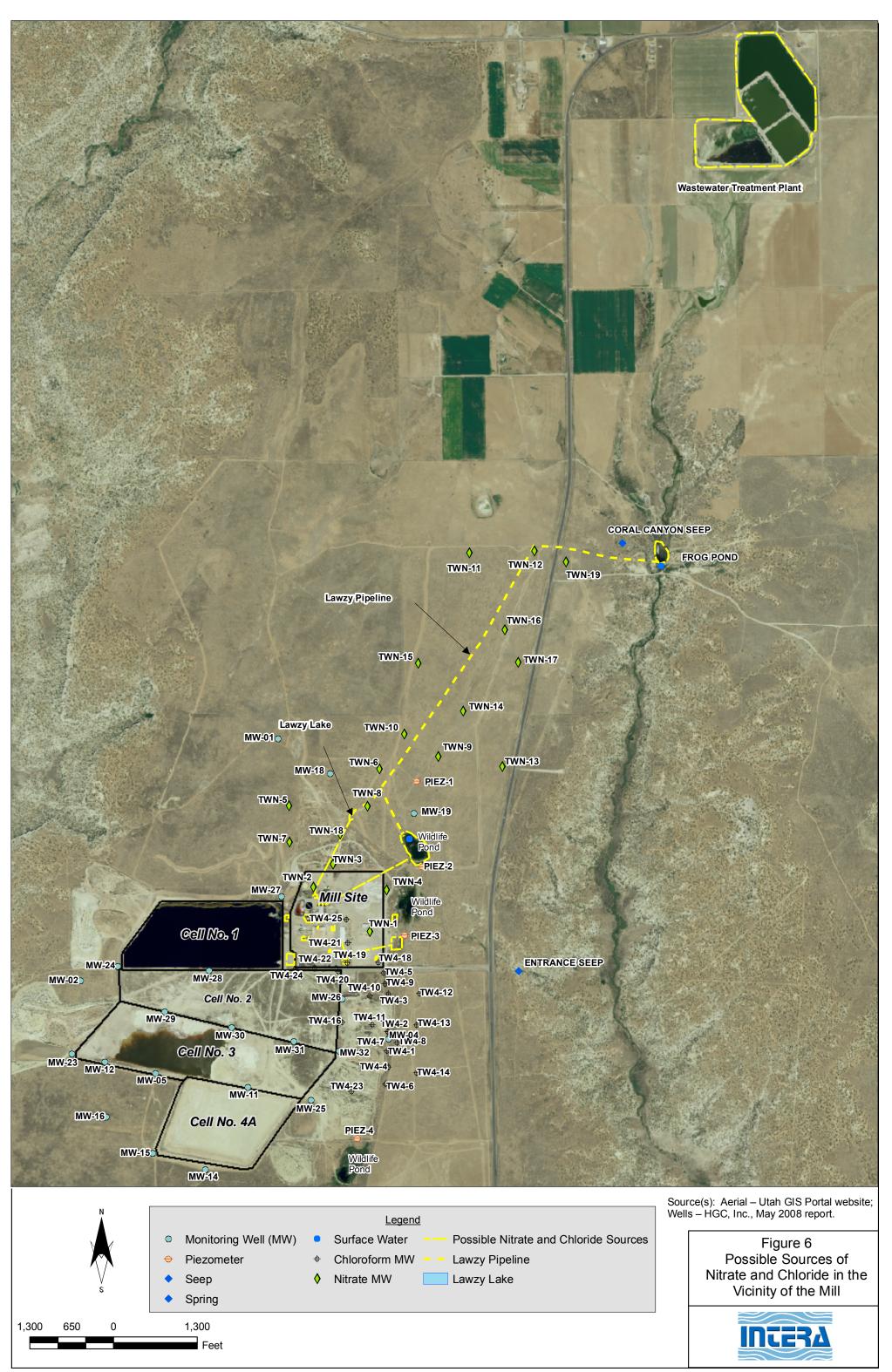


Chloride data from September, October, or November of 2009. A single data point was used for each well.

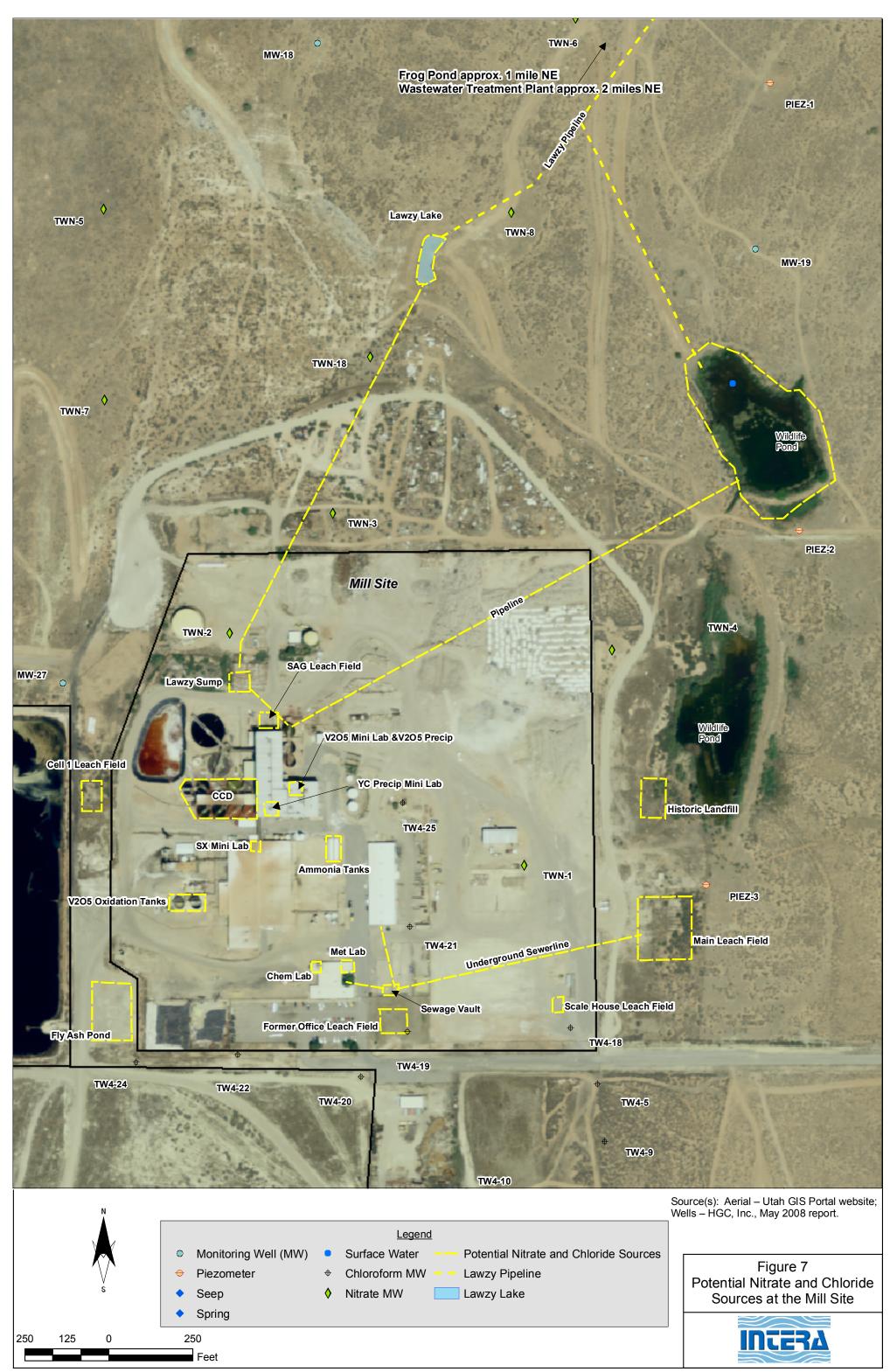


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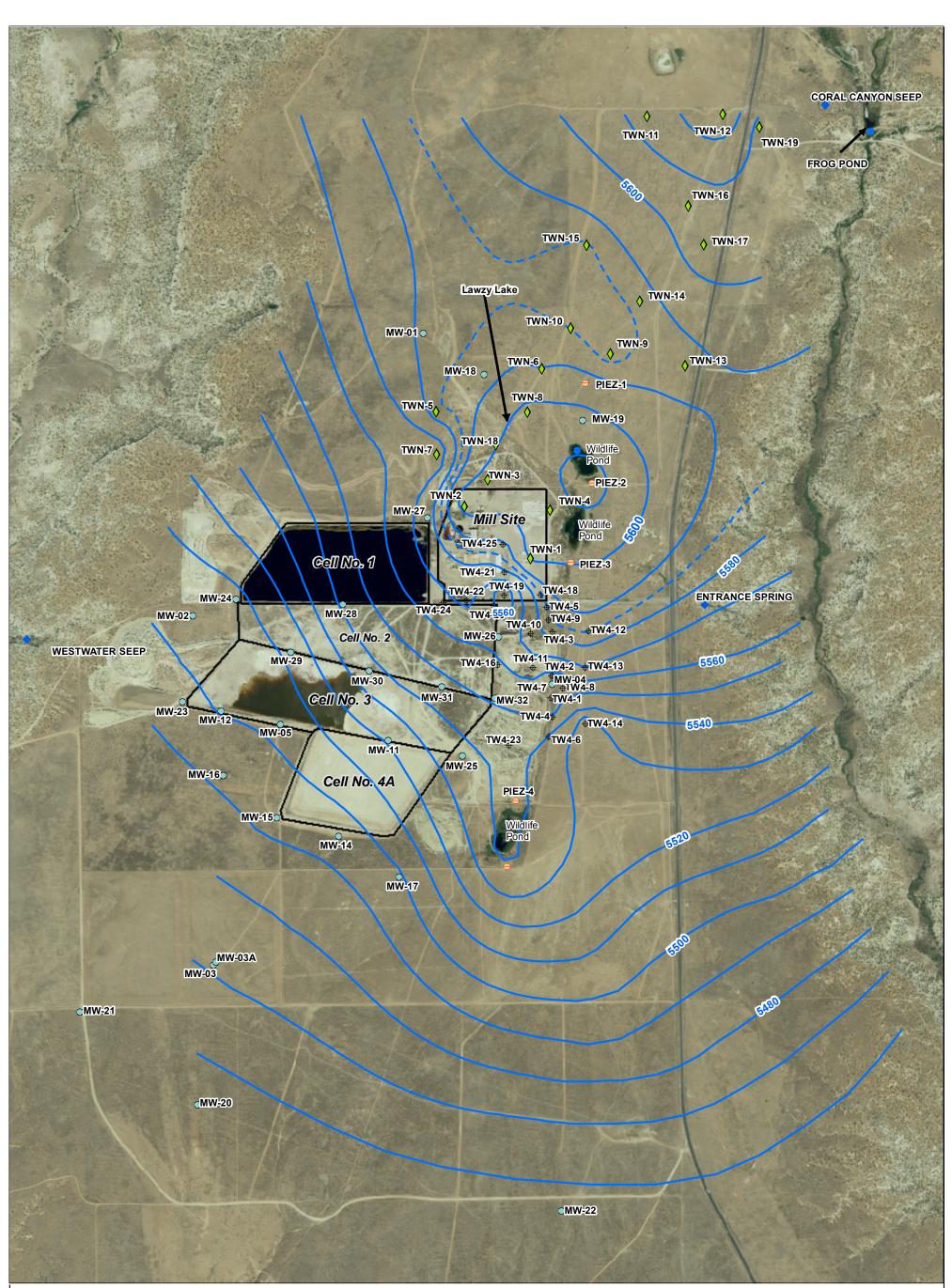




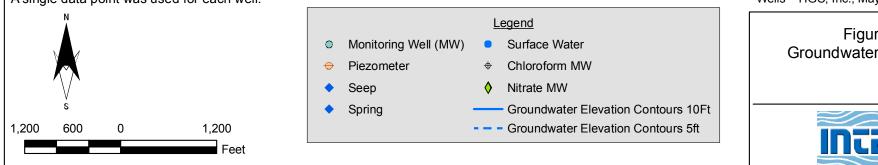
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Groundwater elevation measurements collected december 11 trhough December 16, 2009. A single data point was used for each well.

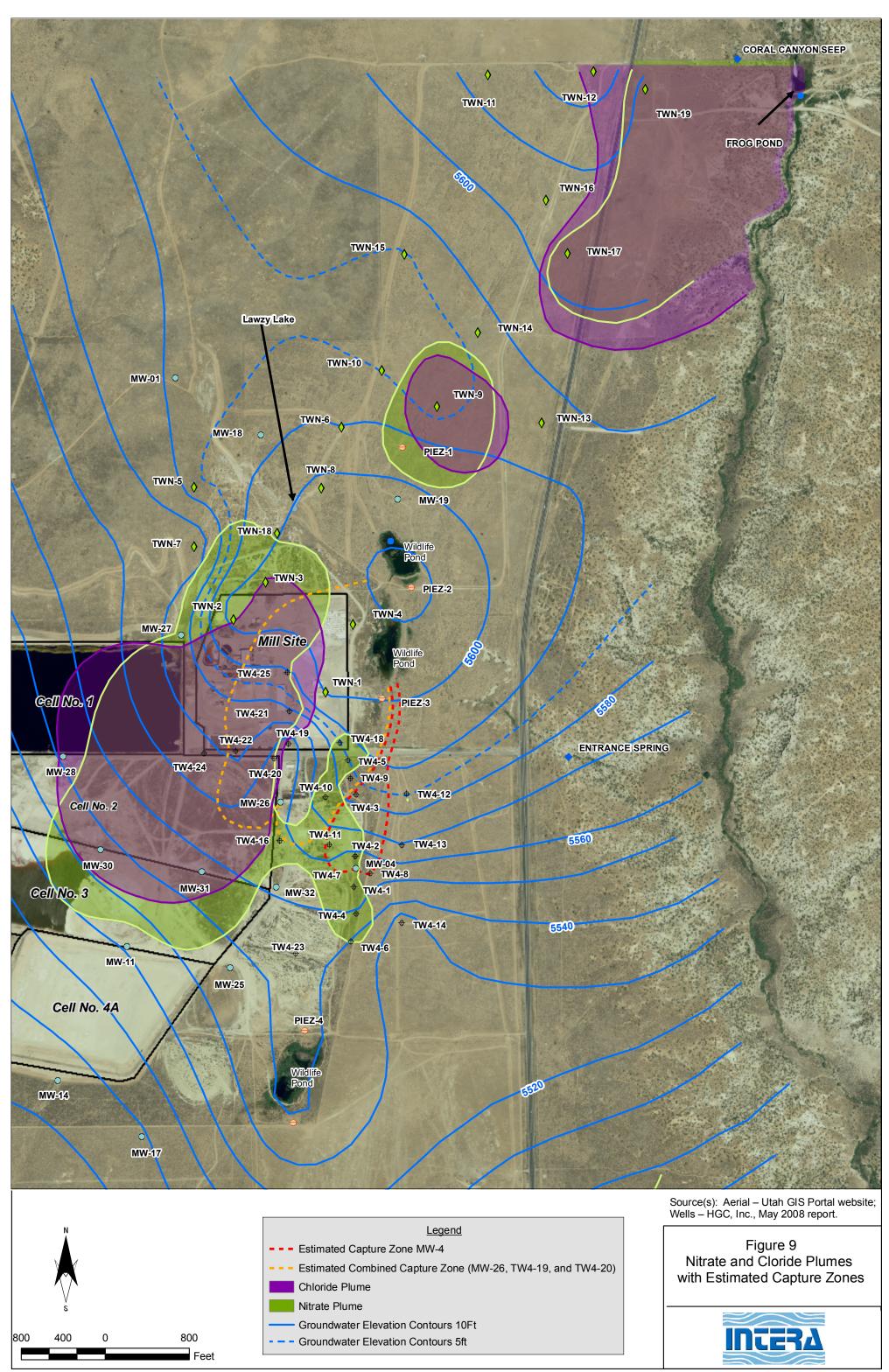


Source(s): Aerial – Utah GIS Portal website; Wells - HGC, Inc., May 2008 report.

> Figure 8 **Groundwater Elevations**



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Tables

Table 1 Sampling Design

Sample Location	Analysis	Notes	
New Monitoring Well TWN-1	Nitrate, Chloride	Test Main Leach Field as source and fill data gap to east of TW4-25	
New Monitoring Well TWN-2	Nitrate, Chloride	Test SAG Leach Field, Lawzy Sump and Historic Pond as sources and fill data gap to north of TW4-25	
New Monitoring Well TWN-3	Nitrate, Chloride	Test Lawzy Lake as source and fill data gap to north of TW4-25	
New Monitoring Well TWN-4	Nitrate, Chloride	Test Upper Wildlife Pond as source and fill data gap to northeast of TW4-25	
New Monitoring Wells TWN-5, TWN-6, TWN-7, TWN-8, TNW-18	Nitrate, Chloride	Test area north of Lawzy Lake as source and fill data gap to the northwest	
New Monitoring Wells TWN-9, TWN, 10, TWN-14	Nitrate, Chloride	Step out from 6.8 mg/L nitrate found in PIEZ 1	
New Monitoring Wells TWN-11, TWN-12, Wells TWN-13, TWN-14, TWN-15, TWN-16, TWN-17, TWN- 18, TWN-19	Nitrate, Chloride	Define plume to the northeast	
TW4-3, TW4-5, TW4-9, TW4-10, TW4-12, TW4-18, TW4-19, TW4-20, TW4-21, TW4-22, TW4-23, TW4-24, TW4-25	Nitrate, Chloride	Provide current and quarterly concentrations of nitrate and chloride in chloroform wells.	
MW-5, MW-11, MW-25, MW-26, MW-27, MW-28, MW-29, MW-30, MW-31 and MW-32	Nitrate, Chloride	Provide current and quarterly concentrations of nitrate and chloride in monitoring wells	
Piezometer 1, Piezometer 2, Piezometer 3	Nitrate, Chloride	Additional groundwater sampling point	

		Nitrate	Chloride
Well	Sample Date	(mg/L)	(mg/L)
MW-01	10/19/2009	0.2	17
MW-02	10/21/2009	<0.1	6
MW-03	10/26/2009	0.2	46
MW-03A	10/28/2009	1	42
MW-04	9/14/2009	5.3	43
MW-05	10/12/2009	<0.1	51
MW-11	10/19/2009	<0.1	30
MW-12	10/13/2009	<0.1	67
MW-14	10/20/2009	<0.1	17
MW-15	10/20/2009	0.1	38
MW-17	10/21/2009	0.9	35
MW-18	10/21/2009	<0.1	58
MW-19	10/19/2009	2.2	25
MW-20	10/28/2009	6.2	71
MW-22	10/27/2009	3.8	67
MW-23	10/20/2009	0.1	8
MW-24	10/28/2009	0.1	46
MW-25	10/13/2009	<0.1	34
MW-26	10/13/2009	0.1	58
MW-27	10/12/2009	5.2	44
MW-28	10/12/2009	0.1	104
MW-29	10/26/2009	<0.1	35
MW-30	10/14/2009	15	129
MW-31	10/14/2009	22.6	138
MW-32	10/14/2009	<0.1	32
PIEZ-1	10/27/2009	7.4	61
PIEZ-2	10/27/2009	0.6	7
PIEZ-3	10/27/2009	1.2	19
TW4-01	9/15/2009	7.3	36
TW4-02	9/15/2009	6.6	43
TW4-03	9/15/2009	2.8	21
TW4-04	9/15/2009	8.4	39
TW4-05	9/15/2009	8.3	48
TW4-06	9/15/2009	5	37
TW4-07	9/15/2009	4.1	37
TW4-08	9/15/2009	<0.1	44
TW4-09	9/15/2009	2.5	30
TW4-10	9/15/2009	8.1	51
TW4-11	9/15/2009	7	49
TW4-12	9/15/2009	5.1	22
TW4-13	9/15/2009	4.7	63
TW4-14	9/15/2009	1.5	38
TW4-15	9/14/2009	0.1	46
TW4-16	9/15/2009	8.8	79
TW4-17	9/15/2009	0.1	33
TW4-18	9/15/2009	5.9	26
TW4-19	9/14/2009	<0.1	43

 Table 2

 Nitrate and Chloride Sampling Results

		Nitrate	Chloride
Well	Sample Date	(mg/L)	(mg/L)
TW4-20	9/14/2009	3.3	153
TW4-21	9/15/2009	9.2	281
TW4-22	9/15/2009	40.3	391
TW4-23	9/15/2009	<0.1	43
TW4-24	9/15/2009	30.7	618
TW4-25	9/15/2009	3.3	328
TWN-01	10/28/2009	0.5	18
TWN-02	11/2/2009	20.8	55
TWN-03	11/2/2009	29	106
TWN-04	10/28/2009	0.4	11
TWN-05	11/10/2009	0.2	48
TWN-06	11/3/2009	1.4	21
TWN-07	11/10/2009	0.1	7
TWN-08	11/3/2009	<0.1	12
TWN-09	11/10/2009	12	205
TWN-10	11/10/2009	1.4	26
TWN-11	11/3/2009	1.3	74
TWN-12	11/3/2009	0.5	109
TWN-13	11/4/2009	0.5	83
TWN-14	11/4/2009	3.4	32
TWN-15	11/10/2009	1.1	78
TWN-16	11/4/2009	1	39
TWN-17	11/4/2009	6.7	152
TWN-18	11/2/2009	1.3	57
TWN-19	11/2/2009	7.4	125
Upper Wildlife Pond	10/27/2009	0.1	3

 Table 2

 Nitrate and Chloride Sampling Results

Attachment 1

Request for Voluntary Plan and Schedule to Investigate and Remediate Nitrate Contamination at the White Mesa Mill Site, Near Blanding, dated September 30, 2008

CF DUF, RFH, MUM, SUL, & T



State of Utah

JON M. HUNTSMAN, JR. Governor

> GARY HERBERT Lieutenant Governor

Department of Environmental Quality

> Richard W. Sprott Executive Director

DIVISION OF RADIATION CONTROL Dane L. Finerfrock Director

RECEIVED.

OCT n A 2008

Ber.

September 30, 2008

CERTIFIED MAIL RETURNED RECEIPT REQUESTED

Mr. David Frydenlund Vice President, Regulatory Affairs Denison Mines (USA) Corporation (DUSA) Independence Plaza, Suite 950 1050 17th Street Denver, CO 80265

SUBJECT: Nitrate Contamination Investigation and Corrective Action Plan, White Mesa Uranium near Blanding. Utah. Request for Voluntary Plan and Schedule to Investigate and Remediate.

Dear Mr. Frydenlund:

On September 16, 2008 the Utah Division of Radiation Control (DRC) sent an by e-mail request for a meeting with DUSA concerning nitrate concentrations that exceeded the Utah Ground Water Quality Standard (GWQS) of 10 mg/L at the White Mesa Uranium Mill (facility) near Blanding. DRC attached a draft letter documenting DRC findings concerning the nitrate concentrations exceeding the GWQS. A meeting was held by a conference call with DRC and DUSA representatives on September 24, 2008. In this meeting both parties agreed that:

- 1) Nitrate concentrations have exceeded the GWQS in the groundwater at the facility in five monitoring wells, most of which are not located within the confines of the known chloroform groundwater plume (MW-30, MW-31, TW4-22, TW4-24, and TW4-25).
- For the monitor wells in question multiple samples in each have been found in excess of the nitrate GWQS, beginning as early as June 22, 2005 (2nd quarter 2005 monitoring event).
- 3) The nitrate plume has migrated in a different direction than the chloroform plume.
- 4) The physical boundaries of the nitrate plume are not fully defined.
- 5) The source(s) of the nitrate contamination are currently unknown.

168 North 1950 West • Salt Lake City, UT Mailing Address: P.O. Box 144850 • Salt Lake City, UT 84114-4850 Telephone (801) 536-4250 • Fax (801-533-4097 • T.D.D. (801) 536-4414 www.deg.utah.gov Printed on 100% recycled paper

Page 2

Request for Voluntary Plan and Schedule

During the September 24, 2008 conference call DRC staff informed DUSA that the DRC intends to use discretion in this matter, on an interim basis, including forbearance on use of formal enforcement and up-front monetary penalties, provided that:

- 1. On or before December 15, 2008 DUSA submits a plan of action and schedule for Executive Secretary approval, for completion and submittal of:
 - A. A Contamination Investigation (CI) report; and
 - B. A Groundwater Corrective Action Plan (CAP).
- 2. DUSA shows good faith in submittal of the plan and schedule above, in a timely manner and with appropriate content, so as to allow the Executive Secretary to fully review and evaluate the proposal before December 15, 2008.
- 3. DUSA receives Executive Secretary approval of the proposed plan of action and schedule cited in Item I, above, on or before December 15, 2008.
- 4. DUSA enters into a Stipulated Consent Agreement by January 15, 2009 with the Executive Secretary, including defined milestones, deadlines, deliverables, and stipulated penalties related to the approved plan of action and schedule.

DUSA agreed that it would comply with the above Voluntary Plan and Schedule rather than have DRC issue a Notice of Violation.

In regard to the content of the CI Report and Groundwater CAP, outlined in Item 1 above, Executive Secretary approval will be based on determination of clear performance standards and objectives, tangible deliverables, and measurable deadlines that meet all the information requirements found in UAC R317-6-6.15(D). For your reference, the requirements of UAC R317-6-6.15(D) are as follows:

- D. Contamination Investigation and Corrective Action Plan Requirements
 - 1. Contamination Investigation The contamination investigation shall include a characterization of pollution, a characterization of the facility, a data report, and, if the Corrective Action Plan proposes standards under R317-6-6.15.F.2. or Alternate Corrective Action Concentration Limits higher than the ground water quality standards, an endangerment assessment.
 - a. The characterization of pollution shall include a description of:
 - (1) The amount, form, concentration, toxicity, environmental fate and transport, and other significant characteristics of substances present, for both ground water contaminants and any contributing surficial contaminants;
 - (2) The areal and vertical extent of the contaminant concentration, distribution and chemical make-up; and

- (3) The extent to which contaminant substances have migrated and are expected to migrate.
- b. The characterization of the facility shall include descriptions of:
 - (1) Contaminant substance mixtures present and media of occurrence;
 - (2) Hydrogeologic conditions underlying and, upgradient and downgradient of the facility;
 - (3) Surface waters in the area;
 - (4) Climatologic and meteorologic conditions in the area of the facility; and
 - (5) Type, location and description of possible sources of the pollution at the facility;
 - (6) Groundwater withdrawals, pumpage rates, and usage within a 2-mile radius.
- *c. The report of data used and data gaps shall include:*
 - (1) Data packages including quality assurance and quality control reports;
 - (2) A description of the data used in the report; and
 - (3) A description of any data gaps encountered, how those gaps affect the analysis and any plans to fill those gaps.
- d. The endangerment assessment shall include descriptions of any risk evaluation necessary to support a proposal for a standard under R317-6-6.15.F.2 or for an Alternate Corrective Action Concentration Limit.
- e. The Contamination Investigation shall include such other information as the Executive Secretary requires.
- 2. Proposed Corrective Action Plan

The proposed Corrective Action Plan shall include an explanation of the construction and operation of the proposed Corrective Action, addressing the factors to be considered by the Executive Secretary as specified in R317-6-6.15.E. and shall include such other information as the Executive Secretary requires. It shall also include a proposed schedule for completion.

3. The Contaminant Investigation and Corrective Action Plan must be performed under the direction, and bear the seal, of a professional engineer or professional geologist.

It should be noted that in accordance with UAC R317-6-6.15(C) "...A person subject to this rule who has been notified that the Executive Secretary is exercising his or her authority under R317-6-6.15 to require submission of a Contamination Investigation and Corrective Action Plan, shall, within 30 days of that notification, submit to the Executive Secretary a proposed schedule for those submissions, which may include different deadlines for different elements of the Investigation and Plan...". This Request for Voluntary Plan and Schedule does not constitute formal notice under UAC R317-6-6.15(C). As a result, the Executive Secretary is allowing DUSA to have up to 90 days from the September 16, 2008 (date that DUSA was first notified by e-mail of nitrate exceeding the GWQS) to develop and secure Executive Secretary approval of an appropriate plan of action and schedule to meet the requirements of UAC R317-6-6.15(D).

Page 3

. Page 4

We appreciate your corporation in this matter. If you have any questions please call Dean Henderson at (801) 536-0046.

UTAH WATER QUALITY BOARD

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Dane L. Finerfrock Co - Executive Secretary

DCH:dh

Attachment 2 Source Review Report (Tischler, 2009)

MEMORANDUM

To:Denison Mines (USA) Corp.From:Jo Ann TischlerDate:December 30, 2009Subject:Source Review Report for Nitrate and Chloride in Groundwater at the
White Mesa Mill

Introduction

In correspondence dated September 15 and September 30, 2008. At that time, the DRC noted that on a review of the 13 quarterly groundwater monitoring reports for the White Mesa Mill (Mill), submitted by Denison Mines (USA) Corp. (Denison) to DRC since the second quarter of 2005, groundwater nitrate levels had exceeded the State water quality standard of 10 mg/L in certain monitoring wells at the Mill site. Specifically, DRC noted that:

- 1. Nitrate concentrations have exceeded the Ground Water Quality Standard (GWQS) in the groundwater at the facility in five monitoring wells, most of which are not located within the confines of the known chloroform groundwater plume (MW-30, MW-31, TW4-22, TW4-24, and TW4-25);
- 2. For the monitor wells in question multiple samples in each have been found in excess of the nitrate GWQS, beginning as early as June 22, 2005 (2nd quarter 2005 monitoring event);
- 3. The nitrate plume has migrated in a different direction than the chloroform plume;
- 4. The physical boundaries of the nitrate plume are not fully defined; and
- 5. The source(s) of the nitrate contamination are currently unknown.

A map indicating the location of all monitoring wells under the Mill's Groundwater Discharge Permit (GWDP) and chloroform investigation, which includes the five monitoring wells in question, is attached to this report as Figure 1. A map indicating the 1st Quarter 2008 water levels and direction of groundwater flow in the perched aquifer is attached to this report as Figure 2.

In correspondence dated December 1, 2009, the Utah Division of Radiation Control stated their observation that "an apparent chloride plume is in concert with the nitrate contamination plume" at the white Mesa Mill. The observation was based on data from chloroform investigation wells and tailings cell compliance wells during the fourth quarter of 2008 and the first quarter of 2009. DRC's letter included a nitrate and chloride plume map. DRC noted that chloride concentrations ranged from 113 to 1010 mg/L inside the 100 mg/L iso-concentration line.

DRC has recommended that Denison address and explain the chloride concentrations in the nitrate Contamination Investigation Report (CIR) that is due to DRC, on or before January 4, 2010.

My report of November 19, 2008 addressed my findings and conclusions regarding sources of nitrate at, and proximal to, White Mesa Mill. The purpose of the current report is to perform an evaluation of the "type, location and description of possible sources of pollution at the facility," which is required by R317-6-6.15b.(4) to be included in the CIR. This report expands the analysis in the November 19, 2008 report to address sources of groundwater chloride, as well as potential sources that may result in the presence of both nitrogen and chloride.

To perform this evaluation, I have considered:

1. What are the current and historic sources of nitrogen-bearing chemicals and biological nitrogen at the Mill?

2. What off-site sources of chemical and biological nitrogen exist within proximity of the Mill?

3. What are the current and historic sources of chloride-bearing chemicals at the Mill?

4. What off-site sources of chemical chloride exist within the proximity of the Mill?

5. Do mechanisms exist for the nitrogen and chloride to reach groundwater?

6. Do mechanisms exist for the nitrogen to reach groundwater as nitrate?

7. Are the known volumes and concentration of the sources consistent with ongoing nitrogen and chloride presence in groundwater?

1.0 Basis and Limitations of this Evaluation

This evaluation was limited to a qualitative process source review. That is, it considered a broad range of nitrogen and chloride sources present on or in the vicinity of the Mill and narrowed them down to those most likely to affect groundwater. The review did not limit the potential sources based on quantitative factors in groundwater hydrogeology or geochemistry.

The evaluation in this report is based on the following information:

1. Interviews with Denison corporate staff during October 2008, to gather information on nitrogen-bearing materials used or present on site throughout the Mill's operating history.

- 2. Interviews with Denison corporate staff during October 2008, to gather information on historical use of pits, ponds, landfills, and offsite water sources at the Mill.
- 3. Interviews with Denison corporate staff during December 2009 to supplement previous operations information to address chloride, as well as nitrate, sources.
- 4. Current and historic site maps provided by Denison corporate staff.
- 5. The Mill's process and equipment description from Denison's Radioactive Materials License renewal application dated February 2007.
- 6. Tailings solution sample data provided by Denison corporate staff.
- 7. Reagent, Laboratory Chemical Inventory, and Petroleum Products tables from the White Mesa Mill Spill Prevention, Control, and Countermeasures (SPCC) Plan (2001).
- 8. DRC Draft Request for Additional Information (RFI) regarding nitrate exceeding Utah GWQSs dated September 15, 2008, and DRC Request for Voluntary Plan and Schedule to Investigate and Remediate dated September 30, 2008.
- 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.
- 10. Revised Background Groundwater Quality Report; Existing Wells for Denison Mines (USA) Corp.'s White Mesa Mill Site, San Juan County, Utah, Prepared by INTERA, Inc., October 2007.
- 11. Revised Addendum: Evaluation of Available Pre-Operational and Regional Background Data; Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.'s White Mesa Mill Site, San Juan County, Utah, prepared by INTERA, Inc., November 16, 2007.
- 12. Revised Addendum: Background Groundwater Quality Report: New Wells For Denison Mines (USA) Corp.'s White Mesa Mill Site, San Juan County, Utah, prepared by INTERA, Inc., April 30, 2008).
- 13. Data from the 2nd Quarter 2008 Chloroform Monitoring Report White Mesa Uranium Mill.

- 14. Nitrate and chloride plume maps prepared by Intera from 2008 Mill groundwater data.
- 15. Reference documents cited at the end of this report.

2.0 Overview of Environmental and Human (Anthropogenic) Nitrogen Sources

In both the natural and industrial environments, nitrogen exists in three chemical forms: either as free nitrogen gas (N2), "fixed" in inorganic compounds or "bound" into organic compounds, as discussed below.

2.1 Biological Nitrogen Cycle

Apart from free atmospheric nitrogen (gaseous N_2), nitrogen exists in the natural environment in four chemical forms:

- Organic nitrogen (urea, uric acid, amines, amino acids, nucleic acids, alkaloids, proteins, etc.);
- Inorganic free ammonia, that is present in equilibrium between its non-ionic form (NH₃) at high pH, and ionized form (NH₄OH) at neutral and low pH;
- Inorganic nitrite, an intermediate oxidized form (NO₂); and
- Inorganic nitrate, a stable oxidized form (NO₃).

Nitrogen is ubiquitous in the living environment and is part of the living tissues, digestive wastes, and decomposition products of every living thing on the earth's surface. As a result, there are many natural sources that mobilize nitrates into surface water and many mechanisms for nitrates to enter groundwater.

Nitrogen is continuously converted and recycled through the biosphere in a series of processes that comprise the nitrogen cycle. The wastes from living things and the proteins in dead plant and animal tissues are decomposed by ammonification bacteria to form ammonia. Specialized nitrifying bacteria convert the available ammonia to nitrite and/or nitrate in aquatic environments and soils. Nitrite is relatively short-lived in water and hydrated environments because aquatic bacteria convert it rapidly to nitrate. Organisms such as fungi and denitrifying bacteria use the nitrates as a source of oxygen, releasing the bound nitrogen back to the atmosphere as gaseous nitrogen.

In aquatic environments, the least stable form of nitrogen in water is ammonia. In oxygenated aquatic environments, it is readily converted to nitrite and nitrate. In oxygendeficient waters it may be converted to nitrogen gas and hydrogen ions.

2.2 Anthropogenic Nitrogen

Nitrogen compounds are some of the most widely synthesized, converted, and consumed materials in every human industrial, commercial, and domestic activity. Human activity introduces nitrogen into the environment from four major types of sources:

- Agricultural;
- Combustion-related;
- Sewage and septic-related; and
- Industrial chemicals.

Agricultural

By far the largest source of nitrogen compounds introduced to the environment by human activity are from agricultural sources. Per the US EPA, the largest loads of ammonium and nitrite/nitrate nitrogen reach the environment from agricultural, domestic and commercial runoff to surface water bodies and infiltration to groundwater from overuse of fertilizers, as well as feedlots, cattle yards, slaughterhouses and dairies. In the western US particularly, nitrate/nitrite overloads from agricultural sources far outweigh by several orders of magnitude all the chemical/industrial loads to most surface receiving waters.

Combustion

The second largest source is the combustion of fossil fuels, resulting in atmospheric nitrogen both from the nitrogen bound in the fuel (particularly in coal) and the conversion of atmospheric nitrogen to oxygenated compounds at combustion temperatures in motor vehicles, power plants, boilers, incinerators, kilns, and other fired heaters. In stationary equipment, depending on the efficiency of combustion, some nitrate may remain bound in compounds in the resulting fly ash and/or bottom ash.

Per even the oldest literature on the topic, all coal sources worldwide average from 1.0 to 1.5 percent (10,000 to 15,000 ppm or 10,000,000 to 15,000,000 ppb) bound nitrogen. More modern data indicates the range to be as wide as 0.5 to 2 percent. Nitrogen in coal is generally bound into complex heterocyclic molecules (ring compounds containing both carbon and nitrogen). The nitrogen content of ash resulting from coal combustion varies, and may have even higher levels, depending on the type of burner and type of emissions control. Both stack gases and residual ash exhibit nitrogen in oxidized form, as nitrite/nitrate. In fact, historically, the earliest industrial attempts at synthesis of ammonia and nitrate compounds for the chemical industry were based on converting this nitrogen content of coal.

Sewage and Septic Sources

The third largest sources are from septic systems and sewage plant byproducts. Ubiquitous and relatively uncontrolled leach fields and septic systems load nitrogen in a variety of compounds and forms (from sanitary wastes, food wastes, detergents, and cleaning chemicals) directly to surface and subsurface soils. Both the US EPA and US Geological Survey consider septic systems to be one of the largest uncontrolled threats to surface water and drinking water quality nationwide. Recent source investigations published by Dennis McQuillan at the 2004 National Onsite Wastewater Recycling Conference for nearly 1,200 water wells in New Mexico indicated that, in that setting,

on-site septic systems contaminated more acre-feet of groundwater, and more public supply systems, than all other sources in the region combined.

Land disposal or land application of sludges and solids from aerators, digesters, and other municipal sewage treatment plant processes, which convert, dewater, and concentrate multiple forms of nitrogen from treated influent water have a comparable or greater effect on receiving soils. Wastewater plants also add nitrogen to the atmosphere through the off-gases from driers, digesters and open process equipment.

Table 1 presents data on nitrate levels in influent liquids and residual solids from a wide range of municipal sewage treatment plants as studied by Metcalf and Eddy. Both primary sludges and digester sludges range as high as 60,000 mg/L (ppm) of total nitrogen.

Historic Sewage Treatment Practices

Very little specific information is available regarding the Blanding municipal sewer treatment plant or Publicly-Owned Treatment Works (POTW). However, general historic information on wastewater management history provides some idea of what operations were likely in a rural POTW which was already in operation before the construction of White Mesa Mill in the late 1970s, and may have been in operation as early as the first decades of the twentieth century.

Data from the USEPA wastewater treatment inventory indicates that in 1945, only 5,786 sewer treatment plants operated throughout the entire US. By 1974, this number had increased to 21,011. These numbers indicate that prior to and during this period, a large number of communities managed sewage waste by untreated direct discharge to surface water bodies, deep wells, land disposal areas, and septic fields. The data also indicates that as recently as 1974, primarily in rural areas, 78 percent of the existing treatment plants had less than 1 million gallons per day (MGD) capacity and 14 percent still had no secondary treatment (no biological or chemical processes to remove organic content). Of all 21,011 plants of all types operating in 1974, 95 percent had no post-treatment nitrogen or chloride removal.

According to the US EPA <u>1974 Needs Survey</u>, the most common type of treatment design in facilities of less than 1 MGD, and in many above that size, was aerobic stabilization ponds. This type of treatment attempts to increase the oxygen content available to treatment bacteria by aeration and mixing, or by aeration and mixing coupled with algae growth for additional oxygen. These types of facilities are defined as suspended growth treatment processes. In suspended growth treatment, the biomass is mixed and suspended throughout the wastewater. After microbial contact and treatment, the majority of the biomass (bacteria and algae) exits the pond with the treated water. If there is little or no downstream solids removal processing, nearly the entire solids mass exits with the treated water.

It should also be noted that biological treatment, whether suspended or fixed type, is designed primarily to convert, not remove, organic carbon and nitrogen content. While the sewage carbon and nitrogen compound levels are reduced during bio-treatment, they are converted into an increase in biomass (microbes and algae). Unless solids reduction steps follow the bio-treatment, nearly the same carbon and nitrogen levels exit in the treated water, just in different forms.

Suspended growth systems are far more prevalent in rural settings than the more sophisticated attached growth processes (trickling filters, rotating biological contactors, and packed bed reactors) used in large urban plants, in which the biomass is attached to an engineered surface, wastewater passes through the mass for bio-treatment, and exits with lower suspended and dissolved solids content.

Application of a Time-Relevant Case Study

For two years during the late 1970's, I participated in a sampling and analysis study of municipal sewage treatment plant outfalls and nearby receiving waters in a non-urban area of northern New Jersey. The study was part of an ongoing program to assess nitrogen-based pollutant loads and other sources of chemical and biochemical oxygen demand exiting from small-community secondary treatment plant discharges into the upper reaches of the Hackensack Meadowlands. Water samples from drainages that received flows from industrial/commercial outfalls just upstream and downstream were also sampled for comparison. The work was published by Dr. R. Trattner in "Water Quality in a Recovering Ecosystem" in 1978. While the receiving environments differed from the Blanding area situation (surface water versus soil and groundwater), the wastewater treatment plant sources in New Jersey were of comparable vintage and type to warrant the extension of some observations to the Blanding situation.

The most significant observation from two years of monthly monitoring was that with respect to effluent nitrate, the plants were generally in upset conditions more often than they were in controlled conditions. The upsets included the periodic overtopping of settling and solids removal equipment and discharge of high total suspended solids (TSS), indicating that bio sludge was exiting via the effluent water instead of through the solids management circuit.

The other significant observation was that the receiving waters outside the sewer plant outfalls exhibited amine and nitrate levels orders of magnitude higher than receiving waters near the industrial outfalls, including outfalls from nitrogen-wasting processes including tanning and dyeing, leather finishing, rendering, and meat-packing plants.

While the above findings resulted from monitoring of aqueous waste to surface water discharges (not aqueous waste to soil to groundwater), the indications are consistent with the USEPA and McQuillan opinions regarding the relatively greater importance of sewage nitrogen than industrial nitrogen as an environmental pollutant.

Industrial Chemicals

Industrial chemicals and chemical wastes are generally a smaller source of nitrogen than those identified above. In the US chemical industry, non-gaseous industrial nitrogen compounds typically reach the environment through:

- Industrial discharges into municipal wastewater treatment systems followed by treatment and water discharge into surface water bodies;
- On-site wastewater treatment to permit-driven standards and discharge into surface receiving waters;
- Land disposal of the solids and sludges from either of these types of treatments; and
- Direct spills of nitrogen-bearing chemical products or chemical/industrial wastes.

As mentioned above, however, in biotic environments, nearly all inorganic nitrogen compounds, upon exposure to water and oxygen, are readily converted to nitrites, then nitrates, by ubiquitous natural biochemical processes in surface water bodies and runoff channels. Therefore, nearly any industrial spill or release of inorganic nitrogen compounds that is exposed to atmospheric oxygen and soil or water bacteria will eventually be converted to nitrate. For this reason, ammonia nitrogen compounds that reach groundwater through surface spills will eventually be exhibited in groundwater as nitrate, not ammonia, nitrogen.

3.0 Overview of Natural and Anthropogenic Chloride Sources

3.1 Natural Sources and Properties

The chloride ion is present in one of the most ubiquitous materials on earth – seawater and natural brines. In inland areas, inorganic chloride compounds may be present in regional geologies as residual salts and mineral deposition from ancient inland seas. Chloride as sodium chloride is present in biotic systems almost universally as a dilute saline component of cellular fluids in both micro- and macro-species.

Chloride is a polar ion that in many forms (chlorates, chlorites, hypochlorites, chlorine dioxide, metal chlroides) is a strong oxidizer, generally destructive to both microscopic and macroscopic life. Since the late 19th century chlorine-containing bleaches and preparations have seen increasingly widedspread use as germicides and sterilants, beginning even before their ability to destroy microbes by penetration and disruption of their cell membranes was understood.

However, unlike the plethora of nitrogen-bearing chemicals and biochemicals in biotic systems, few or no organo-chlorine compounds exist in nature. Organo-chlorine species (arochlors, chloroohenols, dioxins, chloramines, chlorinated olefins, chlorosulfonic compounds) are also disruptive to biotic processes, hence their extensive use during the

20th century of chlorinated organics as tissue-soluble pesticides and herbicides. Overwhelmingly, the chloro-organic compounds present in the natural environment today are the products of synthetic organic chemistry and/or the secondary chlorination of synthetic and natural organic chemicals in wastewater treatment settings.

3.2 Anthropogenic Sources

Sewage and Septic Sources

Chloride is a relatively non-reactive solute that occurs in all sewage. It enters sewage from two sources – household chemicals and wastes discharged into the sewer system, and additional chloride added during sewage treatment. Chloride-bearing household chemicals include primarily bleaches, cleaners, and water softener salts used and disposed in relatively large volumes, and pharmaceuticals, solvents and pesticides generally present in domestic wastewater at very low levels. US EPA data from the past decade indicates that domestic water entering a typical household increases in chloride content from 20 to 50 times before it reaches the sanitary sewer or septic sump. For households using salt-regenerated water softeners, this ratio of increase may be one or more orders of magnitude higher.

Data from the same period indicates that from tap water to the effluent of a sewage treatment plant, chloride levels increases an average of 74 times and up to 200 times. That is, the municipal treatment of domestic wastewater not only does not remove the chloride ion prior to discharge, it adds significantly to its concentration. Chloride addition in wastewater treatment is discussed below.

Disinfection in Sewage Treatment Plants

Chlorine, in one of several forms, is the most common disinfectant in wastewater treatment throughout the world. Depending on plant size, safety considerations, and economic factors, it is applied either as free chlorine gas, sodium hypochlorite, calcium hypochlorite, and/or chlorine dioxide. Chlorine in one of these forms is added to generate an excess of solubilized chlorine, in the form of hypochlorous acid.

Chlorine reacts first with inorganic ions in biotreated sewage to form chloride ions. The effluent from most wastewater treatment aerobic steps contains significant amounts of nitrogen in either the ammonia form, or as nitrate if the plant is designed to achieve nitrification. As additional chlorine is added, and the inorganic demand is satisfied, free chlorine reacts readily with the ammonia content of bio-treated wastewater to form mono-, di- and tri-chloramines, which act as disinfectants. Some chloramines are eventually oxidized to nitrous oxide and nitrogen.

The point beyond oxidation, at which all the reaction demands have been met and all added chlorine remains as free chlorine, is referred to as the break point. The majority of chlorinated compounds formed up to the breakpoint, other than the nitrous oxide and nitrogen gas, precipitate as solids and increase the sludge volume. The goal of wastewater plant chlorination is to add chlorine far in excess of the breakpoint over the process from biotreatment through discharge. As a result, treated effluent may contain heavy loads of excess chlorine, to ensure disinfection. Metcalf and Eddy indicate that wastewater plants running optimally may have residual chlorine levels (all forms) in effluent from the biotreatment step only, as ranging from less than 1 ppm to as much as 7 ppm. They do not report chlorine addition levels for the subsequent steps of the process prior to discharge, which is where the heaviest chlorine use takes place. If the plant does not have a de-chlorination process step, the chlorine residuals remain in the discharged effluent. The levels of chloride and chlorinated compounds that exit the plant during upset conditions, or when impoundments overtop and sludges and sludge solutions exit the plant, are significantly higher than what is exhibited at the exit of the biotreatment step.

Other Uses in Typical Wastewater Plants

Chlorine is added widely throughout other parts of typical sewage plants, also adding to the effluent chloride load. In the collection area it may be applied for slime growth control, corrosion protection, and odor control. In the treatment section it may be applied for grease removal, BOD reduction, oxidation of ferrous sulfate, filter process control, reduction of sludge bulking, oxidation of supernatant form digesters and control of foaming in digesters, ammonia oxidation, odor control and oxidation of bio-refractory (non-degraded) compounds. It is also heavily used in the disposal section of most plants for disinfection (bacteria reduction) and odor control.

In the New Jersey case study for example, 10 of the 11 monitored sewer plant designs were based on aerated stabilization ponds, and one was an anaerobic Imhoff tank design. Typical of the era, the Imhoff plant and nine of the aerobic plants used inorganic forms of chlorine, primarily hypochlorites, at multiple points in the process for odor control, slime and microbe control, corrosion control, general disinfection and microbe destruction prior to effluent discharge. One aerobic plant used a UV/bromine treatment for the same purpose. Also typical of the era, 10 of the 11 had no tertiary treatment for nitrogen removal, and none of the 11 had any polishing treatment for chloride or bromide removal.

Industrial Chemicals

The production of chlorine (gas), primarily via the hydrolysis of natural brines, is one of the most important heavy chemical industries, ranking as one of the top three chemicals produced in the US, both by tonnage and dollar value. Chlorine's organic and inorganic chloride products are used in a wide spectrum of chemical processes including pulp and paper, solvents and degreasers, polymers and plastics, pesticides, refrigerants, bleaches and sanitizers, heat transfer fluids, dry cleaning, military chemical weapons (nerve and blister agents), road de-icing, and metallurgy.

Industrial chlorine or chloride enters the environment via the same routes as described for industrial nitrogen, above, that is, wastewater treatment associated with chemical manufacture or use, or direct spills of chemical products.

In industrial settings, the presence of chloride in environmental media may be affected significantly by all of the industrial and domestic use of inorganic chlorides (salts), synthetic chemicals, and sewer treatment sources. In rural and non-industrial settings, where the presence of synthetic industrial chlorinated chemicals are present at household (or ranch or farm) sized quantities, the effects of inorganic salts (salt licks, road deicing, water softeners) and sewage treatment sources, tend to predominate.

4.0 **Potential Sources of Groundwater Nitrate**

Table 2a provides a summary of industrial, commercial, agricultural and municipal sources of nitrogen compounds from which potential candidate sources for the Mill nitrogen can be elicited. The list does not itemize every scientifically known nitrogen compound. That is, it does not include short-lived or rare compounds synthesized solely for research purposes. For brevity, in many cases the list presents a class of compounds or types in lieu of naming every species in the category.

The upper section of the table identifies those compounds and classes of materials that could be expected to be present on the Mill site or in the vicinity of the Mill. The lower section completes a broader survey of compounds and sources and indicates why they are not, or are likely not, present at or proximal to the Mill.

The potential sources are evaluated and discussed in more detail in the sections below.

4.1 On-Site Nitrate Sources at the Mill

The Mill commenced operations in May 1980, and operated on a campaign basis at near full capacity on conventional ores from the Colorado Plateau (uranium-vanadium ores) and Arizona Strip (uranium ores) until 1991. The Mill also processed conventional ores for short durations in 1995 from the Arizona Strip, in 1999 from the Colorado Plateau, and in 2008 and 2009 from the Henry Mountains complex and the Colorado Plateau. In addition, commencing in 1993, the Mill processed finite volumes of alternate feed materials from several Formerly Utilized Sites Remedial Action Program (FUSRAP) sites and from other uranium and metal industry sources. As indicated in my evaluations of alternate feed characteristics since 1997, alternate feed materials have never been an appreciable source of nitrogen compounds, never exhibiting more than ppm levels in finite volumes of materials that have either been stored in closed containers or have remained on the ore pad less than a few months before processing. Based on this history, the potentially larger sources of nitrogen introduction into the Mill likely preceded and were independent of the alternate feed program.

Tables 3a and 3b provide integrated lists of nitrogen-bearing laboratory and bulk reagents stored and used on the Mill site. Potential sources of groundwater nitrogen from among these and other materials on the Mill site are discussed below.

Septic Leach Fields

As mentioned above, both the US EPA and US Geological Survey consider septic systems to be one of the largest sources of nitrate loads to surface water and groundwater, nationwide. The Mill has several operating or historic septic leach fields. The locations of these leach fields are indicated on the attached Figure 3. Some key facts relating to these leach fields are discussed below.

The Former Office Leach Field (located south east of the Mill's Administration Building) is no longer in use. It was used in the early 1980's to accept septic waste from the Mill's administration building. For a short period of time, it also accepted wastes from the Mill's chemical and metallurgical laboratories, until Cell 1 was competed in 1981;

The Scale House Leach Field (located south west of the Scale House) may no longer be in use (see discussion under Main Leach Field below). It was used until the mid 1980's to accept septic waste from the restroom in the Scale House. It also accepted laboratory wastes from the temporary laboratory in the Scale House from around 1977 until the main laboratories in the Mill's administration building were commissioned in 1980;

The Cell 1 Leach Field (located just east of Cell 1) is currently used to accept septic wastes from the restrooms in the Mill's Central Control Room and SX Building;

The SAG Leach Field (located just north of the Mill building) was used to accept septic waste from the restroom in the Shifter's Office near the SAG Mill. It is currently operable, but that office and restroom have been closed since the 1999 Mill run. The toilet at that location is currently not operable.

The Main Leach Field (located east of the ore pad) was put into use in the mid 1980's and is currently in use. Septic wastes from the restrooms in the Administration Building, the Maintenance Shop, the Warehouse and the Changing/Shower rooms are piped to the Sewage Vault, located under the current yellowcake storage area, where it is pumped to the Main Leach Field. There is a pipe from the Scale House to the Sewage Vault. However, effluent is not entering the Sewage Vault from that pipe, which suggests that the waste from the Scale House restroom is still being discharged into the Scale House Leach Field, or that there could possibly be a breach in the pipe and the Scale House waste may be discharging at that point.

Two of these leach fields (the Scale House Leach Field, and the Former Office Leach Field) are believed to be the source of the existing chloroform contamination at the Mill, due to the historic disposal of laboratory wastes in those leach fields (see the discussion below relating to Mill Laboratories). Nitrate, along with chloroform, has been sampled in all of the chloroform investigation wells as part of the chloroform investigation. Attached as Table 4 to this report is a list of all chloroform and nitrate sample results from the chloroform investigation, as taken from the Mill's most recent Chloroform

Monitoring Report. Attached as Table 5 to this report is a table prepared by DRC and attached to the draft September 15, 2008 Request for Additional Information, which shows nitrate concentrations in monitoring wells within the chloroform contamination plume and highlights in yellow nitrate concentrations in those wells that have exceeded the GWQS of 10 mg/L. Table 6, provided by Denison Corporate staff, is a tabulation of chloride and nitrate data from Mill monitoring wells and test wells collected during the last quarter of 2009.

In addition, as described below, prior to the construction of Cell 1, the Mill laboratories have also discharged a variety of non-septic nitrogen-bearing chemical solutions to several of the leach fields.

From this information, it is clear that the Scale House Leach Field and Former Office Leach Field have contributed nitrate to groundwater at the site. It is possible that the other septic leach fields alone, or in conjunction with these two leach field, have given rise to or contributed to the nitrate contamination that is the subject of this report. A number of these other leach fields are either upgradient or cross-gradient to such nitrate contamination. In particular, the SAG Leach Field is located upgradient of the nitrate plume. The Main Leach Field has been the Mill's main septic leach field since the mid 1980's, and is located upgradient/crossgradient of the nitrate plume.

Because the SAG Leach Field is upgradient of the nitrate plume and the Main Leach Field is located upgradient/crossgradient of the nitrate plume, they should be given a high priority in the Sampling Plan.

Frog Pond

Until the early 1990s, process water for the Mill was limited to the deep water supply wells on site, and the Mill sought additional sources of process water. Recapture Reservoir was not constructed until 1988-1989, and the pipeline from Recapture Reservoir to the Mill was not completed until around 1991-1992. From the mid 1980s until the Recapture Reservoir water was first piped to the Mill in 1991-1992, effluent from the regional sewage treatment plant, north-east and upgradient of the Mill site served as an additional water source for Mill operations.

The two ponds associated with the water treatment facility are unlined. Effluent and seepage from the water treatment plant flows to Corral Canyon, just east of the Mill site. This flow was dammed by local ranchers prior to construction of the Mill to form a pool just north of the entrance to Corral Canyon. This pool exists today and is referred to as the "Frog Pond". Discussions with personnel at the City of Blanding have confirmed that the water in the Frog Pond is fed by the water treatment facility.

At the Frog Pond an electric pump carried the water for use at the Mill via an underground pipe at the rate of about 200 gallons per minute (gpm). Just north of the Mill's restricted area, the water could be diverted to either the northern most wildlife pond (the "Upper Wildlife Pond") or to a secondary pond, referred to as "Lawzy Lake".

At the Upper Wildlife Pond a diesel pump was activated when water was needed in the Mill. Water was then pumped from the Upper Wildlife Pond to the Mill's pre-leach tanks, which acted as water storage for the Mill. The water in Lawzy Lake was gravity fed via a pipe to a sump (the "Lawzy Sump") within the restricted area. Once the water reached the Lawzy Sump, it was pumped via a pipe to the pre-leach tanks for water storage. None of the ditches, the Upper Wildlife Pond, or Lawzy Lake are lined.

The locations of the water treatment ponds, the Frog Pond, the Upper Wildlife Pond and Lawzy Lake are shown on Figure 4. The various ditches and pipelines connecting Lawzy Lake to Lawzy Sump, the wildlife ponds to the SAG leach field, and the sewage vault to the Main Leach Field are also shown on the attached Figures 5.

Water was pumped from the Frog Pond to the Upper Wildlife Pond and/or Lawzy Lake as needed during operations. During periods of full operations, those ponds were filled with water from the Frog Pond several times per year, and sometimes several times per month.

Anecdotal evidence suggests that the waste treatment facility experienced upsets and leakages in their post-treatment sludge ponds, resulting in discharges of sewage sludge and/or sludge-laden water from the plant to the Frog Pond. The sludge-laden waters exhibited a septic/sewage odor in the channel, in each ponded area, in the Lawzy Sump, and where it entered the uranium leach circuit. Various Mill staff described adding the water to the Mill process at rates varying from 25 to 200 gpm depending on the specific needs of the ore run (at normal operating rates the Mill consumes and evaporates approximately 650 gpm). This use of pond water was finite and lasted until about 1992, when Recapture Reservoir water became available.

As discussed above, sanitary sewage byproducts are extraordinarily high in nitrates and other nitrogen-bearing compounds concentrated in the precipitation, concentration and digestion steps of the sewage treatment process. As mentioned in Table 1, typical sludge exhibits nitrogen contents ranging up to 60,000 ppm. Because sewage sludge has already undergone physical/chemical treatment (primary treatment) and, in some plants, bio-oxidation (secondary treatment), the majority of the nitrogen content is present in the nitrated form.

This source review did not include any study of the size, process configuration or operational practices of the regional sewage treatment plant at the time of reuse of its effluent at the Mill. It is not known whether the plant had primary (suspended solids), secondary (biological treatment and disinfection), or tertiary (color, odor and nitrate/chloride conversion and polishing) treatment. Based on the location and time period under consideration it is likely the plant was limited to primary and/or secondary treatment. The data in Table 1 is relevant and representative because it represents an overview of nationwide treatment plants, including some of greater sophistication, collected in the late 1970s through 1980, a period when the Blanding treatment plant operated but the Mill was not yet constructed.

Although the Mill's use of sewage-based water ceased in the early 1990's, sediments and residuals from the Frog Pond and transfer ponds remained and may still be detectable by soil sampling or additional groundwater sampling. However, nitrate concentrations would be expected to diminish significantly over time due to natural biodegradation, and current nitrate levels would be expected to be lower than when these structures were actively used.

This source could be the sole or a significant contributor to the nitrate plume at the Mill site, and is upgradient to the most upgradient well in question (TW4-25). Furthermore, the fact that the water from the Frog Pond was conveyed on the surface via pipeline to the Mill site, could explain why high nitrate concentrations have not been observed in the Mill's most upgradient monitoring wells, MW-1, MW-18 and MW-19, as noted by DRC.

For these reasons, the Upper Wildlife Pond, Lawzy Lake and the Lawzy Sump are likely sources of nitrate in on-site groundwater.

Fly Ash Pond

From 1980 to 1989, the Mill used a coal-fired steam boiler for operations. Fly ash and bottom ash from combustion of bituminous Colorado Plateau coal were disposed of primarily in tailings Cell 2. However, the ash disposal system did not always work as intended, due to the high clinker volume in the ash. In upset situations, the fly ash was disposed of in a pit referred to as the "Fly Ash Pond" that was located just north of TW4-24. The Fly Ash Pond was originally built to hold construction water. The location of the Fly Ash Pond is indicated on Figure 3.

The Fly Ash pond was located in the area of the Mill close to tailings Cell 1 that was designed to catch surface runoff from the site and direct it into the tailings cells, that is, it was a low area. As a result, the pit was often filled with water after rainfalls, and came to be referred to as a pond. Because it was often the focal point for runoff from the Mill's ore pad and process facilities, it may also have accumulated any runoff from surface spills of re-agents or process streams that could potentially have occurred during the history of Mill operations. For example, any potential upsets in the nearby vanadium circuit (which could contain nitrates, as discussed below) that may have resulted in spills to the surface could have potentially impacted the Fly Ash Pond.

The Fly Ash pond was emptied out and the deposited fly ash was disposed of in Cell 2 in 1989. The emptied pit was filled with random fill and use of the pit ceased at that time. However, because the area where the Fly Ash Pond had been located is at a relatively low point, it has until recently continued to pool rainwater and has frequently been covered in standing water during storms, overflowing onto the surrounding surface. This area was re-graded and re-contoured in 2007 in an effort to better direct the runoff water to tailings Cell 1 and to thereby minimize this pooling.

As discussed in Section 2, above, coal and coal-based combustion ash may exhibit up to percent levels (tens of thousands of ppm) of bound or oxidized nitrogen. As also

mentioned, oxidized, distilled, and treated coal residuals were the chemical industry's most important source of nitrogen chemicals before the advent of high pressure synthesis technology. The Fly Ash Pond could therefore be considered to be a potential source for nitrate contamination in groundwater at the site. However, because the Fly Ash Pond is located several hundred feet downgradient of TW4-25 and the upgradient boundary of the plume, the Fly Ash Pond is not likely the most significant contributing source to the plume.

Potential Spills from Uranium and Vanadium Circuit Chemicals

The Mill uses ammonia or amine compounds at several points in the processing circuits. A summary of nitrogen-bearing compounds used in the Mill's processes, from the Operations Chemical Inventory in the Mill's SPCC Plan is provided in Table 3a.

Anhydrous ammonia is stored as a gas in the tank farm before it is volatilized in a vaporizer for 1) introduction to the yellowcake precipitation area and 2) pH adjustment in the vanadium circuit. In these circuits, ammonia is dissolved into aqueous process streams as ammonium hydroxide.

Ammonium sulfate, purchased and stored both as powdered solid and aqueous solution, is added to the vanadium precipitation circuit. An organic amine, purchased and stored as a liquid, is added to the solvent extraction (SX) circuit; however it is present in only trace amounts in both the SX and counter-current decantation (CCD) areas.

Spills and overflows of these materials within the process buildings enter the floor drains and are transferred to the tailings system. The process circuits and floor drains and sumps that could historically have held or carried these solutions are designated on Figure 3.

Based on information from Mill personnel, there has been no history of failures or upsets of the storage tanks, drums, or powder containers of the liquid or solid materials in the tank farm or in transfer to the Mill buildings. Although some of these materials contain high concentrations of fixed or bound nitrogen, spills of these materials are too finite a phenomenon to account for an ongoing plume on their own.

There is no history of spills or upsets of the anhydrous ammonia tank system. If an upset were to occur in this system it would, in any case, generate primarily a gaseous emission, not a liquid or solid discharge to the tank farm pads and berms.

The only potential ongoing source within the current Mill operations is theoretically the vanadium and/or uranium circuit floor drain systems. Within the process buildings, spills, overflows, wash-downs and other process waters containing ammonium hydroxide (generated from the anhydrous ammonia), ammonium sulfate, and organic amine enter the floor drain system from time to time and are transferred by above-ground pipe to the tailings system. The floor drains are typical concrete box channels with top gratings, designed to receive, collect, and channel spills, vessel overflows and drain-outs, and

wash-down waters to the tailings transfer lines. The types of activities that transfer nitrogen-bearing solutions to the floor drains are ongoing and can be relatively frequent during operational periods.

At the current time, there is no reason to expect that there are breaches or breaks in the floor drains or the tailings transfer lines. As a result, the floor drains and transfer system are an unconfirmed potential source.

However, for the foregoing reasons, and because all of the process circuits, floor drains and sumps are located downgradient of TW4-25 and the upgradient boundary of the plume, these should be considered to be low priority potential sources and hence given a low priority in the Sample Plan.

Mill Laboratories

Table 3b lists nitrogen-bearing chemicals used and stored in small quantities in the Mill's on-site chemical and metallurgical laboratories. The laboratories stored and used small (from 100ml vials to kilogram and liter quantities) of a variety of nitrogen-bearing compounds as reagents, titrants, indicators, separating agents, and surfactants, for sample preparation, extraction, and testing steps and received additional nitrogen-bearing process samples from various points in the vanadium circuit for QC testing. Testing materials, residuals, rinsates and other chemicals that reached the lab sinks and lab drain systems were, as required by the Mill's license conditions, discharged to the tailings system commencing in June 1981, after completion of tailings Cell 1. Between around May 1980 and June 1981, laboratory wastes were discharged to the Former Office Leach Field. Some nitrogen may therefore have been discharged to the Former Office Leach Field prior to June 1981. In addition, potential leaks or breaches in the lab drain system could also theoretically be a potential source of groundwater nitrogen, in part due to the sheer number of different types of nitrogen compounds they may have transported. However, the mass of nitrogen contained in the small volumes of bottled reagents and process samples in the labs, even if their contents entered the drains in their entirety, are likely too insignificantly small to account for the observed nitrate plume. Furthermore, the Mill's laboratory is located downgradient of TW4-25 and the upgradient boundary of the nitrate plume. Therefore, the labs are a relatively low-priority source.

Tailings

The Mill's tailings cells contain nitrogen in both the ammonia and nitrate forms. Mill tailings solutions have been sampled from time to time over the Mill's history. Care must be taken in interpreting sample results, because the concentrations of analytes in tailings solutions can vary significantly from one sample event to another, depending on:

- whether or not the Mill is operating,
- whether or not it is re-circulating tailings solutions into the process or adding fresh water to the process, and

• the extent to which evaporation or rainfall have affected concentration or dilution prior to sampling.

The Statement of Basis for the Mill's GWDP reports that sample data from September 1980 through March 2003 showed a range for nitrite /nitrate in the Mill's tailings solutions of 17.0 mg/L to 49.2 mg/L, with an average of 30.91 mg/L. Recent sample results obtained in August 2009 show concentrations of nitrite and nitrate in the solutions in the slimes drain for Cell 2 of 38 mg/L that are consistent with these historic results. The average concentrations for nitrite and nitrate in the pond solutions in Cells 1 and 3 were 254 mg/L and 102 mg/L, respectively, which are somewhat higher than those historic numbers, possibly demonstrating the results of evaporation in those ponded areas prior to sampling.

The presence of nitrate, as well as ammonia, in the Mill's tailings is reasonable and expected for the reasons discussed above, and summarized here:

- The Mill uses ammonia and amine nitrogen in several locations in the process and re-circulates solutions of these materials to the tailings system yielding large masses and concentrations of ammonia nitrogen in tailings;
- The Mill introduced nitrate nitrogen, albeit for a finite period of two years, into the uranium circuit and ultimately to the tailings system yielding smaller masses and concentrations of nitrate nitrogen in tailings; and
- Other sources of nitrogen (such as fly ash) and surface runoff containing nitrogen compounds, were exposed to atmospheric oxidizing conditions before they were transferred to tailings yielding smaller masses and concentrations of nitrate nitrogen in tailings.

As a result, it is reasonable to expect and detect both a low level of nitrate and a higher level of ammonia nitrogen in the tailings.

As discussed above, in biotic systems, ammonia nitrogen is readily converted to nitrite and nitrate. In abiotic (non-living) systems, such as the tailings, this is not the case. Ammonia nitrogen is soluble and stable in water in a non-living, non-oxidized system. It remains in water in either ionized or unionized form, switching easily between the two, depending on the pH of the solution. In aqueous systems with high pH, ammonia remains in the non-ionized NH₃ form. At neutral pHs and in low pH (acidic) systems such as tailings, ammonia is present primarily in the ammonium ion form (NH₄+). In the abiotic, hot, acidic, low-oxygen, nutrient- and microbe-deficient environment of the tailings solutions, ammonia nitrogen is not converted to nitrate (however, nitrate that enters the system as nitrate remains as nitrate).

Like abiotic aqueous systems, groundwater also does not normally exhibit either the aggressive chemical oxidizing or biologically enzyme-catalyzed conditions to convert ammonia nitrogen into nitrite/nitrate. Hence, ammonia nitrogen that reaches groundwater directly through failure of surface impoundment or structure liners, which has not been exposed to atmospheric oxygen and bacteria *before* reaching groundwater, generally

would be expected to remain and be detected as ammonia or ammonia nitrogen, not nitrate/nitrite, in groundwater.

In order for an ammonia nitrogen source to appear in groundwater as nitrate, it would need to reach groundwater via a surface spill in which it would have time to be converted to nitrate by chemical or biological processes *before* reaching groundwater.

Because the Mill's tailings contain nitrate, the tailings cells are included here as a potential source of nitrate in groundwater. However, given that:

- recent studies have indicated that the Mill's tailings cells are not leaking , (including the July 2007 Hurst and Solomon Mill sampling event summary, the INTERA Revised Background Groundwater Quality Report, November 2007 INTERA Revised Evaluation of Pre-Operational Background Data, and the April 2008 INTERA Revised Background Groundwater Quality Report).
- the nitrate plume has been detected in high concentrations in TW4-25, which is almost a quarter of a mile upgradient of the Mill's tailings cells;
- There appears to be no groundwater mounding under the tailings cells (see Figure 2 from the Stewart report),

it would appear that although the Mill's tailings cells are a potential source of the nitrate contamination, they are not a likely source of the contamination and should not be given a high priority in the Sample Plan.

Other Surface Disposal Areas

During the Mill's earlier history, the site contained a short-lived landfill for noncontaminated Mill solid wastes. The landfill received non-hazardous debris and office trash until it was shutdown in approximately 1982. All of the contents of that landfill were excavated and disposed of in the solid waste disposal area of tailings Cell 2.

The location of this landfill is indicated on Figure 3.

While the landfill may have contained nitrogen-bearing compounds from food waste, soap containers, and organic garbage, it would have been present at minutely low levels. Unless chemical materials or sewage related solids were inadvertently placed there, it is unlikely that the former landfill could pose an important source for the groundwater nitrate plume, and should not be given a high priority in the Sample Plan.

Historic Pre-Mill Sources

Prior to construction of the Mill and related facilities, the Mill property was privately owned and was used for cattle grazing. A barn and corral were located in the area close to the current dike between Cell 1 and Cell 2, west of monitoring well TW4-24. Also, a stock watering pond (the "Historic Pond") was located northwest of the Mill's administration building, where the Mill's sulfuric acid tank is currently located. There was no irrigation or agriculture on the land. An aerial photo depicting the land use prior to construction of Mill facilities is attached as Figure 5.

The Historic Pond was dammed and put in place many years prior to construction of the Mill. In fact, it had the recognition of being the first dam built in Utah by a gas-powered tractor, so it probably dates back to approximately the 1920s. The Historic Pond was displaced by Mill facilities when the Mill was constructed. The main sulfuric acid tank at the Mill is currently located on the site of the former Historic Pond. Many years of livestock watering at the Historic Pond could have contributed significant amounts of nitrate to the local soils and the pond. Pooled water in the pond could have provided a sufficient head to drive this nitrate to groundwater. As the Historic Pond is a reasonable source of nitrate over many years, and is located upgradient of the nitrate plume, it should be given a priority in the Sample Plan.

It is also possible that the historic barn and corral could have been a source of nitrate at the site. However, in the absence of standing water at that location, it is not likely that such a source could have impacted groundwater. Also, the location of this potential source is downgradient of the upgradient boundary of the current nitrate plume. For these reasons, this potential historic source of nitrate should not be given a high priority in the Sample Plan.

4.2 Offsite Sources

The Mill is located south of Blanding, Utah in a rural agricultural region of the state. Land uses proximal to the Mill include farming, ranching, cattle grazing, feed and grain silos, and the municipal wastewater treatment plant that serves Blanding and some of the surrounding area. A substantial number of farms and ranches are likely not connected to the municipal treatment facility and likely use septic systems for domestic sewage. Direct fertilization with swine or cattle manure is also still practiced in rural Utah. The town of Blanding, population 3,162 (2000 census), is approximately 5 miles north-northeast of the Mill boundary.

One potential offsite source of nitrate is the management of livestock on properties adjacent to the Mill's restricted area, which are subject to cattle grazing leases. Such cattle use the wildlife ponds for drinking water, and may have contributed nitrate to the wildlife pond area. However, any addition of nitrate into the wildlife ponds from livestock would be commingled with, and minimal compared to, the addition of nitrate into the wildlife ponds from the Frog Pond waters. Therefore there is no need to perform any additional investigations relating to livestock influences at the wildlife ponds. If the wildlife ponds are determined to be the source of the nitrate plume, then it would be reasonable to assume that the nitrate in the wildlife ponds could have originated from a combination of the Frog Pond Water and these livestock activities.

It should be noted that nitrate in surface waters, estuarine, riparian, and humic surfaces is a plant nutrient (hence the widespread use of nitrate fertilizers in agriculture). Nitrate in these environments will be uptaken and converted by terrestrial and aquatic plants, plankton, and algae in a cycle over time (nitrates are stable and non-volatile so they do not vaporize directly to air from aqueous solutions). The total nitrate mass in such a system is re-distributed among the sediments and precipitates, benthic materials, aquatic plants and microorganisms, terrestrial plants and microorganisms, and macro-organisms in the system in a cycle, whether the nitrate entered the system through aqueous transport or soil deposition. Therefore the wildlife ponds could once have exhibited higher concentrations of nitrate and been the source or contributor to a nitrate plume, even though the current water in the wildlife ponds does not presently demonstrate high concentrations of nitrate

Although this study did not include a rigorous itemization of all regulatory-listed sites or contamination sources upgradient and side gradient of the Mill, overall, there are many potential past and ongoing agricultural and domestic sources that may also affect the nitrogen balance in groundwater entering the Mill boundary. However, because upgradient monitoring wells MW-1, MW-18, and MW-19 do not indicate high concentrations of nitrate, it is unlikely that any of these offsite sources are a continuing source of the nitrate contamination. While it is possible that agricultural practices on neighboring properties that occurred at some time in the past (but which no longer occur) could have contributed a slug of nitrate contamination to groundwater that has passed by the upgradient monitoring wells and that now forms the nitrate plume at the site, this would appear to be unlikely and should not be a high priority in the investigation.

5.0 Potential Sources of Groundwater Chloride

For the discussion in the following section, it should be noted that, like the nitrate plume, the chloride plume appears to originate to the northwest end of the Mill property, generally upgradient of the tailings area, the Mill process buildings, and the outdoor chemical storage areas.

5.1 On-Site Sources at the Mill

Processing and Laboratories

As indicated in my evaluations of alternate feed characteristics, alternate feed materials have never been an appreciable source of chloride compounds, never exhibiting more than ppm levels in finite volumes of materials that have either been stored in closed containers or have remained on the ore pad less than a few months before processing. Based on this history, chloride introduction into the Mill groundwater was likely independent of the alternate feed program.

Table 3c lists chloride-bearing chemicals used in the Mill operations. Sodium chloride is stored as bulk salt and used in regeneration of ion exchange resins in the uranium recovery circuit. Sodium chlorate is stored in two fiberglass tanks (17,700 gallons and 10,500 gallons) within a dike east of the solvent extraction building. Other inorganic chlorine compounds including sodium perchlorate, sodium hypochlorite, calcium hypochlorite, and hydrochloric acid are stored in the tank farm or storage dike areas for

use throughout the process. Smaller quantities of inorganic and chloro-organic compounds such as Ajax, bowl cleaner, and PVC cements are stored and used in the Mill building and shops.

Based on information from Mill personnel, there has been no history of failures or upsets of the storage tanks, drums, or powder containers of the liquid or solid materials in the tank farm or in transfer to the Mill buildings. Although the salt storage area contains a large volume of sodium chloride, spills of this material is too finite a phenomenon to account for an ongoing plume by itself, as are sodium chlorate spills from the tank dikes outside the solvent extraction tank area.

There is no history of spills or upsets of the chlorine tank system. If an upset were to occur in this system it would, in any case, generate primarily a gaseous emission, not a liquid or solid discharge to the tank farm pads and berms.

The only potential ongoing source within the current Mill operations is theoretically the vanadium and/or uranium circuit floor drain systems. As discussed above, the types of activities that transfer chloride solutions to the floor drains are ongoing and can be relatively frequent during operational periods, however, at the current time, there is no reason to expect that there are breaches or breaks in the floor drains or the tailings transfer lines. More importantly, all of the process circuits, floor drains and sumps are located downgradient of TW4-25 and the upgradient boundary of the chloride and nitrate plumes, and as a result, cannot be the primary source of the groundwater contamination.

Table 3d lists chloride-bearing chemicals used and stored in small quantities in the Mill's on-site chemical and metallurgical laboratories. The laboratories stored and used small (from 100ml vials to kilogram and liter quantities) of ammonium chloride and chlorine-containing color indicators. However, the mass of chlorides contained in the small volumes of bottled reagents and process samples in the labs, even if their contents entered the laboratory drains in their entirety, are likely too insignificantly small to account for the observed chloride plume. Furthermore, the Mill's laboratory is located downgradient of TW4-25 and the upgradient boundary of the chloride plume. Therefore, the labs could be considered only a relatively low-priority source.

While there exist a number of different nitrogen-bearing and chloride bearing chemicals at the Mill, the only single compound containing both a nitrogen and chloride source is ammonium chloride. Ammonium chloride is stored in reagent bottle quantities in the laboratory, and has never been inventoried in bulk quantities anywhere on site. Its presence in the laboratory and occasionally in the laboratory drain system is not sufficient to explain ongoing and coincident plumes of nitrate and chloride.

Tailings

The single largest mass of chloride in the Mill is the tailings system. USDOE data for mills operating in the Moab area on Colorado Plateau ores indicates that tailings cell chlorides average 310 mg/L. Data on Cell 3 indicate chloride levels from 3,191 mg/L

(Titan Enviornmental studies 1994) to 30,600 mg/L (Hazen studies 2001). Nitrate content was not analyzed during these studies. If a source the size of the 3 million gallon Cell 3 impoundment were continuously leaking a solution of these levels of chlorides, it could potentially produce or contribute to an appreciable chloride plume. However, the Mill tailings system is not likely a primary source of chloride for two reasons. First, if the tailings system were leaking at an appreciable rate, there would be a sizeable hydraulic mound under the tailings cells and chloride would not be the only ion detected in a measurable plume. That is, other tailings constituents would be detected as well. Second the plumes in question originate in the northeast corner of the site, and the tailings system is side-gradient, and down-gradient of the majority of the affected wells.

5.2 Off-site Sources

Table 2b provides a summary of industrial, commercial, agricultural and municipal sources of chloride compounds from which potential candidate sources for the Mill chloride can be elicited. Due to the large number of synthetically created chlorinated species in modern use, the table summarizes and addresses classes of chemicals rather than individual compounds. Potential sources proximal to the Mill site are discussed below. The upper section of the table identifies those compounds and classes of materials that could be expected to be present on the Mill site or in the vicinity of the Mill. The lower section completes a broader survey of compounds and sources and indicates why they are not, or are likely not, present at or proximal to the Mill.

Sewage Sources

As mentioned above, chloride is present in all domestic wastewater and all septic and sewage treatment effluent. In fact, per the McQuillan study, the presence of chloride in nitrate contaminated groundwater is a primary parameter indicating for groundwater nitrate originating from sewage sources. In sewage-related groundwater contamination, groundwater chloride generally increases with nitrate level. In groundwaters affected by septic system effluents, the relationship may be linear, as indicated in the New Mexico studies. In surface waters receiving municipal treated sewage effluent, the relationship varies with both treatment plant factors and receiving water factors, but still increases with nitrate level.

Sewage sources are the most likely explanation for the coincident chloride and nitrate plumes for several reasons. As discussed above, the coincident plumes appear to originate northwest and upgradient of the Mill's tailings, processing and storage areas. The major potential source upgradient of the Mill is the Blanding POTW effluent discharge system that reaches the Frog Pond, the Upper Wildlife Pond, Lawzy Lake, and the Lawzy Sump. As evidenced by anecdotal information specific to the plant, it has had multiple upsets that could have discharged sludge-bearing liquids to the ditches and ponds upgradient of the site. As indicated in the technical literature on sewage treatment plants from its time period, it very likely discharged both high nitrate and high chloride loaded waters even in non-upset conditions. As evidenced by Mill operating history,

these wastewaters were transported on-site to the Mill for use as makeup water for the leach circuit into the early 1990's.

Moreover, the POTW effluent was a continuous source at one time. Unlike the Mill chemical inventories, which are stored in finite quantities and can reach the environment primarily by finite spills, the POTW effluent continually "recharges" the pond and ditch systems upgradient of the identified plumes. However, management practices at the POTW may have changed, and nitrate and chloride concentrations in effluent may have decreased over time. This could have resulted in a "sludge flow" effect in the vicinity of the site.

Agricultural Sources

In rural, non-industrial environments, the uses of inorganic chloride salts outweigh synthetic organic chloride chemicals. Primary uses include road and surface de-icing, water softening, septic system odor control, salt licks, meat curing and preserving, and disinfectants in dairies and slaughter areas. Recent data from the middle Rio Grande Valley indicate that the highest ratios of chloride to nitrate are generated in plumes from dairies (likely a combination of nitrogen from cattle wastes and chlorine from dairy surface disinfection).

To a lesser degree, some organic chlorides are still applied in agricultural areas in the form of pesticides, herbicides, and grain and legume silo fumigants

Per the pre-operational baseline information for the Mill site, the site was used as ranchland prior to construction of the Mill. The exact nature of historic operations is unclear, that is, it is not known whether the ranch supported dairy cattle or beef cattle, fertilized and grew feed and fodder of any type, maintained deer and cattle salt licks, drained slops from slaughtering, or cured slaughtered meat, as well as where on the site each activity occurred, and when the activity ceased. Hence it is plausible, but cannot be confirmed, that on site agricultural activities using chloride salts, or generating chloride byproducts and nitrogen wastes occurred.

Industrial Sources

The Blanding area and southeastern Utah in general are notable for their lack of chemical production and heavy chemical use industries. None of the industrial processes that use chlorine or chlorinated compounds as reagents, solvents or intermediates are present on or near the Mill area. The presence of synthetic chloro-chemical sources in the region can be assumed to be limited to small quantities of cleaners and solvents in homes, ranches and farms, dry cleaners, and machine maintenance shops. With the exception of the agricultural uses described in the paragraphs above, these uses are likely either too small or too remote to have an appreciable effect on Mill site groundwater.

6.0 Conclusions

Based on the foregoing information, it can be concluded that:

There are several reasonable potential sources for nitrates in Mill groundwater:

- The septic leach fields at the site;
- The municipal sewage plant discharge water used historically as Mill water makeup;
- Livestock activities at the wildlife ponds;
- Livestock activities at the Historic Pond;
- The former Fly Ash Pond;
- Potential historic spills of ammonia-bearing process chemicals;
- Potential breach in the vanadium circuit floor drains or tailings transfer lines; and
- A potential leak in the Mill's tailings cells.

There are several plausible sources for chloride in Mill groundwater:

- The septic leach fields at the site;
- The municipal sewage plant discharge water used historically as Mill water makeup;
- Potential historic spills of chloride-bearing process chemicals;
- A potential leak in the Mill's tailings cells.
- Agricultural/ranching activities on the site prior to Mill operations.

To date, the nitrate and chloride plumes have been identified to extend upgradient of TW4-25, and to the northeast boundary of the Mill property. Of the potential sources listed above, the only ones that originate upgradient of TW4-25 are:

- 1. the waters from the Frog Pond, the Upper Wildlife Pond, Lawzy Lake and the Lawzy Sump, including potential livestock activity near the wildlife ponds;
- 2. possible livestock activity near the Historic Pond; and
- 3. possible influences from septic leach fields at the site, in particular the SAG Leach Field and the Main Leach Field.

The other on-site potential sources would not appear to be able to explain the nitrate and chloride contamination in TW4-25 or further upgradient. In addition, contamination due to spills would appear to be too small and infrequent to give rise to the identified plumes, and there is no apparent reason to expect a breach in process facilities and drains that would give rise to the plume. Based on the currently available process and historic information, the most plausible source for apparently coincident chloride and nitrate plumes would be a chlorinated sewage-based source north or northwest of the Mill.

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Enclosures: Attachments

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Table 1: Nitrogen from Sewage Sources

	Sewage Pla	ant Influent	Sewage Pl	ant Primary			Sewage Pla	0	Sewage Plant	0
	(liqu	uid)	Slue	dges	Sewage Plant Prim	ary Sludges	Slu	dge	Sludge	•
	Range	Mean				Typical				Typical
	(mg/L or	(mg/L or	Range	Typical	Range (mg/L or	mg/L or	Range	Typical	Range (mg/L or	(mg/L or
	ppm)	ppm)	(percent)	(percent)	ppm)	ppm)	(percent)	(percent)	ppm)	ppm)
Organic N	8 to 35	21.5								
Free Ammonia	12 to 50	31								
Nitrite	0	0								
Nitrates	0	0								
Total N	20 to 85	52.5	1.5 to 6.0	2.0	15000 to 60,000	20,000	1.6 to 6.0	4.0	16000 to 60,000	40,000

Source: Metcalf & Eddy. Wastewater Engineering Treatment/Disposal/Reuse Second Edition

Nitrogen Compound or			If Present at or Near Mill, Can It Generate	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Nitrate?	Sources⁵
	Fabric softeners, ore separation,			
	detergents, corrosion inhibitors,			
Adogen 283, 382, 2364,	bactericides, inks, antislip agent,			
2382	waterproofing, chemical intermediates.	Yes. Process reagent.	Yes	None identified.
Aluminum nitrate		Yes. Process reagent.	Yes	None identified.
	As a fertilizer or in synthesis of fertilizer			
	compounds. Manufacture of nitric acid,			
	hydrazine hydrate, hydrogen cyanide,			
	urethanes, acrilonitriles, fuel cells. Used as			
	refrigerant, in nitriding steel, developing			
	diazo films, dyeing, as a condensation			
	catalyst, yeast nutrient, latex preservative,			
	neutralizer in the petroleum industry. Used			
A	in synthesis of synthetic fibers, urea	Yes. Anhydrous used in		Wastewater plant and
	formaldehyde, nitroparaffins, melamine,	vanadium circuit and	Mara	sludge overflow,
hydroxide	ethylenediamine, rocket fuel.	yellowcake precipitation.	Yes	agricultural sources.
Ammonio-cupric sulfate	Colling printing, manufacture of conner			
(ammoniated copper	Calico printing, manufacture of copper	No. None of these processes	Yes	Possible. Agriculural
sulfate)	arsenate, insecticide, fiber treatment.	are present at the Mill.	res	sources.
Ammonium				Possible. Agricultural
dimethyldithiocarbamate	Fungicide	Not used at the Mill.	Yes	sources.
Ammonium dinitro-o-				Possible. Agricultural
cresolate	Herbicide	Not used at the Mill.	Yes	sources.
	Emulsifier for oils, waxes, hydrocarbon			
	solvents, detergents, water-repellants,	No. None of these processes		Wastewater plant and
Ammonium linoleate	surface tension reducer.	are present at the Mill.	Yes	sludge overflow.
	Fertilizer, explosives, pyrotechnics,			
	herbicide, insecticide, synthesis of nitrous	Possibly. 1. Trace quantities		
	oxide, solid rocket proellant, freezing	only in ore. 2. Trace quantities		Wastewater plant and
Ammonium nitrate	mixtures, nutrient for antibiotic and yeast	only in lawn care and topsoil		sludge overflow,
NH_4NO_3	synthesis.	fertilizing.	Yes	agricultural sources.
Ammonium polyphosphate				Wastewater plant and
(urea ammonium				sludge overflow,
polyphosphate)	Liquid fertilizer.	Possibly.	Yes	agricultural sources.

Nitrogen Compound or			If Present at or Near Mill, Can It Generate	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Nitrate?	Sources ⁵
Ammonium sulfate (NH ₄) ₂ SO ₄	Fertilizers, water treatment, fermentation, fireproofing compounds, viscose rayon, tanning, food additive.	Yes. Used in vanadium precipitation.	Yes	Possible. Agriculural sources.
Ammonium vanadate (ammonium metavanadate)	Catalyst as vanadium pentoxide, dyes, varnishes, indelible inks, drier for inks and paints, photography, analytical reagent.	Yes. Intermediate in vanadium circuit.	Yes.	None identified.
Ammonium chlorate	Explosives.	Yes. Possibly trace levels in ores.	Yes	None identified.
Barbituric Acid	Indicator, dyes, polymerization agent, pharmaceuticals	Yes. Lab reagent.	Yes.	None identified.
Barium diphenylamine sulfonate Brucine sulfate	Separation agent Separation agent	Yes. Process and lab reagent. Yes. Lab reagent.	Yes. Yes.	None identified. None identified.
		Possibly. Trace quantities only in lawn care and topsoil fertilizing.	Yes	Wastewater plant and sludge overflow, agricultural sources.
Calcium nitrate Ca(NO ₃) ₂ ·H ₂ O	Saltpeter. Pyrotechnics, explosives, matches, fertilizers, preparation of C-14 for nuclear irradiation.	only in ore. 2. Trace quantities only in lawn care and topsoil fertilizing.	Yes	Wastewater plant and sludge overflow, agricultural sources.
Cationic polyacrylamides	Thickening agent, suspending agent, adhesive additive, food additive.	Yes. Process reagent.	Yes.	None identified.
	Formerly widely used in utility, industrial and residential heaters, boilers, and direct firing. Historically, destructive distillation of coal was significant source of coal tar compounds, ammonia nitrogen, pharmaceutical, and other organic compounds. Used as source of coke for iron and steel manufacture, synthetic fuels, oils, synthesis gas (CO and H ₂).	Yes. Former coal fired burners and coal flyash pond near process buidlings.	Yes	None identified.
Dicapthon (CH ₂ 0) ₂ P(S)OC ₆ H ₃ (CI)NO ₃	Insecticide	No. Not used at Mill.	Yes	Wastewater plant overflow, wastewater sludge overflow, agricultural sources.
Dipyridyl a	Reagent for iron determination	Yes. Lab reagent.	Yes.	None identified.

			If Present at or Near	
Nitrogen Compound or	22		Mill, Can It Generate	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Nitrate?	Sources ⁵
		Yes. Small quantities in		
		drummed solutions used in		
	Rocket fuel, oxygen scavenger in boiler	boiler area. Sulfate form used		
Hydrazine	water treatment.	in lab.	Yes	None identified.
	Corrosion inhibitors in boilers and process			
Nitrites	water treatment.	Yes. Low levels in boiler area.	Yes	None identified.
				Wastewater plant
				overflow, wastewater
o-Nitrobiphenyl/nitro	Dyes, fungicide, plasticizer for cellulose,	No. None of these processes		sludge overflow,
diphenyl	wood preservative,	are present at the Mill.	Yes	agricultural sources.
· ·				Possible. Agricultural
Nitrofuran (furazolidone)	Former antibiotic drug for cows.	No. Not used at Mill.	Yes	sources.
· · · · ·				Possible in wastewater
				plant overflow,
				wastewater sludge
Nitrofurantoin	Antibacterial agent.	No. Not used at Mill.	Yes	overflow.
		Yes. Possible trace levels		
Nitroglycerin	Explosives, medicinals.	inores.	Yes	None identified.
Nitro toluenes (mono, di	Explosives, urethane synthesis, organic	Yes. Possible trace levels in		
and tri)	synthesis, toluidines, dyes.	ores.	Yes	None identified.
	Water treatment, enhancement of solvent		100	
Other organo amines	extraction	Yes, Used in Mill's SX circuit.	Yes	None identified.
other organe annioe			100	Wastewater plant
				overflow, wastewater
Other organo ureas, amino	Ubiquitous in human waste, animal waste,	Yes. In leach fields, sewage		sludge overflow,
acids, proteins	food decomposition, domestic sewage.	sludge overflow ponds.	Yes	agricultural sources.
acids, proteins	iood decomposition, domestic sewage.	Possibly. 1. Trace quantities	Tes	Wastewater plant
	Pyrotechnics, explosives, matches,	only in ore. 2. Trace quantities		overflow, wastewater
Potassium nitrate	fertilizer, meat curing, tobacco, glass	only in lawn care and topsoil		sludge overflow,
KNO ₃	manufacture, tempering steel.	fertilizing.	Yes	agricultural sources.
			163	agricultural sources.
	Manufacture of sulfocyanides, thioureas,			
	textile dyeing, photofinishing, dyestuffs,			
Potassium thiocyanate	medicine.	Yes. Process and lab reagent.	Yes	None identified.
	Photofilm, catalyst for ethylene oxide,			
	silverpalting, inks, mirror plating, hair dye,			
	germicide, antisepic and cauterizing agent,			
Silver Nitrate	lab reagent.	Yes. Process and lab reagent.	Yes	None identified.

Nitrogen Compound Sources

Nitrogen Compound or Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	If Present at or Near Mill, Can It Generate Nitrate?	Potential Off Site Sources⁵
	Solid rocket fuel, fertilizer, solder flux, glass manufacture, refrigerant, matches, dynamite and gunpowder, pharnaceuticals, aphrodisiac, color fixative/preservative for meat and fish, enamel for pottery, tobacco products.			Wastewater plant overflow, wastewater sludge overflow, agricultural sources.

Nitrogen Compound or			If Present at or Near	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Mill, Can It Generate Nitrate?	Sources ⁵
Ammonio ferric sulfate (ferric ammonium sulfate)	Madiaina tautila duaina	No. None of these processes	NIA	None identified
(lemc ammonium suitate)	Medicine, textile dyeing. Analytical reagent, drugs, textile dyeing,	are present at the Mill.	NA	None identified.
	meat preserving, foam rubber, vinyl	No. None of these processes		
Ammonium acetate	plastics, explosives.	are present at the Mill.	NA	None identified.
Ammonium benzene		No. None of these processes		None identified.
sulfonate	Igniter, chemical synthesis.	are present at the Mill.	NA	None identified.
Sanonato		No. None of these processes		
Ammonium benzoate	Medicine, latex preservative.	are present at the Mill.	NA	None identified.
	Production of ammonium salts, dyes,			
	leavening for cookies, crackers, pastry			
	dough, fire extinguishers, pharmaceuticals,			
		No. None of these processes		
Ammonium bicarbonate	compost treatment, degreasing textiles.,	are present at the Mill.	NA	None identified.
	Ceramics, reagent, glass etching, laundry			
	sour, brewery and dairy sterilizer, beryllium	No. None of these processes		
Ammonium bifluoride	electroplating.	are present at the Mill.	NA	None identified.
	Analytical reagent, ink removal from	No. None of these processes		
Ammonium bioxalate	fabrics.	are present at the Mill.	NA	None identified.
	Catalyst in organic synthesis, permanent	No. None of these processes		
Ammonium bisulfate	wave hair solutions.	are present at the Mill.	NA	None identified.
		No. None of these processes		
Ammonium bitartrate	Baking powder.	are present at the Mill.	NA	None identified.
	Fireproofing compounds, electrical	No. None of these processes	N14	
Ammonium borate	condensers, herbicide.	are present at the Mill.	NA	None identified.
	Dhotographic cilver procipitation, modicing			
	Photographic silver precipitation, medicine, engraving, textile finishing, fire retardant,	No. None of these processes		
Ammonium bromide	anticorrosive agents, analytcial chemistry.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium cadmium	and your or agents, and your onernistry.		INA.	
bromide (cadmium		No. None of these processes		
ammonium bromide)	Plating and preparation of metals.	are present at the Mill.	NA	Agricultural sources.
	Pesticide, photo emulsions, chemical	No. None of these processes		, ignould an oburood.
Ammonium caprylate	intermediate.	are present at the Mill.	NA	Agricultural sources.

Nitrogen Compound or			If Present at or Near Mill, Can It Generate	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Nitrate?	Sources ⁵
		No. None of these processes		
Ammonium carbamate	Fertilizer.	are present at the Mill.	NA	Agricultural sources.
	Ammonium salts, medicine, baking			
	powder, smelling salts, fire extinguishers,			
	pharmaceuticals, textiles, wine	No. None of these processes		
Ammonium carbonate	fermentation, ceramics, wool washing, organic sythesis.	No. None of these processes are present at the Mill.	NA	Agricultural sources.
Ammonium carbonate	Dry batteries, dye and printing mordant,		INA	Ayricultural sources.
	solderflux, synthesis of ammonia			
	compounds, fertilizer, pickling agent in zinc			
	processing, electoplating, washing			
	powders, melt retardant for snow treating,			
	urea formaldehyde resins, bakery	No. None of these processes		
Ammonium chloride	products.	are present at the Mill.	NA	None identified.
	Dye mordant, photogrpahic coatings,			
Ammonium chromate	anlaytical reagent, catalyst, corrosion inhibitor.	No. None of these processes	NA	None identified.
Ammonium chromium		are present at the Mill.	INA	
sulfate (chromium		No. None of these processes		
ammonium sulfate)	Dye mordant, tanning.	are present at the Mill.	NA	None identified.
	Pharmaceuticals, rustproofing, cotton			
	printing, plasticizer, analyzing phosphate in	No. None of these processes		
Ammonium citrate	fertilizer.	are present at the Mill.	NA	None identified.
Ammonium cobaltous				
phosphate (cobaltous	Plant nutrient, glass coloring, glazes,	No. None of these processes		
ammonium phosphate)	enamels, anlaytical chemistry.	are present at the Mill.	NA	None identified.
Ammonium coholt culfato	Ceramics, cobalt plating, catalyst.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium cobait suitate	Ceramics, cobait plating, catalyst.	are present at the Mill.		
	Dyeing, pigments, manufacture of alizarin,			
	chrome alum, oil purification, pickling,			
	manufacture of catalysts, tanning,			
Ammonium dichromate	perfumes, photography, engraving,	No. None of these processes		
	lithography, chromic oxide,pyrotechnics.	are present at the Mill.	NA	None identified.
Ammonium	Synthesis of heterocyclic compounds,	No. None of these processes	N 14	
dithiocarbamate	anlaytical reagent.	are present at the Mill.	NA	None identified.

			If Present at or Near	
Nitrogen Compound or			Mill, Can It Generate	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Nitrate?	Sources ⁵
	Fluoride synthesis, analytical chemistry,			
	disinfectant in brewing, glass etching,			
	textile mordant, wood preserving,	No. None of these processes		
Ammonium fluoride	mothproofing.	are present at the Mill.	NA	None identified.
	Laundry sours, mothproofing, disinfectant			
	in brewing, glass etching, electroplating,	No. None of these processes		
Ammonium fluosilicate	light metal casting.	are present at the Mill.	NA	None identified.
	Analytical chemistry for precipitating	No. None of these processes		
Ammonium formate	metals.	are present at the Mill.	NA	None identified.
	Emulsifying agent in cheese and salad	No. None of these processes		
Ammonium gluconate	dressing.	are present at the Mill.	NA	None identified.
Ammonium glutamate		No. None of these processes		
(sodium glutamate)	Flavor enhancer in foods.	are present at the Mill.	NA	None identified.
Ammonium hexachloro-		No. None of these processes		
osmate	Plating.	are present at the Mill.	NA	None identified.
Ammonium		No. None of these processes		
hexachloroplatinate	Plating, platinum sponge.	are present at the Mill.	NA	None identified.
Ammonium hexafluoro		No. None of these processes		
germanate	Plating.	are present at the Mill.	NA	None identified.
	Textiles, rayon, rubber, fertilizers,			
	refrigeration, condensation polymerization,			
	photography, pharmaceuticals, soaps,			
	lubricants, fireproofing, ink, explosives,			
	ceramics, ammonium compounds,			
	saponifying fats and oils, detergents, food			
	additives, household cleansers, organic	No. None of these processes		
Ammonium hydroxide	synthesis.	are present at the Mill.	NA	None identified.
	Organic preparations, doping agent for			
Ammonium hypophosphite	semiconducors, polymerization initiator,	No. None of these processes		
(phosphine)	condensation catalyst.	are present at the Mill.	NA	None identified.
Ammonium				
ichthosulfonate	Pharmaceutical preparations, cosmetic	No. None of these processes		
(ichthammol)	preparations, dermatological soaps.	are present at the Mill.	NA	None identified.
		· ·		
		No. Mill does not use this		
Ammonium iodate	Oxidizing agent.	oxidizer.	NA	None identified.

Nitrogen Compound or			If Present at or Near	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Mill, Can It Generate Nitrate?	Sources ⁵
		No. None of these processes		
Ammonium iodide	lodides, medicine, photography.	are present at the Mill.	NA	None identified.
	Production of oil-water emulsions,	No. None of these processes		
Ammonium laurate	cosmetics.	are present at the Mill.	NA	None identified.
	Dispersing agent in concrete and rubber	No. Not used in ore flotation at		
	mixes, tanning, oil well drilling mud, ore	the Mill. None of these		
Ammonium lignin sulfate	flotation, production of vanillin, industrial	processes are present at the		
(lignin sulfonate)	cleaners, gypsum, dyes,pesticides.	Mill.	NA	None identified.
	Reagent, pigments, dehydrogenation and			
	desulfurization catalyst in petroleum	No. None of these processes		
Ammonium molybdate	refining, production of molybdenum.	are present at the Mill.	NA	None identified.
	Reagent, ion exchange columns,	No. None of these processes		
Ammonium-12-	photographic additive, water resistance	are present at the Mill. Not		
molybdophosphate	additive.	used in Mill's ion exchange	NA	None identified.
	Catalyst, reagent, precipitant and ion			
Ammonium-12-	exchange mediumin nuclear fuel cycle,	No. None of these processes		
molybdosilicate	photofixing and photo-oxidizing agent,	are present at the Mill.	NA	None identified.
		No. None of these processes		
Ammonium nickel chloride	Electroplating, dyeing.	are present at the Mill.	NA	None identified.
		No. None of these processes	NIA	News identified
Ammonium nickel sulfate	Electroplating.	are present at the Mill.	NA	None identified.
Ammonium nitroso-b-	Analytical response for concretion of motols			
phenylhydroxyl amine	Analytical reagent for separation of metals		Yes	None identified.
(cupferron)	(coper, vanadium, iron).	Not used at the Mill.	res	none identified.
Ammonium oleate	Emulaituing agant in compation	No. None of these processes	NA	None identified.
Ammonium oleale	Emulsifying agent in cosmetics. Analytical chemistry, safety explosives,	are present at the Mill.	INA	
	manufacture of oxalates, rust and scale	No. None of these processes		
Ammonium oxalate	removal.	No. None of these processes	NA	None identified.
Ammonium oxalate	Thickening agent of rpetroleum-derived	are present at the Mill.	INA	none identified.
	solvents and lubricants, waterproofing	No. None of these processes		
Ammonium nalmitata			NA	None identified.
Ammonium palmitate	agent. Intermediate for boron chemicals, power	are present at the Mill.	INA	
	level controller in nuclear submarine	No. None of those processes		
Ammonium nontoborato		No. None of these processes	NIA	None identified.
Ammonium pentaborate	reactors.	are present at the Mill.	NA	none identified.

			If Present at or Near		
Nitrogen Compound or			Mill, Can It Generate	Potential Off Site	
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Nitrate?	Sources ⁵	
	Explosives, pyrotechnics, etching and				
	engraving, analytical chemistry, smokeless	No. None of these processes			
Ammonium perchlorate	rocket and jet propellant.	are present at the Mill.	NA	None identified.	
		No. Mill does not use this			
Ammonium permanganate	Strong oxidizer.	oxidizer.	NA	None identified.	
		No. Mill does not use this			
Ammonium perrhenate	Mild oxidizer.	oxidizer.	NA	None identified.	
	Oxidizer, bleaching agent, photography,				
	printed circuit board etching,	No. Mill does not use this			
	copper, plating, deodorizing and bleaching	oxidizer. None of these			
	oils, analine dyes, foodpreservative,	processes are present at the			
Ammonium persulfate	washing yeast, depolarizing batteries.	Mill.	NA	None identified.	
	Wood flameproofing, matches, fertilizer,				
	feed additive, plant nutrient, manufacture				
Ammonium phosphate	of yeast, vinegar, bread, solder flux fortin,				
(monobasic, hembasic,	copper, brass, zinc, purifying sugar,	No. None of these processes			
dibasic)	toothpastes, pH buffer,metal ceaning.	are present at the Mill.	NA	None identified.	
	Reducing agent, corrosion inhibitor added	No. None of these processes			
Ammonium phosphite	to lubricants and greases.	are present at the Mill.	NA	None identified.	
Ammonium		No. None of these processes			
phosphotungstate	Chemical reagent, ion exchange media.	are present at the Mill.	NA	None identified.	
Ammonium picrate	Pyrotechnic, explosives.	Possibly traces in ore.	Yes	None identified.	
Ammonium			100		
polymanuronate		No. None of these processes			
(ammonium alginate)	Thickening agent and food stabilizer.	are present at the Mill.	NA	None identified.	
		No. None of these processes			
Ammonium polysulfide	Analytical reagent, insecticide.	are present at the Mill.	NA	None identified.	
		No. None of these processes			
Ammonium selenate	Mothproofing.	are present at the Mill.	NA	None identified.	
		No. None of these processes			
Ammonium selenite	Alkaloid testing, glass coloring.	are present at the Mill.	NA	None identified.	
	Vanising creams, shaving cream,				
	cosmetics, waterproofing of cements,	No. None of these processes			
Ammonium stearate	concrete, stucco, paper, textiles.	are present at the Mill.	NA	None identified.	
	Flameproofing of textiles and paper, weed				
	and brush killer, electroplatin, production of	No. None of these processes			
Ammonium sulfamate	nitrous oxide.	are present at the Mill.	NA	None identified.	
		are present at the min.			

Nitrogen Compound or			If Present at or Near Mill, Can It Generate	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Nitrate?	Sources ⁵
		No. Mill does not use this		
Ammonium sulfate nitrate		oxidizer.	NA	None identified.
	Textiles, photo developer, brass and			
	bronze coloring, soda ash production,	No. None of these processes		
Ammonium sulfide	synthetic flavors.	are present at the Mill.	NA	None identified.
	Chemical intermediate,			
	medicine,permanent wave solutions,	No. None of these processes		
Ammonium sulfite	photography, metal lubricant.	are present at the Mill.	NA	None identified.
Ammonium		No. None of these processes		
sulforicinoleate	Medicine, furniture polish.	are present at the Mill.	NA	None identified.
		No. None of these processes		
Ammonium tartrate	Textiles, medicine.	are present at the Mill.	NA	None identified.
Ammonium	Precipitating agent for organic bases in			
tetrathiocyanodiammono	pharmaceuticals, amines, amino acids,	No. None of these processes		
chromate (Reinecke salt)	mercury.	are present at the Mill.	NA	None identified.
Ammonium	Producing high purity tungsten disulfide for	No. None of these processes		
tetrathiotungstate	catalysts, lubricants, semiconductors.	are present at the Mill.	NA	None identified.
5	photography, freezing solutions, rocket			
	propellants, zinc coating, weed killer, soil			
	sterilization, defoliant, iron pickling,			
	electroplating, polymerization catalyst,			
	separator for gold, iron, hafnium,	No. None of these processes		
Ammonium thiocyanate	zirconium.	are present at the Mill.	NA	None identified.
		No. None of these processes		
Ammonium thioglycolate	Hair waving, hair removal.	are present at the Mill.	NA	None identified.
	Photographic fixer, reagent, fungicide,	·		
	reducing agent, silverplating, zinc and			
	metal casting cleaner, fog screens, hair	No. None of these processes		
Ammonium thiosulfate	waving solutions.	are present at the Mill.	NA	None identified.
Ammonium titanium		No. None of these processes		
oxalate	Cellulose and leather dyeing.	are present at the Mill.	NA	None identified.
		No. None of these processes		
Ammonium tungstate	Preparation of tungsten compounds.	are present at the Mill.	NA	None identified.
~ ~		No. None of these processes		
Ammonium valerate	Flavoring material	are present at the Mill.	NA	None identified.

Nitrogen Compound or			If Present at or Near	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Mill, Can It Generate Nitrate?	Sources ⁵
Ammonium zirconifluoride				
(zirconium ammonium		No. None of these processes		
fluoride)	Chemical reagent.	are present at the Mill.	NA	None identified.
	Water repellant for paper and textiles,			
Ammonium zirconyl	catalyst, latex paint stabilizer, floor wax	No. None of these processes		
carbonate	additive, glass fiber fabrication.	are present at the Mill.	NA	None identified.
Ammonobasic mercuric				
chloride (ammoniated		No. None of these processes		
mercury)	Topical germicide, medicines.	are present at the Mill.	NA	None identified.
		No. None of these processes		
Amobarbitol	Medicine, pharmaceutical, hypnotic.	are present at the Mill.	NA	None identified.
	Dyestuffs, rubber accelerators and			
	antioxidants, shoe polish, photographic			
	chemicals, isocyanates for urethanes,			
	explosives, petroleum refining, synthesis of			
	pharmaceuticals, phenolics, herbicides,	No. None of these processes		
Aniline	fungicides.	are present at the Mill.	NA	None identified.
		No beryllium oxidizers used in	N 1 4	
Beryllium nitrate BeNO ₃		Mill circuit.	NA	None identified.
	Auto lacquers, explosives, collodion for			
	wound dressing and gun cotton, rocket			
Cellulose	fuel, printing ink, bookbinder's cloth, leather	•		
nitrate/nitrocellulose	finishing, celluloid film, flashless powder.	are present at the Mill.	NA	None identified.
	Oxidant for organic compounds, azide			
	manufacture, polymerization catalyst for	No. None of these processes		
	polyolefins.	are present at the Mill.	NA	None identified.
4-Chloro-3-nitrobenzenoic		No. None of these processes		
acid	Dyes, perfumes, flavors, pharmaceuticals.	are present at the Mill.	NA	None identified.
2-Chloro-3-nitrobenzene		No. None of these processes		
sulfonamide	Dyes, pharmaceuticals	are present at the Mill.	NA	None identified.
6-Chloro-3-nitro benzene		No. None of these processes		
	Dyes, pharmaceuticals	are present at the Mill.	NA	None identified.
4-Chloro-3-nitro benzoic	Dyes, synthesis of agricultural chemicals,	No. None of these processes		
trifluoride	pharmaceuticals.	are present at the Mill.	NA	None identified.
4 Oblass - O nitrank start	Dues sumthasis of aming shlavor barrels	No. None of these processes	NIA	None identified
4 Chloro -2 nitrophenol	Dyes, synthesis of amino chlorophenols	are present at the Mill.	NA	None identified.

Nitrogen Compound or Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	If Present at or Near Mill, Can It Generate Nitrate?	Potential Off Site Sources⁵
Chromium nitrate/chromic		No. No catalysts used. No		
nitrate	Catalyst, corrosion inhibitor.	chrome-based inhibitors used.	NA	None identified.
	Sythesis of urethane plastics and foams,	No. None of these processes		
Di-isocyanates	cross-linking agent for nylon.	are present at the Mill.	NA	None identified.
	Primarily sythesized as hydrazine oxidizer	No. None of these processes		
Dinitrogen tetroxide	in rocket fuels.	are present at the Mill.	NA	None identified.
		No. None of these processes		
Ferric nitrate	Dyes, tanning, analytical chemistry.	are present at the Mill.	NA	None identified.
	Ceramics, pyrotechnics, salt baths,	No. No refrigeration fluids or		
	refrigeration, heat exchange media, rocket	heat exchange salts used at		
Lithium nitrate	propellant.	Mill. No other uses at Mill.	NA	None identified.
	Pyrotechnics, synthesis of concentrated	No. None of these processes		
Magnesium nitrate	nitric acid.	are present at the Mill.	NA	None identified.
		No. None of these processes		
Manganous nitrate	Ceramics, catalyst, chemical intermediate.	are present at the Mill.	NA	None identified.
	•	No. Leach circuit is based on		
		sulfuric acid, no nitric used. No		
		ore flotation conducted at mill.		
	Manufacture of ammonium nitrate fertilizer,	No spent fuel reprocessing is		
	explosives, dyes, drugs, cellulose nitrate,	conducted at the Mill. No other		
	photoengraving, etching steel, ore flotation,			
Nitric acid	urethanes, rubber, spent nuclear fuel.	Mill.	NA	None identified.
	Oxidizizer, pyrotechnics, railroad flares,	No. None of these processes		
Strontium nitrate	matches, marine signals.	are present at the Mill.	NA	None identified.
		No. None of these processes		
Thallium Nitrate	Analysis, green pyrotechnics	are present at the Mill.	NA	None identified.
	Photofilm, ethylene oxide catalyst, inks,			
	silverplating, mirrors, germicide (wall			
	spray), dyes, antiseptic, wound	No. None of these processes		
Silver nitrate AgNO3	cauterization, lab reagent.	are present at the Mill.	NA	None identified.
	Alcohol synthesis, preparation of oliphatic			
	nitrogen compounds, standards for water	No. None of these processes		
Silver nitrite AgNO2	anlaysis.	are present at the Mill.	NA	None identified.
Nitroacetanilide		No. None of these processes		
$NO_2C_6H_4NHCOCH_3$	Manufacture of nitroaniline.	are present at the Mill.	NA	None identified.
		•		
p-Nitro o-aminophenol		No. None of these processes	N I A	Nana Jalan (10 - 1
$O_2NC_6H_4NH_2$	Dyes.	are present at the Mill.	NA	None identified.

Nitrogen Compound or			If Present at or Near Mill, Can It Generate	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Nitrate?	Sources⁵
		No. None of these processes		
m-Nitroaniline	Dye intermediate.	are present at the Mill.	NA	None identified.
	Dye, synthesis of phtographic antifog,	No. None of these processes		
o-Nitroaniline	coccidiostats, o-phenylenediamine	are present at the Mill.	NA	None identified.
	Dye intermediate, corrosion inhibitors,	No. None of these processes		
p-Nitroaniline	gasoline gum inhibitors, antioxidants.	are present at the Mill.	NA	None identified.
o-nitroanisole		No. None of these processes		
C ₆ H ₄ OCH ₃ NO ₂	Dyes, pharmaceuticals.	are present at the Mill.	NA	None identified.
p-nitroanisole		No. None of these processes		
C ₆ H ₄ OCH ₃ NO ₂	Dyes.	are present at the Mill.	NA	None identified.
	Dyes, pharmaceuticals, surface active			
	agents (surfactants), mosquito repellant,	No. None of these processes		
Nitrobenzaldehyde	vapor phase corrosion inhibitor.	are present at the Mill.	Yes.	None identified.
	Manufacture of aniline, cellulose eteher			
	solvent, cellulose acetate, metal polish,			
	shoe plish, manufacture of benzidine,	No. None of these processes		
Nitrobenzene C ₆ H ₅ NO ₂	quinoline.	are present at the Mill.	NA	None identified.
Nitorbenzene azo		No. None of these processes		
resorcinol	Determination of magnesium.	are present at the Mill.	NA	None identified.
m-Nitrobenzene sulfonic		No. None of these processes		
acid	Organic synthesis, anti-reduction agent.	are present at the Mill.	NA	None identified.
		No. None of these processes		
6-Nitrobenzimide azole	Photo antifogging agent.	are present at the Mill.	NA	None identified.
Nitrobenzoic acid	Dyes, reagent for alkaloids, organic	No. None of these processes		
C ₆ H ₄ (NO ₂)COOH	synthesis.	are present at the Mill.	NA	None identified.
		No. None of these processes		
m-Nitrobenzoyl chloride	Dyes, photochemicals, pharmaceuticals.	are present at the Mill.	NA	None identified.
	Dyes, photochemicals, intermediate for	No. None of these processes		
p-Nitrobenzyl chloride	procaine hydrochloride (novocaine).	are present at the Mill.	NA	None identified.
	Dyes, pharmaceuticals, syntheis of p-nitro	No. None of these processes		
p-Nitrobenzyl cyanide	phenyl acetic acid	are present at the Mill.	NA	None identified.
Nitrobromoform (bromo		No. None of these processes		
picrin)	Military poison, organic synthesis	are present at the Mill.	NA	None identified.
		No. None of these processes		
2-Nitro, 1-butanol	Organic synthesis	are present at the Mill.	NA	None identified.
Nitro carbon nitrate	Strong oxidizer.	No. Not used at Mill.	NA	None identified.

Nitrogen Compound or Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	If Present at or Near Mill, Can It Generate Nitrate?	Potential Off Site Sources⁵
Nitro chlorobenzene	Dyes, parathion manufacture, agricultural	No. None of these processes		
(Chloro nitrobenzene)	chemicals, rubber chemicals.	are present at the Mill.	NA	None identified.
		No. None of these processes		
2-Nitro p-cresol	Chemical synthesis intermediate.	are present at the Mill.	NA	None identified.
	Chemical synthesis intermediate; stabilizer	No. None of these processes		
o-Nitro diphenylamine	for nitrogylcerine.	are present at the Mill.	NA	None identified.
	Solvent for nitrocellulose, cellulose acetate,			
	dyes, vinyl and alkyd resins, waxes, fats.	No. None of these processes		
Nitroethane	Used as fuel additive.	are present at the Mill.	NA	None identified.
2-Nitro-2-ethyl-1,3-		No. None of these processes		
propanediol	Organic synthesis.	are present at the Mill.	NA	None identified.
Nitrous oxide (N ₂ O or		No. None of these processes		
laughing gas)	Anaesthetic	are present at the Mill.	NA	None identified.
		No. None of these processes		
Picramic acid	Azo dye synthesis, reagent for aluminum	are present at the Mill.	NA	None identified.
	Explosives, matches, electric batteries,	No. None of these processes		
Picric acid	etching of copper, textile dyeing.	are present at the Mill.	NA	None identified.
	Analytical chemistry for estimation of	No. None of these processes		
Picrolinic acid	calcium, identification of alkaloids	are present at the Mill.	NA	None identified.
		No. None of these processes	N 1 A	
Picrotoxin	Medicine fomulations	are present at the Mill.	NA	None identified.
Diam diable side	Evelopium	No. This type of explosive is not	NIA	None identified
Picryl chloride	Explosives Air bag explosive anisters, preservative for	used in mining.	NA	None identified.
	diagnostic medicines, intermediate in	No. None of these processes		
Sodium Azide	explosive manufacture.	are present at the Mill.	NA	None identified.
Sodium Azide	•	•		
Toluene diamines	Chain extender and cross linker, sythesis	No. None of these processes	NA	None identified.
	of dyes, polymers,polyurethanes.	are present at the Mill.	NA	
	lignin, reagent for nitrite, vulcanization	No. None of these processes		Nu su tra difficial
Toluidines (amino toluenes) Zirconium nitrate	accelerator.	are present at the Mill.	NA	None identified.
	Dreaser wative	No. None of these processes	NIA	None identified
$Zr(NO_3)_2$ 5H ₂ O	Preservative.	are present at the Mill.	NA	None identified.
		No. None of these processes		
Zirconium nitride ZrN	Crucibles, cermets, refractories.	are present at the Mill.	NA	None identified.

Nitrogen Compound Sources

			If Present at or Near	
Nitrogen Compound or			Mill, Can It Generate	Potential Off Site
Source ¹	Uses ^{2,3}	Present on Mill Site ⁴	Nitrate?	Sources ⁵
NOTEO				

NOTES

1. Does not include short-lived intermediates and isotopes, research compounds, and insoluble gases.

2. Many of the compounds below, while not synthesized or used regionally or at the Mill, are present at low levels in domestic products in the Mill offices, kitchen areas, shops, and labs.

3. In some cases, only one entry is given for multiple compounds of the same class and same use.

4. Additional chemicals inventoried from 100 ml to kilogram/liter levels at the laboratories are identifed in Table 3a.

4. Most nitrogen-bearing organic compounds in sewage plant influent will be present in a converted form as nitrate/nitrite in effluent and sludge.

Chloride Compounds and Classes ^{1,2,3}	Uses ^{2,3}	Present on Mill Site ⁴	Present Near Mill Site	Potential Off Site Sources ⁵
0103363	0365	Fresent on will Site	Sile	As disinfectant in drining water
chloramines	Dye intermediates, disinfectant, oxidizer,	Yes	Yes	and wastewater treatment plants
	pulp bleaching, synthesis of solid rocket			
	propellants, herbicides, defoliants,			
chlorates and perchlorates	explosives.	Yes	No	NA
chlorine oxides, sodium hypochlorite, calcium hypochlorites	Bleach, germicides, sterilants, odor control agents	Possibly. At very low levels in cleaning compounds.	Yes	As disinfectant in drinking water and wastewater treatment plants, Blanding OTW, and upgradient and downgradient septic leach systems.
	Reagent in wiide range of organic and inorganic synthesis including polymers, pesticides, herbicides, colors, pharmaceuticals, hydrochloric and inorganic acids, agricultural chemicals,			
	flame retardants. Disinfectant and sterilant. Syntheisi of mace and tear gas. Formerly used in combat gas,defoliants and other chemical weapon formulation. Used as disinfectant in food processing,			As disinfectant in drining water
chlorine	drinking water, and wastewater treatment.	Yes	Possibly	and wastewater treatment plants
calcium chlorides	de-icing (primarily roads and traffic surfaces)	Possibly	Yes	County and/or municipal road de- icing
Sodium Chloride	Wide range of domestic, agricultural, industrial uses as feed chemical chemical for choralkali production, regenerant for ion exchange resins, dyeing, curing, food preserving, de-icing.	Yes	Yes	Water treatment plants, household water softeners, wastewater treatment, cattle salt licks, road de-icing, meat and game curing.
	Organic synthesis intermediate, dyes, drugs, alcohol denaturants, antiseptics,			
chlorophenols and derivatives	solvents, insecticides, fungicides Detergents, phamaceuticals, intermediates, pesticides, ion exchange resins, smoke-prodcuing chemicals, anhydrous HCI synthesis, rubber-based	No	No	NA
chlorosulfo compounds (inorganic and organic)	plastics, rayon, solvents, dehydrating agent, acrylation reactions, chemical	No	No	NA

Chloride Compounds and			Present Near Mill	
Classes ^{1,2,3}	Uses ^{2,3}	Present on Mill Site ⁴	Site	Potential Off Site Sources ⁵
chlorinated aromatic compounds	Syntheis of phenols, chloronitroaromatics, aniline, dyes. Carriers for isocyanate production, heat transfer fluid, solvents, pesticide intermediate.	No	No	NA
chlorine oxides	Bleaching wood pulp, fats and oils, watertreament, odor control, biocides, maturing agents for flour, esterificaton catalysts.	No	Possibly	As disinfectant in drinking water and wastewater treatment plants
chloroanilines	Pharmaceuticals, syntheis of agricultural chemicals, intermediate for dyes and quinones.		No	NA
chlorofluorocarbons	Formerly as refrigerants, aerosol propellants, flame suppressants.	No	Possibly	In finite quantities as refrigerants in air conditioning and chilling systems
chlorine, chlorine dioxide, sodium hyprochlorite, calcium hyposchlorite, chloramines, taste control agents	potable water treatment	No	????	TBD????
chlorocarbons, chloroaromatics, oxychlorinated compounds	pesticides, herbicides, and fumigants	No	Yes	grain silos, bean and legume silos
vinyl chloride and derivatives	vinyl, vinylidene, chlorinated olfin polymers and plastics	No	No	NA

Chloride Compounds and			Present Near Mill	
Classes ^{1,2,3}	Uses ^{2,3}	Present on Mill Site ⁴	Site	Potential Off Site Sources ⁵
	metal chlorides for catalyst use, acids,			
other inorganic chemical	plating solutions, printing inks, mirror			
production	coatings, ceramic colors.	No	No	NA
	ethylene oxide and propylene oxide			
ethylene dichloride	production	No	No	NA
	epoxies, flame resistant olefins, synthetic			
other chlorinated alkane	caffeine, photography, antifreezes,			
hydrocarbons	perfumes.	No	No	NA
chlorine, chlorine dioxide and				
other bleaching agents in paper				
	pulp and paper	No	No	NA

NOTES

1. Chemicals are generally adressed in this table as classes of materials rather than individual compounds.

2. Many chlorinated compounds , while not synthesized or used regionally or at the Mill, are present at low levels in domestic products in the Mill offices, kitchen areas, shops, and labs.

3. Compunds containing both nitrogen and chlorine are addressed in Table 2a.

4. Additional chemicals inventoried from 100 ml to kilogram/liter levels at the laboratories are identifed in Table 3d.

Table 3a Nitrogen Compounds in Mill Operations Inventory

Adogen 283 Adogen 382 Adogen 2364 Adogen 2382 Aluminum nitrate solution Anhydrous ammonia Ammonia inhalants Ammonia sulfate Ammonia meta-vanadate Ammonium hydroxide Aqua ammonia Barium diphenylamine sulfonate Cationic Polyacrylamides Silver Nitrate

Table 3b Nitrogen Compounds in Laboratory Inventory

Amino, 4-amino-1-naphthalane sulfonic acid Ammonium acetate Ammonium chloride Ammonium hydroxide Ammonium iodide Ammonium meta-vanadate Ammonium molybdate Ammonium nitrate Ammonium oxalate, monohydrate Ammonium persulfate Ammonium phosphate, dibasic Ammonium phosphate, monobasic Ammonium pyrolidine, dithiocarbamate Ammonium sulfate Ammonium thiocyanate Ammonium vanadate Ammonium chloride Barbituric acid Brucine sulfate Cobalt nitrate Cupferron Cyclohexanedintrilotetraacetic acid Diphenylamine sulfonic acid sodium salt Diphenyl, 1,3-diphenyl-1,3-propanedione Dipyridyl a Disodium ethylenediamine tetraacetate EDTA Ethylenedinitrilo tetraacetic acid disodium salt

Ethyl, 1-ethyl-2-[(1,4 dimethyl-2-phenyl-6pyrimidinylidene)-methyl] quinolone chloride Ferric ammonium sulfate Hydrazine sulfate Hydroxyquinolone Hydroxylamine hydrochloride Hydroxylamine sulfate Methyl red Methylene blue Monoethanolamine Naphthy, N-(1-naphthy) ethylene-diamine dihydrochloride Nitrazine yellow Nitric acid Nitro-benzene Phenanthroline, 1, 10 Phenanthroline, 1, 10 ferrous sulfate Phenanthroline, 1, 10 monohydrate Phenyl benzohy, N-phenylbenohy-droxamic acid Potassium cyanide Potassium nitrate Potassium nitrite Potassium thiocyanate Primene, JM-T solvent Pyridine Quinoline Hydroxyquinoline Rhodamine Silver nitrate Sodium ammonium phosphate Sodium cyanide Sodiumnitrate Sodium nitrite Sodium thiocyante Sulfanilamide Sulfanilic acid Thallic nitrate

Tris (hydroxymethyl) aminomethane Thorin ti Urea

thorium determination

Note to Tables 3a and 3b:

Nitrogen may also be present in adhesives, cements, hardeners, sufactants, detergents, flocculants, paints and cleaning agents used in lab and mill equipment cleaning, and general maintenance.

Table 3c Chlorine Compounds in Mill Operations Inventory

Ajax Barium chloride Calcium hypochlorite Chlorine Hydrochloric acid Penchlor solution PVC cement Sodium chlorate Sodium chloride (salt) Sodium hypochlorite Sodium perchlorate Tetrachloroethylene Vanish Bowl Cleaner (HCI solution)

Table 3d Chlorine Compounds in Laboratory Inventory

Ammonium chloride

Ethyl, 1-ethyl-2-[(1,4 dimethyl-2-phenyl-6pyrimidinylidene)-methyl] quinolone chloride Hydroxylamine hydrochloride Methylene blue Table 4

Nitrate, Chloride and Chlorinated Organics from Quarterly Chloroform Monitoring Report

MW-4	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
28-Sep-99	6200					
28-Sep-99	5820					
28-Sep-99	6020			<u> </u>		
15-Mar-00	5520			<u></u>		
15-Mar-00	5430			†		
2-Sep-00	5420				9.63	
30-Nov-00	6470				9.37	
29-Mar-01	4360			ł	8.77	
22-Jun-01	6300				9.02	
20-Sep-01	5300			-	9.45	
8-Nov-01	5200				8	
26-Mar-02	4700				8.19	
22-May-02	4300			t	8.21	
12-Sep-02	6000			<u> </u>	8.45	
24-Nov-02	2500		+	<u> </u>	8.1	<u> </u>
28-Mar-03	2000			†	8.3	
30-Apr-03	3300	·····			NA NA	
30-Api-03 30-May-03	3400			<u> </u>	8.2	
23-Jun-03	4300				8.2	
30-Jul-03	3600			1	8.1	
29-Aug-03	4100				8.4	
12-Sep-03	3500				8.5	
12-Sep-03 15-Oct-03	3800		-	<u>-</u>	8.1	
8-Nov-03	3800			ł	8.0	
29-Mar-04					NA	
22-Jun-04	NA				NA	
17-Sep-04	3300				6.71	
17-Sep-04 17-Nov-04	4300				7.5	
6-Mar-05	2900				6.3	
25-May-05	3170				7.1	
31-Aug-05	3500				7.0	
					7.0	
1-Dec-05 9-Mar-06	<u> </u>			+	6.0	·
9-Mar-06 14-Jun-06	3100			+	6.0 6.0	
20-Jul-06			1		<u>6.0</u> 1.2	
	2820				- <u>}</u>	
9-Nov-06	2830				6.4 6.2	
15-Aug-07	2600			<u> </u>	6.2	<u> </u>
10-Oct-07 26-Mar-08	2300				5.8	<u> </u>
	2400	1		+		
25-Jun-08	2500				6.09	<u> </u>
10-Sep-08	1800			<u> </u>	6.36	
15-Oct-08	2100				5.86	
12-Sep-02	5700				8.3	
24-Nov-02	5000				8.5	
28-Mar-03	4500			-}	8.2	
23-Jun-03	4700				8.4	
12-Sep-03	3400				8.6	
10-Nov-03	4500		·		8.4	1
29-Mar-04					NA	<u> </u>
22-Jun-04					NA	ļ
17-Sep-04	3300				6.83	

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MW-4	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
17-Nov-04	4100				8	
16-Mar-05	3700				7.1	
25-May-05	3740				7.8	
31-Aug-05	3800	<10	<10	<10	6.9	
12/1/2005	3000	<50	<50	<50	7	NA
7/20/2006	2820	<50	<50	<50	1.2	48
11/9/2006	2830	2.1	1.4	<1	6.4	50
3/9/2006	3100	<50	<50	50	6	49
6/14/2006	3000	<50	<50	50	6	49
2/28/2007	2300	1.6	<1	<1	6.3	47
6/27/2007	2000	1.8	<1	<1	7	45
8/15/2007	2600	1.9	<1	<1	6.2	47
10/10/2007	2300	1.7	<1	<1	6.2	45
3/26/2008	2400	1.7	<1	<1	5.8	42
6/25/2008	2500	1.6	<1	<1	6.09	42
9/10/2008	1800	1.8	<1	<1	6.36	35
10/15/2008	2100	1.7	<1	<1	5.86	45
3/4/2009	2200	1.5	<1	<1	5.7	37
6/23/2009	1800	1.3	<1	<1	5.2	34
9/14/2009	2000	1.4	<1	<1	5.3	43

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TW4-1	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
28-Jun-99	1700				7.2	
10-Nov-99	5.79					
15-Mar-00	1100					
10-Apr-00	1490					
6-Jun-00	1530	1				
2-Sep-00	2320				5.58	
30-Nov-00	3440				7.79	
29-Mar-01	2340				7.15	
22-Jun-01	6000				8.81	
20-Sep-01					12.8	
8-Nov-01	3200				12.4	
26-Mar-02	3200				13.1	
22-May-02	2800				12.7	
12-Sep-02	3300				12.8	
24-Nov-02	3500				13.6	
28-Mar-03	3000				12.4	1
23-Jun-03	3600				12.5	
12-Sep-03	2700				12.5	
8-Nov-03	3400				11.8	
29-Mar-04	3200				11	
22-Jun-04	3100				8.78	
17-Sep-04	2800				10.8	
17-Nov-04	3000				11.1	
16-Mar-05	2700				9.1	
25-May-05	3080				10.6	
31-Aug-05	2900	<10	<10	<10	9.8	
12/1/2005	2400	<50	<50	<50	9.6	
7/20/2006	2840	<50	<50	<50	9.7	51
11/8/2006	2260	1.4	<1	<1	9.4	47
3/9/2006	2700	<50	<50	<50	9.2	49
6/14/2006	2200	<50	<50	<50	9.2	48
2/28/2007	1900	1.2	<1	<1	8.9	47
6/27/2007	1900	1.4	<1	<1	9	45
8/15/2007	2300	1.3	<1	<1	8.4	43
10/10/2007	2000	1.3	<1	<1	7.8	43
3/26/2008	2000	1.3	<1	<1	7.6	39
6/25/2008	1900	1.1	<1	<1	8.68	39
9/10/2008	1700	1.3	<1	<1	8.15	35
10/15/2008	1700	1.3	<1	<1	9.3	41
3/11/2009	1700	1,1	<1	<1	7.5	37
6/24/2009	1500	1	<1	<1	6.9	37
9/15/2009	1700	<1	<1	<1	7.3	36

TW4-2	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
10-Nov-99	2510	<u>-</u>				
2-Sep-00	5220					
28-Nov-00	4220				10.7	
29-Mar-01	3890				10.2	
22-Jun-01	5500				9.67	
20-Sep-01	4900				11.4	
8-Nov-01	5300				10.1	
26-Mar-02	5100				9.98	
23-May-02	4700				9.78	
12-Sep-02	6000				9,44	· · · · · · ·
24-Nov-02	5400				10.4	
28-Mar-03	4700				9.5	
23-Jun-03	5100				9.6	
12-Sep-03	3200				8.6	
8-Nov-03	4700				9.7	·
29-Mar-04	4200		-		9.14	
22-Jun-04	4300				8.22	
17-Sep-04	4100				8.4	
17-Nov-04	4500			·	8.6	
16-Mar-05	3700	***************************************			7.7	
25-May-05	3750				8.6	
31-Aug-05	3900	<10	<10	<10	8.0	
12/1/2005	3500	<50	<50	<50	7.8	
3/9/2006	3800	<50	<50	<50	7.5	56
6/14/2006	3200	<50	<50	<50	7.1	56
7/20/2006	4120	<50	<50	<50	7.4	54
11/8/2006	3420	2.3	<1	<1	7.6	55
2/28/2007	2900	1.8	<1	<1	7.3	54
6/27/2007	3000	2.5	<1	<1	7.8	50
8/15/2007	340	2.2	<1	<1	7.3	49
10/10/2007	3200	2.1	<1	<1	6.9	51
3/26/2008	3300	2,3	<1	<1	6.9	48
6/25/2008	3100	2,2	<1	<1	7.44	46
9/10/2008	2800	2.4	<1	<1	7.1	42
10/15/2008	3200	2.4	<2	2	7.99	47
3/11/2009	3100	2.2	<1	<1	6.5	46
6/24/2009	2800	2	<1	<1	6.4	44
9/15/2009	3000	2	<1	<1	6.6	43

and the second second

TW4-3	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
28-Jun-99	3500	<u>_</u>			7.6	
29-Nov-99	702					
15-Mar-00	834					
2-Sep-00	836				1.56	
29-Nov-00	836				1.97	
27-Mar-01	347				1.85	
21-Jun-01	390				2.61	
20-Sep-01	300				3.06	
7-Nov-01	170				3.6	
26-Mar-02	11				3.87	
21-May-02	204				4.34	
12-Sep-02	203				4.32	
24-Nov-02	102				4.9	
28-Mar-03	ND				4.6	
23-Jun-03	ND				4.8	
12-Sep-03	ND				4.3	
8-Nov-03	ND				4.8	
29-Mar-04	ND				4.48	
22-Jun-04	ND				3.68	
17-Sep-04	ND				3.88	
17-Nov-04	ND				4.1	
16-Mar-05	ND			· · · · · · · · · · · · · · · · · · ·	3.5	
25-May-05	ND		·		3.7	
31-Aug-05	ND	<1	<1	<1	3.5	
1-Dec-05	ND	<1	2.3	<1	3.3	
9-Mar-06	ND	<1	2.2	<1	3.3	26
14-Jun-06	ND	<1	<1	<1	3.2	26
20-Jul-06	ND	<1	1.6	<1	2.9	26
8-Nov-06	ND	<1	<1	<1	1.5	23
28-Fcb-07	ND	<1	<1	<1	3.1	22
27-Jun-07	ND	<1	<1	<1	3.3	23
15-Aug-2007	ND	<1	<1	<1	3.1	24
10/10/2007	ND	<1	<1	<1	2.8	27
26-Mar-08	ND	<1	<1	<1	2.8	21
25-Jun-08	ND	<1	<1	<1	2.85	19
10-Sep-08	ND	<1	<1	<1	2.66	19
15-Oct-08	ND	<1	<1	<1	2.63	22
4-Mar-09	ND	<1	<1	<1	2.5	21
24-Jun-09	ND	<1	<1	<1	2.9	20
15-Sep-09	ND	<1	<1	<1	2.8	21

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TW4-4	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
6-Jun-00	ND			}		
2-Sep-00	ND					
28-Nov-00	3.85					
28-Mar-01	2260				1.02	
20-Jun-01	3100				14.5	
20-Sep-01	3200				14	
8-Nov-01	2900				14.8	
26-Mar-02	3400				15	
22-May-02	3200	·········			13.2	
12-Sep-02	4000		1		13.4	
24-Nov-02	3800		-	<u> </u>	12.6	
28-Mar-03	3300				13.4	
23-Jun-03	3600				12.8	
12-Sep-03	2900		- <u>-</u>		12.3	
8-Nov-03	3500				12.3	······
29-Mar-04	3200		· · · · · · · · · · · · · · · · · · ·		12.2	
22-Jun-04	3500				12.1	
17-Sep-04	3100		·	1	11.1	
17-Nov-04	3600				10.8	
16-Mar-05	3100				11.6	
25-May-05	2400				10	ļ
31-Aug-05	3200	<10	<10	<10	11.3	
1-Dec-05	2800	50	50	50	10.2	
9-Mar-06	2900	50	50	50	9.5	51
14-Jun-06	2600	50	50	50	8.6	48
20-Jul-06	2850	50	50	50	9.7	50
8-Nov-06	2670	1.7	<1	<1	10,1	49
28-Feb-07	2200	1.5	<1	<1	9	49
27-Jun-07	2400	1.7	<1	<1	9.4	47
15-Aug-07	2700	1.5	<1	<1	9.5	45
10-Oct-07	2500	1.5	<1	<1	9.5	47
26-Mar-08	2800	1.6	<1	<1	9.2	43
25-Jun-08	2500	1.5	<1	<1	10.8	42
10-Sep-08	2200	1.4	<1	<1	8.83	39
15-Oct-08	2500	2	<2	<2	10.1	44
4-Mar-09	2200	1.2	<1	<1	10.2	37
24-Jun-09	1800	1.2	<1	<1	8.2	34
15-Sep-09	2000	1.1	<1	<1	8.4	39

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TW4-5	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
20-Dec-99	29.5					· · · ·
15-Mar-00	49					
2-Sep-00	124					
29-Nov-00	255					
28-Mar-01	236	,				
20-Jun-01	240		<u> </u>			
20-Sep-01	240		[
7-Nov-01	260					
26-Mar-02	260			·····		
22-May-02	300	······	· · · · · · · · · · · · · · · · · · ·			
12-Sep-02	330	· · · · · · · · · · ·				
24-Nov-02	260					
28-Mar-03	240	····				
23-Jun-03	290					
12-Sep-03	200				·	
8-Nov-03	240					
29-Mar-04	210					
22-Jun-04	200				·····	
17-Sep-04	150					
17-Nov-04	180					
16-Mar-05	120				[
25-May-05	113					
31-Aug-05	82	<2.5	5.8	<2.5	6	
1-Dec-05	63	<2.5	<2.5	<2.5	6	
9-Mar-06	66	<2.5	3.1	<2.5	6	52
14-Jun-06	51	<1	<2.5	<2.5	5.9	51
20-Jul-06	53.7	<1	<1	<1	6.7	54
8-Nov-06	47.1	<1	<1	<1	2.9	55
28-Feb-07	33	<1	<1	<1	7.8	57
27-Jun-07	26	<1	<1	<1	7	45
15-Aug-07	9.2	<1	<1	<1	7.7	38
10-Oct-07	9.4	<1	<1	<1	8.2	39
26-Mar-08	11	<1	<1	<1	7.4	36
25-Jun-08	9.3	<1	<1	<1	8.7	37
10-Sep-08	11	<1	<1	<1	7.91	34
15-Oct-08	10	<1	<1	<1	9.3	37
4-Mar-09	12	<1	<1	<1	7.9	34
24-Jun-09	13	<1	<1	<1	7.5	37
15-Sep-09	12	<1	<1	<1	8.3	48

and the second second

TW4-6	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
6-Jun-00	ND					
2-Sep-00	ND					
28-Nov-00	ND				ND	
26-Mar-01	ND				.13	
20-Jun-01	ND		·····		ND	
20-Sep-01	3.6				ND	
7-Nov-01	1.00				ND	
26-Mar-02	ND				ND	
21-May-02	ND				ND	
12-Sep-02	ND				ND	
24-Nov-02	ND				ND	
28-Mar-03	ND				0.1	
23-Jun-03	ND				ND	
12-Sep-03	ND				ND	[
8-Nov-03	ND				ND	
29-Mar-04	ND				ND	
22-Jun-04	ND				ND	
17-Sep-04	ND				ND	
17-Nov-04	ND				ND	
16-Mar-05	ND				0.2	
25-May-05	ND				0.4	
31-Aug-05	10.0	<10	2.8	<10	0.8	
1-Dec-05	17	<1	1.3	<1	0.9	
9-Mar-06	31	<1	<1	<1	1.2	31
14-Jun-06	19	<1	<1	<1	1.0	30
20-Jul-06	11	· <1	<1	<1	0.6	37
8-Nov-06	42.8	<1	<1	<1	1.4	65
28-Feb-07	46	<1	<1	<1	1.5	32
27-Jun-07	11	<1	<1	<1	0.6	38
15-Aug-07	18	<1	<1	<1	0.7	36
10-Oct-07	18	<1	<1	<1	0.8	38
26-3-08	52	<1	<1	<1	1.1	33
25-Jun-08	24	<1	<1	<1	0.9	35
10-Sep-08	39	<1	<1	<1	1.14	35
15-Oct-08	37	<1	<1	<1	1.01	33
11-Mar-09	81	<1	<1	<1	2.2	35
24-Jun-09	120	<1	<1	<1	2.7	37
15-Sep-09	280	<1	<1	<1		37

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TW4-7	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
29-Nov-99	256	x :				
15-Mar-00	616					
2-Sep-00	698					
29-Nov-00	684				1.99	
28-Mar-01	747				2.46	
20-Jun-01	1100				2.65	
20-Sep-01	1200			· · · · · · · · · · · · · · · · · · ·	3.38	
8-Nov-01	1100				2.5	
26-Mar-02	1500				3.76	
23-May-02	1600				3.89	
12-Sep-02	1500				3.18	
24-Nov-02	2300				4.6	
28-Mar-03	1800		-		4.8	
23-Jun-03	5200	^			7.6	
12-Sep-03	3600	······			7.6	
8-Nov-03	4500				7.1	
29-Mar-04	2500				4.63	
22-Jun-04	2900				4.83	
17-Sep-04	3100	······			5.59	
17-Nov-04	3800				6	
16-Mar-05	3100				5.2	
25-May-05	2700				5.4	
31-Aug-05	3100	<10	<10	<10	5.2	
1-Dec-05	2500	<50	<50	<50	5.3	
9-Mar-06	1900	<50	<50	<50	1.0	48
14-Jun-06	2200	<50	<50	<50	4.5	47
20-Jul-06	2140	<50	<50	<50	4.7	51
8-Nov-06	2160	1.5	<1	1	4.6	49
28-Feb-07	1800	1.1	<1	1	5	47
27-Jun-07	2600	1.5	<1	1	5.1	45
14-Aug-07	2300	1.4	· <1	1	4.7	44
10-Oct-07	1900	1,2	<1	1	4.7	45
26-Mar-08	2200	1.3	<1	1	4.2	43
25-Jun-08	1800	1.3	<1	1	4.8	43
10-Sep-08	1600	1.4	<1	1	4.16	35
15-Oct-08	1900	<2	<2	2	4.01	40
11-Mar-09	1800	1.2	<1	1	3.7	35
24-Jun-09	1400	<1	<1	1	3.8	37
15-Sep-09	1500	<1	<1	1	4.1	37

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TW4-8	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
29-Nov-99	ND			······		
15-Mar-00	21.8					
2-Sep-00	102					
29-Nov-00	107				ND	
26-Mar-01	116				ND	
20-Jun-01	180				ND	
20-Sep-01	180	· · · · .			0.35	
7-Nov-01	180				ND	
26-Mar-02	190		· · · · · · · · · · · · · · · · · · ·		0.62	
22-May-02	210				0.77	
12-Sep-02	300		·		ND	
24-Nov-02	450				ND	
28-Mar-03	320	· · · · · ·			0.8	
23-Jun-03	420		1		ND	
12-Sep-03	66				ND	·
8-Nov-03	21.0				0.1	
29-Mar-04	24				0.65	
22-Jun-04	110				0.52	
17-Sep-04	120				ND	
17-Nov-04	120				ND	
16-Mar-05	10.0				ND	
25-May-05	ND				0.2	
31-Aug-05	1.1	********			ND	
1-Dec-05	ND	<1	1.7	<1	ND	
9-Mar-06	1.3	<1	<1	<1	0.3	39
14-Jun-06	ND	<1	2.1	<1	ND	37
20-Jul-06	ND	<1	1.8	<1	0.1	39
8-Nov-06	ND	<1	1	<1	ND	40
28-Feb-07	2.50	<1	1	<1	0.7	39
27-Jun-07	2.5	<1	1	<1	0.2	42
15-Aug-07	1.5	<1	1	<1	ND	42
10-Oct-07	3.5	<1	1	<1	0.5	43
26-Mar-08	ND	<1	1	<1	0.1	46
25-Jun-08	ND	<1	1	<1	ND	45
10-Sep-08	ND	<1	1	<1	ND	39
15-Oct-08	ND	<1	1	<1	ND	44
4-Mar-09	ND	<1	1	<1	ND	42
24-Jun-09	ND	<1	1	<1	ND	44
15-Sep-09	ND	<1	1	<1	ND	44

TW4-9	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
20-Dec-99	4.24					
15-Mar-00	1.88					
2-Sep-00	14.2					
29-Nov-00	39.4				ND	
27-Mar-01	43.6			·	ND	
20-Jun-01	59				.15	
20-Sep-01	19				0.40	
7-Nov-01	49				0.1	
26-Mar-02	41				0.5	
22-May-02	38				0.65	
12-Sep-02	49				0.2	
24-Nov-02	51				0.6	
28-Mar-03	34				0.6	
23-Jun-03	33		1		0.8	
12-Sep-03	32				1.1	·····
8-Nov-03	46				1.1	
29-Mar-04	48				0.82	
22-Jun-04	48				0.75	
17-Sep-04	39				0.81	
17-Nov-04	26	······		<u> </u>	1.2	
16-Mar-05	3.8				1.3	
25-May-05	1.2				1.3	
31-Aug-05	ND	<1	2.9	<1	1.3	
1-Dec-05	ND	<1	<1	<1	1.3	
9-Mar-06	ND	<1	2.6	<1	1.5	38
14-Jun-06	ND	<1	2.7	<1	1.5	39
20-Jul-06	ND	<1	<1	<1	0.9	41
8-Nov-06	ND	<1	<1	<1	0.7	44
28-Feb-07	ND	<1	<1	<1	0.6	44
27-Jun-07	21	<1	<1	<1	1.3	42
15-Aug-07	9.5	<1	<1	<1	1.8	38
10-Oct-07	8.7	<1	<1	<1	2	40
26-Mar-08	1.3	<1	<1	<1	2.1	35
25-Jun-08	1.0	<1	<1	<1	2.3	35
10-Sep-08	ND	<1	<1	<1	2.79	28
15-Oct-08	ND	<1	<1	<1	1.99	58
4-Mar-09	ND	<1	<1	<1	2.5	30
24-Jun-09	ND	<1	<1	<1	2.3	30
15-Sep-09	ND	<1	<1	<1	2.5	30
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TW4-10	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
21-Jan-02	14	·····	<u> </u>			
26-Mar-02	16				0.14	
21-May-02	17				0.11	
12-Sep-02	6.0				ND	
24-Nov-02	14				ND	
28-Mar-03	29				0.2	
23-Jun-03	110	·····			0.4	
12-Sep-03	74				0.4	
8-Nov-03	75				0.3	
29-Mar-04	22				0.1	
22-Jun-04	32				ND	
17-Sep-04	63				0.46	
17-Nov-04	120				0.4	·
16-Mar-05	140				1.6	
25-May-05	62.4			1	0.8	
31-Aug-05	110			1	1.1	
1-Dec-05	300	<2.5	<2.5	6.2	3.3	
9-Mar-06	190	<5	<50	<50	2.4	50
14-Jun-06	300	<5	<50	<50	3.5	54
20-Jul-06	504.00	<5	<50	<50	6.8	61
8-Nov-06	452.00	<1	1.6	1	5.7	58
28-Feb-07	500	<1	<1	1	7.6	62
27-Jun-07	350	<1	<1	1	5.1	54
15-Aug-07	660	<1	<1	1	7.3	59
10-Oct-07	470	<1	<1	1	6.7	59
26-Mar-08	620	<1	<1	1	7.3	55
25-Jun-08	720	<1	<1	1	9.91	58
10-Sep-08	680	<1	<1	1	9.23	51
15-Oct-08	1200	<2	<2	2	10.5	61
11-Mar-09	1100	<1	<1	1	11.6	64
24-Jun-09	1200	<1	<1	1	9.8	62
15-Sep-09	910	<1	<1	1	8.1	51

TW4-11	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
21-Jan-02	4700					
26-Mar-02	4900				9.60	
22-May-02	5200				9.07	
12-Sep-02	6200				8.84	
24-Nov-02	5800				9.7	
28-Mar-03	5100				9.7	
23-Jun-03	5700	• • •			9.4	
12-Sep-03	4600				9.9	
8-Nov-03	5200			·	9.3	
29-Mar-04	5300				9.07	
22-Jun-04	5700				8.74	
17-Sep-04	4800				8.75	
17-Nov-04	5800				9.7	
16-Mar-05	4400			· · ····	8.7	
25-May-05	3590				10.3	
31-Aug-05	4400	<10	<10	<10	9.4	
1-Dec-05	4400	<100	<100	<100	9.4	
9-Mar-06	4400	<50	<50	<50	9.2	56
14-Jun-06	4300	<50	<50	<50	10	56
20-Jul-06	4080	<50	<50	<50	10	55
8-Nov-06	3660	1.7	2.7	1.3	10	55
28-Feb-07	3500	1.3	<1	1.6	10.1	54
27-Jun-07	3800	1.6	<1	,1	10.6	53
15-Aug-07	4500	1.7	<1	1.1	10.2	53
10-Oct-07	4400	1.6	<1	1.2	9.8	53
26-Mar-08	340	<1	<1	<1	7.7	63
25-Jun-08	640	<1	<1	<1	7.28	46
10-Sep-08	900	<1	<1	<1	7.93	42
15-Oct-08	1000	<2	<2	<2	9.46	47
11-Mar-09	1100	<1	<1	<1	7.3	49
6-24-09	980	<1	<1	<1	6.8	44
15-Sep-09	1000	<1	<1	<1	7.0	49

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TW4-12	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
12-Sep-02	1.5	<u> </u>			2.54	
24-Nov-02	ND				2.2	
28-Mar-03	ND				1.9	
23-Jun-03	ND				1.8	
12-Sep-03	ND				1.8	
9-Nov-03	ND				1.6	
29-Mar-04	ND				1.58	
22-Jun-04	ND				1.4	
17-Sep-04	ND				1.24	
17-Nov-04	ND				1.5	
16-Mar-05	ND				1.4	
25-May-05	ND				1.6	
31-Aug-05	ND	<1	5.8	<1	1.5	
1-Dec-05	ND		<1	<1	1.4	
9-Mar-06	ND	<1	<1	<1	1.3	19
14-Jun-06	ND	<1	<1	<1	1.4	16
20-Jul-06	ND	<1	<1	<1	1.4	16
8-Nov-06	ND	<1	<1	<1	1.4	16
28-Feb-07	ND	<1	<1	<1	1.5	16
27-Jun-07	ND	<1	<1	<1	1,5	18
Aug-15-07	ND	<1	<1	<1	1.4	29
10-Oct-07	ND	<1	<1	<1	1.4	16
26-Mar-08	ND	<1	<1	<1	1.6	16
25-Jun-08	ND	<1	<1	<1	2.69	19
10-Sep-08	ND	<1	<1	<1	2.65	18
15-Oct-08	ND	· <1	<1	<1	2.47	22
4-Mar-09	ND	<1	<1	<1	2.4	23
24-Jun-09	ND	<1	<1	<1	3.8	22
15-Sep-09	ND	<1	<1	<1	5.1	22

 $\alpha_{\rm eff} = 2$, we approximate the set of the state of the set of the set

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Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
ND				ND	
ND				ND	·
ND				0.2	
ND				0.2	
ND				ND	
ND				0.9	
ND		1		0.12	
ND	····			0.17	
ND				4.43	
ND				4.7	
ND				4.2	
ND	***************************************			4.3	
ND	<1	3.1	<1	4.6	
ND	<1	<1	<1	4.3	
ND	<1	1.7	<1	4.2	67
ND	<1	1.4	<1	4.9	66
ND	<1	<1	<1	4.3	65
ND	<1	<1	<1	0.8	33
ND	<1	<1	<1	4	59
ND	<1	<1	<1	4.6	59
ND	<1	<1	<1	4.4	58
ND	<1	<1	<1	4.1	58
ND	<1	<1	<1	3.8	54
ND	<1	<1	<1	4.24	58
ND	<1	<1	<1	4.26	50
ND	<1	<1	· <1	4.63	58
ND	<1	<1	<1	3.7	58
ND	<1	<1	<1	1.2	57
ND	<1	<1	<1	4.7	63
	(ug/l) ND ND ND ND ND ND ND ND ND ND ND ND ND	Chlorotorm (ug/l)tetrachloride (ug/l)ND	Chloroform (ug/l) tetrachloride (ug/l) Chloromethane (ug/l) ND	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

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TW4-14	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
8-Nov-06	ND	ND	ND	ND	2.4	37
28-Feb-07	ND	ND	ND	ND	2.3	38
27-Jun-07	ND	ND	ND	ND	1.4	38
15-Aug-07	ND	ND	ND	ND	1.1	36
10-Oct-08	ND	ND	ND	ND	0.8	38
26-Mar-08	ND	ND	ND	ND	0.4	57
25-Jun-08	ND	ND	ND	ND	1.56	35
10-Sep-08	ND	ND	ND	ND	1.34	34
15-Oct-08	ND	ND	ND	ND	0.76	40
4-Mar-09	ND	ND	ND	ND	1.6	35
24-Jun-09	ND	ND	ND	ND	1.4	36
15-Sep-09	ND	ND	ND	ND	1.5	38

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TW4-15	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chioromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
12-Sep-02	2.6				ND	
24-Nov-02	ND				ND	
28-Mar-03	ND				0.1	
23-Jun-03	7800				14.5	
15-Aug-03	7400				16.8	
12-Sep-03	2500				2.7	
25-Sep-03	2600				2.5	
29-Oct-03	3100				3.1	
8-Nov-03	3000				2.8	
29-Mar-04	NA				NA	
22-Jun-04	NA				NA	
17-Sep-04	1400				0.53	
17-Nov-04	300				0.2	
16-Mar-05	310				0.3	
30-Mar-05	230	· · ·			0.2	
25-May-05	442				0.2	· · · · · ·
31-Aug-05	960	<5	5.4	<5	0.2	
1-Dec-05	1000		<50	<50	0.3	
9-Mar-06	1100	<50	<50	<50	0.2	52
14-Jun-06	830	<50	<50	<50	0.2	52
20-Jul-06	2170	<50	<50	<50	1.4	65
8-Nov-06	282	<1	<1	2.8	0.3	54
28-Feb-07	570	<1	<1	5.5	0.5	56
27-Jun-07	300	<1	<1	13	0.4	49
15-Aug-07	1400	<1	<1	36	1	57
10-Oct-07	2000	<1	<1	14	0.6	57
26-Mar-08	930	<1	<1	40	0.1	49
25-Jun-08	1300	<1	<1	53	0.56	57
10-Sep-08	630	<1	<1	24	0.24	44
15-Oct-08	1700	<1	<1	100	0.65	64
4-Mar-09	950	<1	<1	51	0.4	49
24-Jun-09	410	<1	<1	12	0.2	48
15-Sep-09	850	<1	<1	30	0.1	46

TW4-16	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
12-Sep-02	140				ND	
24-Nov-02	200				ND	
28-Mar-03	260				ND	······
23-Jun-03	370				ND	
12-Sep-03	350				ND	
8-Nov-03	400				ND	
29-Mar-04	430				ND	
22-Jun-04	530	~_~~~			ND	
17-Sep-04	400				ND	
17-Nov-04	350				ND	
16-Mar-05	240				ND	
25-May-05	212				ND	
31-Aug-05	85	<1	3.2	43	ND	
1-Dec-05	14	<1	2.6	5.9	1.4	
9-Mar-06	39	<1	1.1	21	3.0	60
14-Jun-06	13	<1	2.4	8.9	1.9	55
20-Jul-06	5	<1	<1	2.7	2.7	60
8-Nov-06	13.6	<1	<1	9.2	5.6	62
28-Feb-07	8.70	<1	<1	6.5	12.3	79
27-Jun-07	2.60	<1	<1	1.8	9.9	75
15-Aug-07	7.10	<1	<1	5.1	5.4	66
10-Oct-07	1.40	<1	<1	<1	4.4	69
26-Mar-08	11.00	<1	<1	26	ND	52
25-Jun-08	ND	<1	<1	<1	1.46	58
10-Sep-08	10.00	<1	<1	14	10.5	71
15-Oct-08	3.9	<1	<1	6.6	9.82	89
4-Mar-09	ND	<1	<1	<1	9.6	78
24-Jun-09	ND	<1	<1	<1	8.9	76
15-Sep-09	ND	<1	<1	<1	8.8	79
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TW4+17	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
12-Sep-02	1.6	<u>, , , , , , , , , , , , , , , , , </u>			ND	
24-Nov-02	ND				ND	
28-Mar-03	ND				ND	
23-Jun-03	ND				ND	
12-Sep-03	ND				ND	
8-Nov-03	ND				ND	
29-Mar-04	ND	······································]	ND	
22-Jun-04	ND				ND	
17-Sep-04	ND				ND	
17-Nov-04	ND		· · · · · · · · · · · · · · · · · · ·		ND	
16-Mar-05	ND			[ND	
30-Mar-05	ND				ND	
25-May-05	ND				ND	
31-Aug-05	ND	<1	3.2	<1	ND	
1-Dec-05	ND	<1	1		ND	32
9-Mar-06	ND	<1	1		ND	30
14-Jun-06	ND	<1	3.5		ND	32
20-Jul-06	ND	<1	1.8		ND	31
8-Nov-06	ND	<1	1.5		ND	32
28-Feb-07	ND	<1	<1		ND	32
27-Jun-07	ND	<1	<1	[ND	31
15-Aug-07	ND	<1	<1		ND	32
10-Oct-07	ND	<1	<1		ND	31
26-Mar-08	ND	<1	<1		ND	29
25-Jun-08	ND	<1	<1		ND	30
10-Sep-08	ND	<1	<1		ND	26
15-Oct-08	ND	<1	<1		ND	30
4-Mar-09	ND	<1	<1		ND	31
15-Sep-09	ND	<1	<1		ND	33

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TW4-18	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
12-Sep-02	440				1.49	
24-Nov-02	240				13.3	
28-Mar-03	160				13.1	
23-Jun-03	110				19	
12-Sep-03	68				19.9	
9-Nov-03	84				20.7	
29-Mar-04	90				14	
22-Jun-04	82	the set			12.2	
17-Sep-04	38				14.5	1
17-Nov-04	51	······			17.3	
16-Mar-05	38			· ·	14.1	
25-May-05	29.8				12.9	<u>}</u>
31-Aug-05	39				13.3	
1-Dec-05	14	<1	2.8	<1	7.3	
9-Mar-06	12	<1	1.1	<1	5.9	5.9
14-Jun-06	12	<1	1.6	<1	4.7	35
20-Jul-06	10.80	<1	2.7	<1	6.1	35
8-Nov-06	139.00	<1	<1	<1	8.7	34
28-Feb-07	9.2	<1	<1	<1	5.1	30
27-Jun-07	8.0	<1	<1	<1	4.9	28
15-Aug-07	8.9	<1	<1	<1	5	32
10-Oct-08	7.4	<1	<1	<1	4.4	27
26-Mar-08	6.4	<1	<1	<1	0.7	23
25-Jun-08	5.7	<1	<1	<1	4.55	23
10-Sep-08	8.0	<1	<1	<1	4.68	26
15-Oct-08	9.4	<1	<1	<1	5,15	30
4-Mar-09	11.0	<1	<1	<1	5.2	29
24-Jun-09	16.0	<1	<1	<1	6.2	30
15-Sep-09	13.0	<1	<1	<1	5.9	26

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TW4-19	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
12-Sep-02	7700				47.6	
24-Nov-02	5400				42	
28-Mar-03	4200				61.4	
15-May-03	4700				NA	
23-Jun-03	4500			·	11.4	
15-Jul-03	2400	· · · · · · · · · · · · · · · · · · ·			6.8	
15-Aug-03	2600				4	
12-Sep-03	2500				5.7	
25-Sep-03	4600				9.2	
29-Oct-03	4600	· · ·			7.7	
9-Nov-03	2600				4.8	
29-Mar-04	NA				NA	
22-Jun-04	NA			1	NA	
16-Aug-04	7100				9.91	
17-Sep-04	2600	· · · · ·			4.5	
17-Nov-04	1800	· · · · · · · · · · · · · · · · · · ·			3.6	
16-Mar-05	2200				5.3	
25-May-05	1200				5.7	
31-Aug-05	1400	<5	<5	<5	4.6	
1-Dec-05	2800	50	<50	<50	ND	
9-Mar-06	1200	50	<50	<50	4.0	86
14-Jun-06	1100	50	<50	<50	5.2	116
20-Jul-06	1120	50	<50	<50	4.3	123
8-Nov-07	1050	1.6	2.6	<1	4.6	134
28-Feb-07	1200	1.3	<1	<1	4	133
27-Jun-07	1800			•	2.3	
15-Aug-07	1100	1.9	<1	<1	4.1	129
10-Oct-08	1100	1.9	<1	<1	4	132
26-Mar-08	1800	2.9	<1	<1	2.2	131
25-Jun-08	1000	1	<1	<1	2.81	128
10-Sep-08	3600	8.6	<1	<1	36.2	113
15-Oct-08	4200	12	<1	<1	47.8	124
4-Mar-09	1100	1.2	<1	<1	3.2	127
24-Jun-09	990	1.2	<1	<1	2.4	132
15-Sep-09	6600	15	<1	<1	0.1	43

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TW4-20	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
25-May-05	39000	NS	NS	NS	10.1	NS
31-Aug-05	3800	ND	ND	ND	2.9	NS
1-Dec-05	19000	ND	ND	ND	1.8	131
9-Mar-06	9200	ND	ND	ND	3.8	120
14-Jun-06	61000	ND	ND	ND	9.4	235
20-Jul-06	5300	ND	ND	ND	2.9	134
8-Nov-06	11000	7.1	1.9	2.2	3.5	124
28-Feb-07	4400	3.1	ND	1.1	4.2	124
27-Jun-07	1800	2.2	ND	ND	2.3	112
15-Aug-07	5200	3.5	ND	1.8	2.1	117
10-Oct-08	9000	6.8	ND	1.9	5.6	170
26-Mar-08	13000	9.0	ND	1.5	0.9	132
25-Jun-08	30000	13	ND	1.2	7.96	191
10-Sep-08	21000	15	ND	3.7	4.44	156
15-Oct-08	NS	NS	NS	NS	5.51	166
4-Mar-09	8200	5.7	ND	5.2	5.1	164
24-Jun-09	6800	4.9	ND	4.2	2.9	164
15-Sep-09	13000	8.4	ND	4.4	3.3	153

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TW4-21	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
25-May-05	192	NS	NS	NS	14.6	NS
31-Aug-05	78	ND	ND	ND	10.1	NS
1-Dec-05	86	ND	1.0	ND	9.6	353
9-Mar-06	120	ND	ND	ND	8.5	347
14-Jun-06	130	ND	ND	ND	10.2	318
20-Jul-06	106	ND	ND	ND	8.9	357
8-Nov-06	139	2.0	ND	ND	8.7	296
28-Feb-07	160	1.8	ND	ND	8.7	306
27-Jun-07	300	5.8	ND	ND	8.6	327
15-Aug-07	140	ND	ND	ND	8.6	300
10-Oct-07	120	ND	ND	ND	8.3	288
26-Mar-08	390	7.0	ND	ND	14.3	331
25-Jun-08	160	1.7	ND	ND	8.81	271
10-Sep-08	120	1.6	ND	ND	7.57	244
15-Oct-08	170	2.0	ND	ND	8.0	284
11-Mar-09	180	ND	ND	ND	8.3	279
24-Jun-09	200	ND	ND	ND	8.1	291
15-Sep-09	200	ND	ND	ND	9.2	281

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. TW4-22	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
25-May-05	340	NS	NS	NS	18.2	NS
31-Aug-05	290	ND	ND	ND	15.7	NS
1-Dec-05	320	ND	ND	ND	15.1	263
9-Mar-06	390	ND	ND	ND	15.3	236
06/14/06	280	ND	ND	ND	14.3	221
07/20/06	864	ND	ND	ND	14.5	221
11/08/06	350	ND	1.6	ND	15.9	236
28-Feb-07	440	ND	ND	ND	20.9	347
06/27/07	740	ND	ND	ND	19.3	273
Aug-15-07	530	ND	ND	ND	19.3	259
Oct-10-08	440	ND	ND	ND	18.8	238
03/26/08	1400	ND	ND	ND	39.1	519
06/25/08	1200	ND	ND	ND	41.9	271
10-Sep-08	6300	1.3	ND	ND	38.7	524
15-Oct-08	630	ND	ND	ND	36.3	539
11-Mar-09	390	ND	ND	ND	20.7	177
24-Jun-09	730	ND	ND	ND	20.6	177
15-Sep-09	2300	ND	ND	ND	40.3	391

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TW4-23	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
06/27/07	ND	ND	ND	ND	ND	47
Aug-15-07	ND	ND	ND	ND	ND	46
Oct-10-08	ND	ND	ND	ND	ND	43
03/26/08	ND	ND	ND	ND	ND	41
06/25/08	ND	ND	ND	ND	ND	41
10-Sep-08	ND	ND	ND	ND	ND	35
15-Oct-08	ND	ND	ND	ND	ND	51
11-Mar-09	ND	ND	ND	ND	ND	41
24-Jun-09	ND	ND	ND	ND	ND	43
15-Sep-09	ND	ND	ND	ND	ND	43

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TW4-24	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
06/27/07	2.6	ND	ND	ND	26.1	770
Aug-15-07	2.2	ND	ND	ND	29.0	791
Oct-10-08	1.5	ND	ND	ND	24.7	692
03/26/08	1.5	ND	ND	ND	24.4	740
06/25/08	1.4	ND	ND	ND	45.3	834
10-Sep-08	2.9	ND	ND	ND	38.4	1180
15-Oct-08	ND	ND	ND	ND	44.6	1130
11-Mar-09	1.4	ND	ND	ND	30.5	1010
24-Jun-09	1.5	ND	ND	ND	30.4	759
15-Sep-09	1.4	ND	ND	ND	30.7	618

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TW4-25	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)	
06/27/07	ND	ND	ND	ND	17.1	395	
Aug-15-07	ND	ND	ND	ND	16.7	382	
Oct-10-08	ND	ND ND		ND	17.0	356	
03/26/08	ND	ND	ND	ND	18.7	374	
06/25/08	ND	ND	ND	ND	22.1	344	
10-Sep-08	ND	ND	ND	ND	18.8	333	
15-Oct-08	ND	ND	ND	ND	21.3	366	
11-Mar-09	ND	ND	ND	ND	15.3	332	
24-Jun-09	ND	ND	ND	ND	15.3	328	
15-Sep-09	ND	ND	ND	ND	3.3	328	

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 $(A_{i},A_{i}) = (A_{i},A_{i}) + (A_{i},A_{i}$

Table 5 Nitrate (as N) Concentrations in Wells Inside the 70 μg/L Isoconcentration Boundary Line. White Mesa Uranium Mill near Blanding Utah

Monitoring	Monitor Well											
Event	MW-4	MW-26	TW4-1	TW4-2	TW4-4	TW4-7	TW4-9	TW4-10	TW4-11	TW4-19	TW4-20	TW4-21
1st Quarter 2005	6.3	0.3	9.1	7.7	10.0	5.2	1.3	1.6	8.7	5.3	WNI	WNI
2nd Quarter 2005	7.1	0.2	10.6	8.6	11.3	5.4	1.3	0.8	10.3	5.7	10.1	14.6
3rd Quarter 2005	7.0	0.2	9.8	8.0	9.9	5.2	1.3	1.1	9.4	4.6	2.9	10.1
4th Quarter 2005	7.0	0.3	9.7	7.8	10.2	5.3	1.3	3.3	9.4	<0.1	1.8	9.6
1st Quarter 2006	6.0	0.2	9.4	7.5	9.5	1.0	1.5	2.4	9.2	4.0	3.8	8.5
2nd Quarter 2006	6.0	0.2	9.6	7.1	8.6	4.5	1.5	3.5	10.0	5.2	9.4	10.2
3rd Quarter 2006	1.2	1.4	9.2	7.4	9.7	4.7	0.9	6.8	10.0	4.3	2.9	8.9
4th Quarter 2006	6.4	0.3	9.2	7.6	10.1	4.6	0.7	5.7	10.0	4.6	3.5	8.7
1st Quarter 2007	6.3	0.6	8.9	7.3	9.0	6.0	0.6	7.3	10.1	4.0	4.2	8.7
2nd Quarter 2007	7.0	0.4	9.0	7.8	9.4	5.1	1.3	5.1	10.6	NS	2.3	8.6
3rd Quarter 2007	6.2	1.0	8.4	7.3	9.5	4.7	1.8	7.3	10.2	4.1	2.1	8.6
4th Quarter 2007	6.2	0.6	7.8	6.9	9.5	4.7	2.0	6.7	9.8	4.0	5.6	8.3
1st Quarter 2008	5.8	0.1	7.6	6.9	9.2	4.2	2.1	7.3	7.7	2.2	0.9	14.3
2nd Quarter 2008	6.1	0.6	8.7	7.4	10.8	4.8	2.3	9.9	7.3	2.8	8.0	8.8

* First monitoring event

NS = Not sample because of the University of Utah Hydrogeologic Study.

WNI = Well was not installed

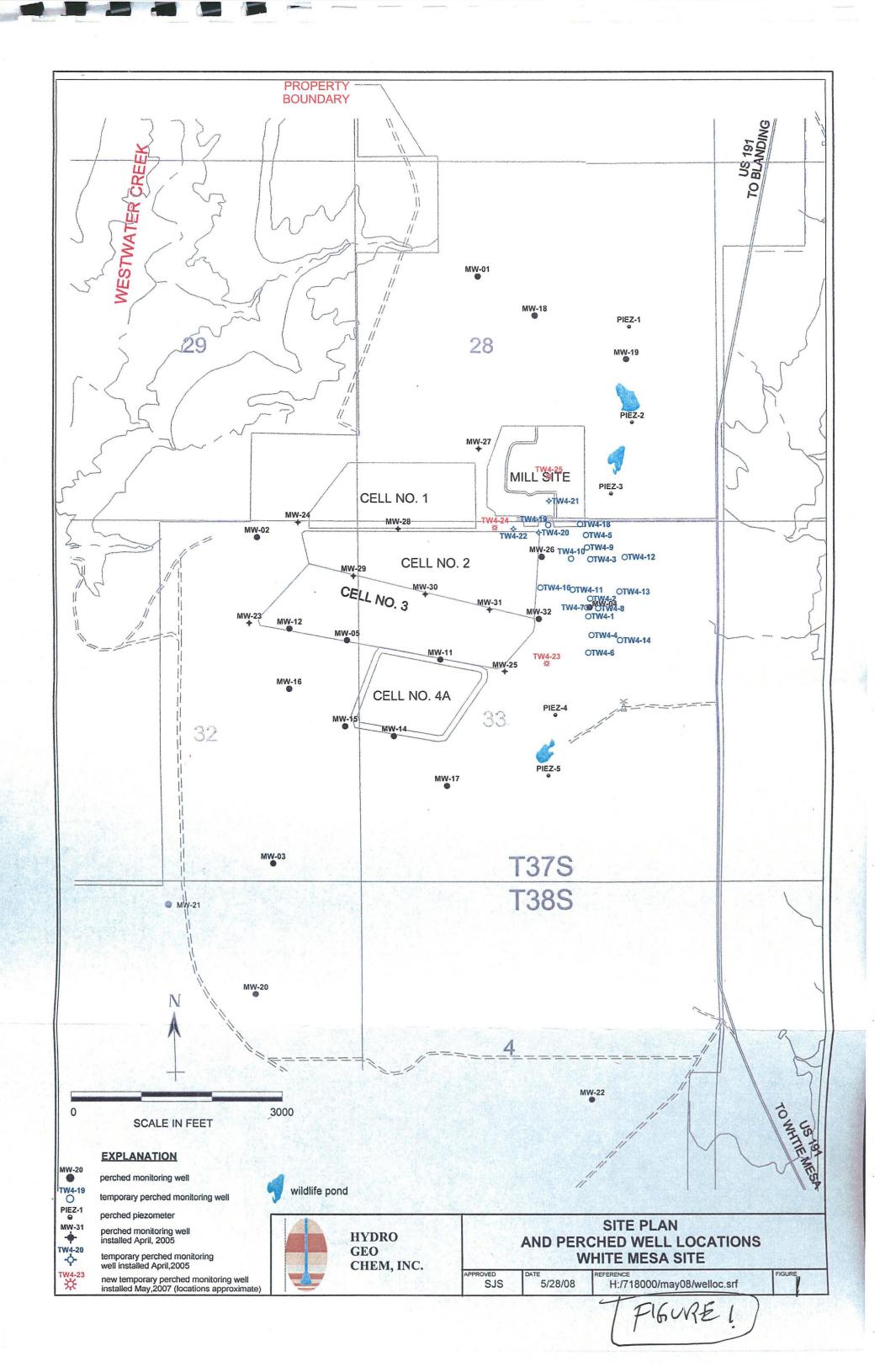
High lighted nitrate concentrations = nitrate concentrations that have exceeded the GWQS of 10 mg/L.

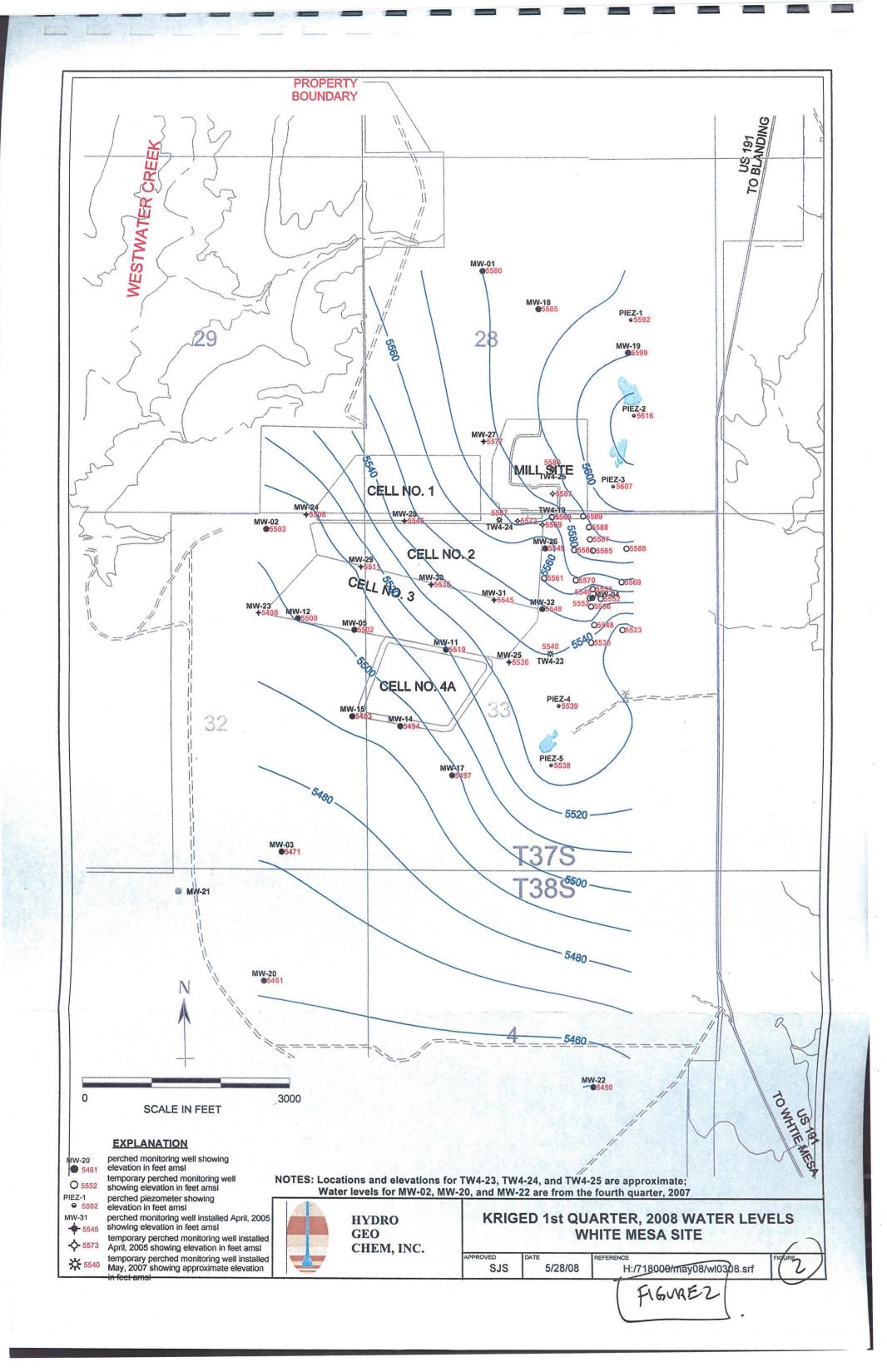
Source: appeared as Table 2 in Utah DRC September 15, 2008 Request for Additional Information

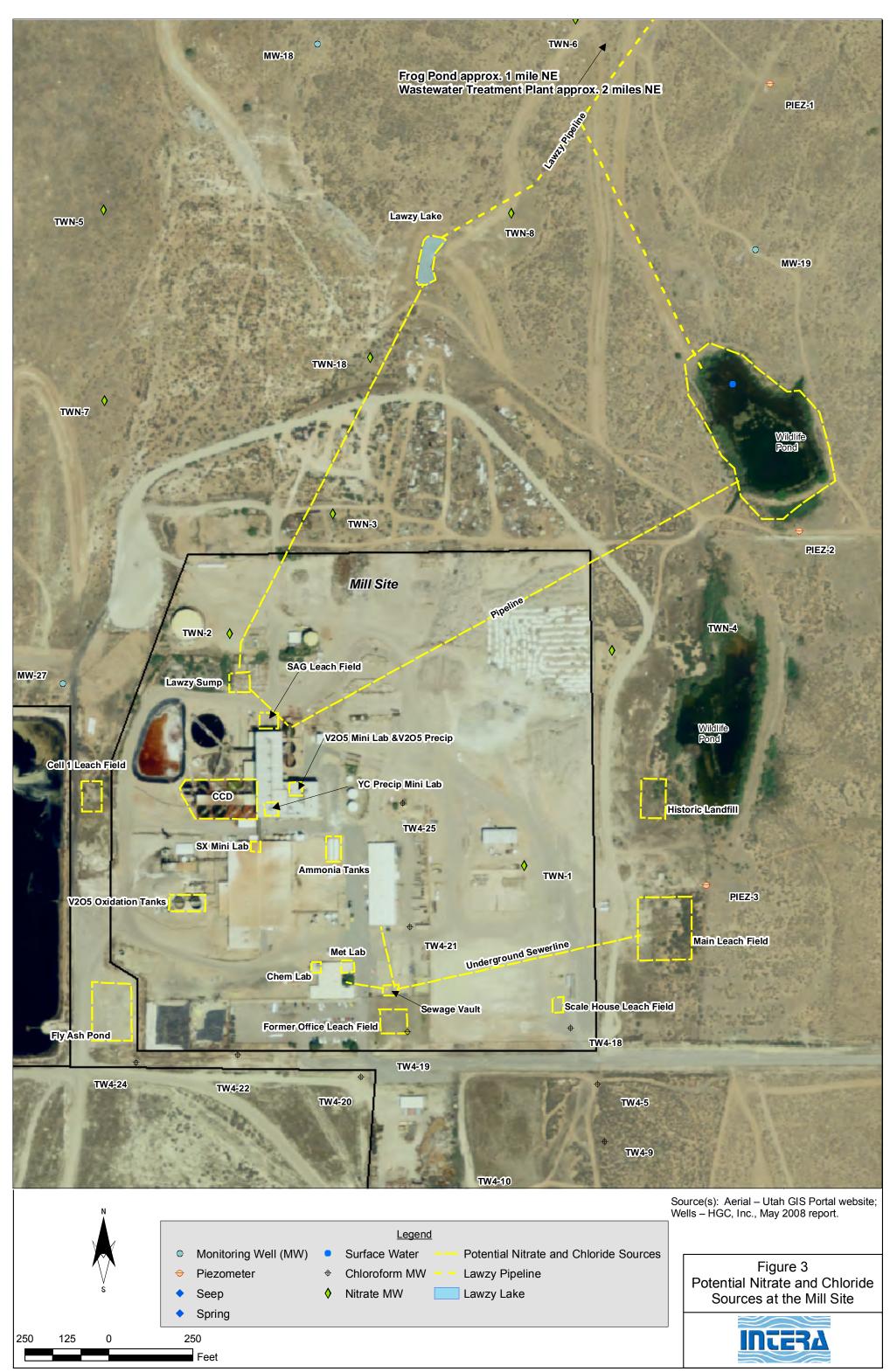
	nd Nitrate in On Site Wells 4t		
PT_NAME	SDATE Report	Chloride Nit	rate
MW-01	10/19/2009 C09100882	. 17	0.2
MW-02	10/21/2009 C09100882	6	0.1 U
MW-03	10/26/2009 C09101105	46	0.2
MW-03A	10/28/2009 C09101105	42	1
MW-04	9/14/2009 C09090634	43	5.3
MW-05	10/12/2009 C09100623	51	0.1 U
MW-11	10/19/2009 C09100882	30	0.1 U
MW-12	10/13/2009 C09100623	67	0.1 U
MW-14	10/20/2009 C09100882	. 17	0.1 U
MW-15	10/20/2009 C09100882	38	0.1
MW-16			
MW-17	10/21/2009 C09100882	35	0.9
MW-18	10/21/2009 C09100882		0.1 U
MW-19	10/19/2009 C09100882		2.2
MW-20	10/28/2009 C09101105		6.2
MW-21			
MW-22	10/27/2009 C09101105	67	3.8
MW-23	10/20/2009 C09100882		0.1
MW-24	10/28/2009 C09101105		0.1
MW-25	10/13/2009 C09100623		0.1 U
MW-26	10/13/2009 C09100623		0.1
MW-27	10/12/2009 C09100623		5.2
MW-28	10/12/2009 C09100623		0.1
MW-29	10/26/2009 C09101105		0.1 U
MW-30	10/14/2009 C09100623		15
MW-31	10/14/2009 C09100623		22.6 D
MW-32	10/14/2009 C09100623		0.1 U
PIEZ-1	10/27/2009 C09101104		7.4
PIEZ-2	10/27/2009 C09101104		0.6
PIEZ-3	10/27/2009 C09101104		1.2
PIEZ-4		46	1.80
PIEZ-5		18	0.70
TW4-1	9/15/2009 C09090634	. 36	7.3
TW4-10	9/15/2009 C09090634	51	8.1
TW4-11	9/15/2009 C09090634	. 49	7
TW4-12	9/15/2009 C09090634	- 22	5.1
TW4-13	9/15/2009 C09090634	63	4.7
TW4-14	9/15/2009 C09090634	38	1.5
TW4-15	9/14/2009 C09090634	46	0.1 D
TW4-16	9/15/2009 C09090634	. 79	8.8
TW4-17	9/15/2009 C09090634	33	0.1
TW4-18	9/15/2009 C09090634	26	5.9
TW4-19	9/14/2009 C09090634	43	0.1
TW4-2	9/15/2009 C09090634	43	6.6 U
TW4-20	9/14/2009 C09090634	153	3.3
TW4-21	9/15/2009 C09090634	281	9.2
TW4-22	9/15/2009 C09090634	391	40.3
TW4-23	9/15/2009 C09090634	43	0.1
TW4-24	9/15/2009 C09090634		30.7
TW4-25	9/15/2009 C09090634	328	3.3

TW4-3	9/15/2009 C09090634	21	2.8
TW4-4	9/15/2009 C09090634	39	8.4
TW4-5	9/15/2009 C09090634	48	8.3
TW4-6	9/15/2009 C09090634	37	5
TW4-7	9/15/2009 C09090634	37	4.1
TW4-8	9/15/2009 C09090634	44	0.1
TW4-9	9/15/2009 C09090634	30	2.5
TWN-1	10/28/2009 C09101104	18	0.5
TWN-10	11/10/2009 C09110461	26	1.4
TWN-11	11/3/2009 C09110253	74	1.3
TWN-12	11/3/2009 C09110253	109	0.5
TWN-13	11/4/2009 C09110253	83	0.5
TWN-14	11/4/2009 C09110253	32	3.4
TWN-15	11/10/2009 C09110461	78	1.1
TWN-16	11/4/2009 C09110253	39	1
TWN-17	11/4/2009 C09110253	152	6.7
TWN-18	11/2/2009 C09110253	57	1.3
TWN-19	11/2/2009 C09110253	125	7.4
TWN-2	11/2/2009 C09110253	55	20.8
TWN-3	11/2/2009 C09110253	106	29
TWN-4	10/28/2009 C09101104	11	0.4
TWN-5	11/10/2009 C09110461	48	0.2
TWN-6	11/3/2009 C09110253	21	1.4
TWN-7	11/10/2009 C09110461	7	0.1
TWN-8	11/3/2009 C09110253	12	0.1
TWN-9	11/10/2009 C09110461	205	12
CORAL CANYON	11/27/2009		
FROG POND	11/27/2009		
COTTONWOOD	11/27/2009		
WESTWATER	11/27/2009		
RUIN SPRINGS	11/27/2009		
CORRAL SPRINGS	11/27/2009		
ENTRANCE SPRING	11/27/2009		
Upper Wildlife Pond	10/27/2009 C09101104	3	0.1 U

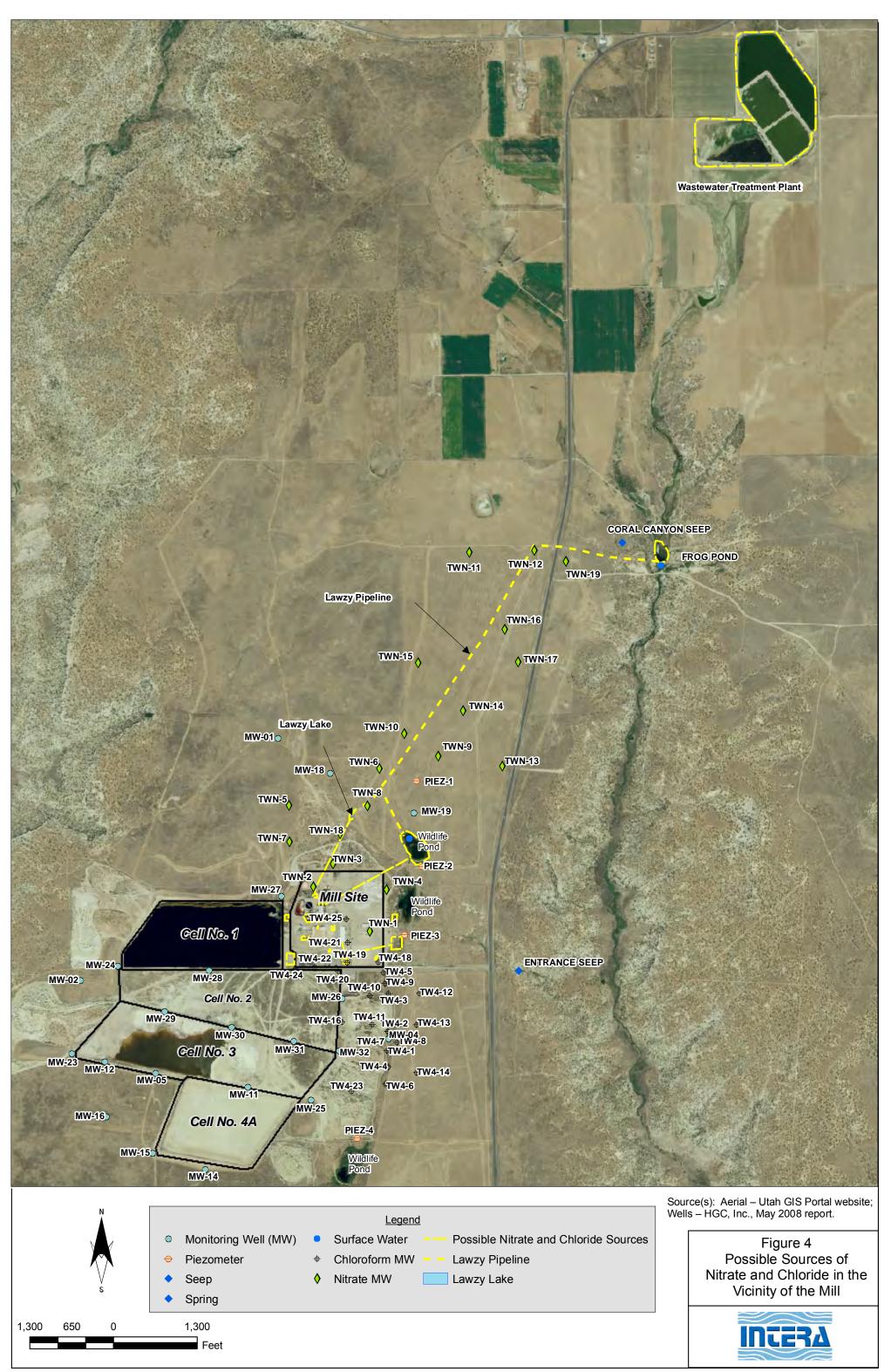
Figures







S:\Projects\IUC-001-01-001 Denison Mines\GIS\mapdocs\20091223MillSourceMap.mxd



S:\Projects\IUC-001-01-001 Denison Mines\GIS\mapdocs\20091223SourceMap.mxd

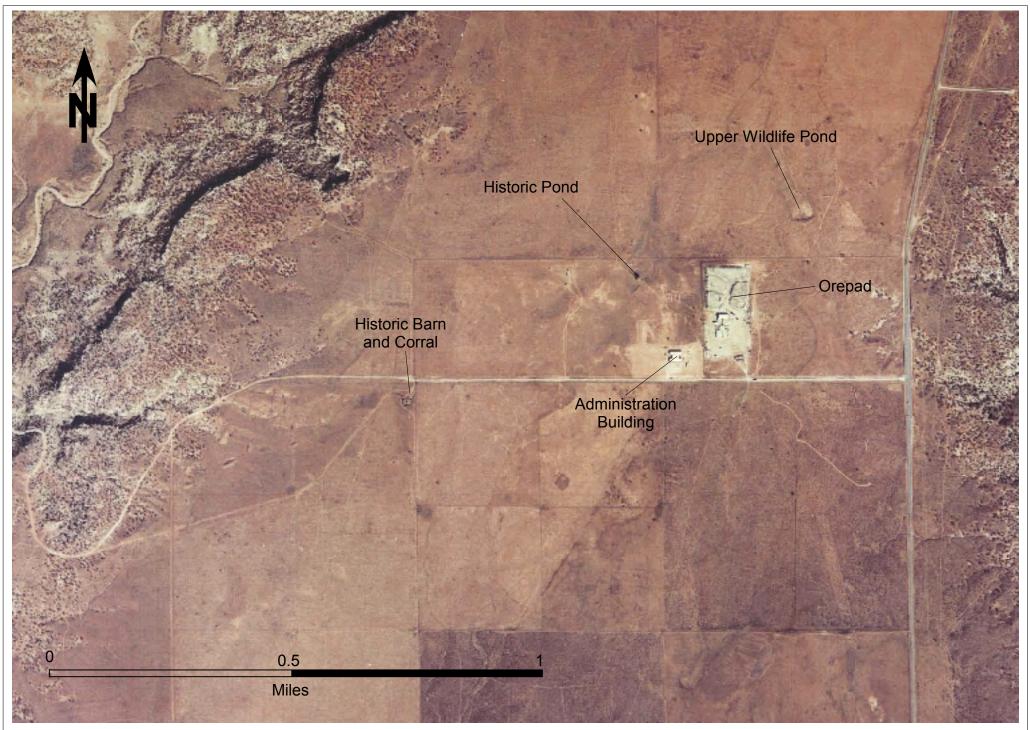


Figure 5 Historic Aerial Photograph (circa.~1979) White Mesa Mill Site

Attachment 3

White Mesa Uranium Mill Ground Water Monitoring Quality Assurance Plan (QAP) State of Utah Groundwater Discharge Permit No. UGW370004. Denison Mines (USA) Corp. April 16, 2009.

Date:4-16-09 Revision-4

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WHITE MESA URANIUM MILL

GROUND WATER MONITORING QUALITY ASSURANCE PLAN (QAP)

STATE OF UTAH GROUNDWATER DISCHARGE PERMIT No. UGW370004

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

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Appendices

Appendix A- Chloroform Investigation Monitoring Quality Assurance Program

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1. INTRODUCTION

This Groundwater Monitoring Quality Assurance Plan (the "Plan") details and describes all sampling equipment, field methods, laboratory methods, qualifications of environmental analytical laboratories, data validation, and sampling and other corrective actions necessary to comply with UAC R317-6-6.3(I) and (L) at the White Mesa Uranium Mill (the "Mill"), as required under paragraph I.H.6 of State of Utah Groundwater Discharge Permit No. UGW370004 (the "GWDP") for the Mill. This Procedure incorporates the applicable provisions of the United States Environmental Protection Agency ("EPA") *RCRA Groundwater Monitoring Technical Enforcement Guidance Document* (OSWER-9950.1, September, 1986), as updated by EPA's *RCRA Ground-Water Monitoring: Draft Technical Guidance* (November 1992).

Activities in an integrated program to generate quality data can be classified as management (i.e., quality assurance or "QA") and as functional (i.e., quality control or "QC"). The objective of this Plan is to ensure that monitoring data are generated at the Mill that meet the requirements for precision, accuracy, completeness, representativeness and comparability required for management purposes and to comply with the reporting requirements established by applicable permits and regulations.

2. ORGANIZATION AND RESPONSIBILITIES

2.1. Functional Groups

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

2.2. Overall Responsibility For the QA/QC Program

The overall responsibility for ensuring that the QA/QC measures are properly employed is the responsibility of the QA Manager. The QA Manager is typically not directly involved in the data generation (i.e., sampling or analysis) activities. At the Mill, the QA Manager is the Mill's Radiation Safety Officer ("RSO") or other qualified person designated by Denison Mines (USA) Corp. ("DUSA") corporate management.

2.3. Data Requestors/Users

The generation of data that meets the objectives of this Plan is necessary for management to make informed decisions relating to the operation of the Mill facility, and to comply with the reporting requirements set out in the GWDP and other permits and applicable regulations. Accordingly, the data requesters/users (the "Data Users") are therefore DUSA's corporate

management and regulatory authorities through the implementation of such permits and regulations. The data quality objectives ("DQOs") required for any groundwater sampling event, such as acceptable minimum detection limits, are specified in this Plan.

2.4. Data Generators

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

The responsibilities of the data generators are as follows:

2.4.1. Sampling and QC Monitors

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

- a) Ensuring that samples are collected, preserved, and transported as specified in Plan;
- b) Checking that all sample documentation (labels, field data worksheets, chain-ofcustody records, packing lists) is correct and transmitting that information, along with the samples, to the Analytical Laboratory in accordance with this Plan;
- c) Maintaining records of all samples, tracking those samples through subsequent processing and analysis, and, ultimately, where applicable, appropriately disposing of those samples at the conclusion of the program;
- d) Preparing quality control samples for field sample collection during the sampling event;
- e) Preparing QC and sample data for review by the QA Manager; and
- f) Preparing QC and sample data for reporting and entry into a computer data base, where appropriate.

2.4.2. Analysis Monitor

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

- a) Training and qualifying personnel in specified Analytical Laboratory QC and analytical procedures, prior to receiving samples;
- b) Receiving samples from the field and verifying that incoming samples correspond to the packing list or chain-of-custody sheet; and
- c) Verifying that Analytical Laboratory QC and analytical procedures are being followed as specified in this Plan, by the Analytical Laboratory's QA/QC program, and in accordance with the requirements for maintaining National Environmental Laboratory Accreditation Program ("NELAP") and/or National Voluntary Laboratory Accreditation Program ("NAVLAP") certification.

2.4.3. Data Reviewers/Approvers

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

- a) Ensuring that the data produced by the data generators meet the specifications set out in this Plan;
- b) Making on-site evaluations and submitting audit samples to assist in reviewing QA/QC procedures;
- c) Determining (with the Sampling and QC Monitor and Analysis Monitor) appropriate sampling equipment and sample containers, in accordance with this Plan, to minimize contamination; and
- d) Supervising all QA/QC measures to assure proper adherence to this Plan and determining corrective measures to be taken when deviations from this Plan occur.

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

2.5. Responsibilities Of Analytical Laboratory

Unless otherwise specified by DUSA corporate management, all environmental analysis of groundwater sampling required by the GWDP or by other applicable permits, will be performed by a contract Analytical Laboratory.

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

In addition, to the extent not otherwise required to maintain NELAP and or NAVLAP certification, the Analytical Laboratory must adhere to U. S. EPA Guideline SW-846 and, to the extent consistent with NELAP and EPA practices, the applicable portions of NRC Regulatory Guide 4.14.

The Analytical Laboratory will be chosen by DUSA and must satisfy the following criteria: (1) experience in analyzing environmental samples with detail for precision and accuracy, (2) experience with similar matrix analyses, (3) operation of a stringent internal quality assurance program meeting NELAP and/or NAVLAP certification requirements and that satisfies the criteria set out in Section 8 below, (4) ability to satisfy radionuclide requirements as stipulated in the applicable portions of NRC Regulatory Guide 4.14, and (5) certified by the State of Utah for and capable of performing the analytical methods set out in Table 1. The analytical procedures used by the Analytical Laboratory will be in accordance with Utah Administrative Code R317-6-6.3L.

3. QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT OF DATA

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

3.1. Precision

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

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

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

3.2. Accuracy

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

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

Where:

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

3.3. Representativeness

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

3.4. Completeness

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

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

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

Executive Secretary approval will be required for any completeness less than 100 percent.

3.5. Comparability

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

4. FIELD SAMPLING QUALITY ASSURANCE METHODOLOGY

4.1. Controlling Well Contamination

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

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

4.2. Controlling Depth to Groundwater Measurements

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

4.3. Water Quality QC Samples

Quality assurance for ground water monitoring consists of the following QC samples:

4.3.1. VOC Trip Blanks

Trip blanks will be used to assess contamination introduced into the sample containers by volatile organic compounds ("VOCs") through diffusion during sample transport and storage. At a minimum (at least) one trip blank will be in each shipping container containing samples to be analyzed for VOCs. Trip blanks will be prepared by the Analytical Laboratory, transported to the sampling site, and then returned to the Analytical Laboratory for analysis

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along with the samples collected during the sampling event. The trip blank will be unopened throughout the transportation and storage processes and will accompany the technician while sampling in the field (DTG, Field and Laboratory Quality Assurance/Quality control, 7.8, pages 7-30, 7-31)

4.3.2. Equipment Rinsate Samples

Where a portable (non-dedicated) pump is used, a rinsate sample will be collected prior to using and after decontaminating the sampling equipment at the beginning of each sampling event and at the beginning of each day of the sampling event (TEGD) Field QA/QC Program, page 119). Where a non-dedicated bailer is used a rinsate sample will be collected prior to any well sampling or purging and after decontamination at the beginning of each sampling event and at the beginning of each day of the sampling event. In the case of equipment rinsate blank samples for a pump, the sample will be prepared by pumping de-ionized water into the sample containers. In the case of equipment rinsate blank samples for a non-disposable or non-dedicated bailer, the sample will be prepared by pouring de-ionized water over and through the bailer and into the sample containers. During quarterly/semi-annual monitoring events, equipment rinsate blanks will need to be analyzed only for the contaminants required during the accelerated monitoring event.

4.3.3. Field Duplicates

One Duplicate set of samples submitted with each Batch (defined in Section 4.3.4) of samples (DTG, Field and Laboratory Quality Assurance/Quality Control, 7.8), taken from one of the wells being sampled and will be submitted to the Analytical Laboratory and analyzed for all contaminants listed in Table 2 of the GWDP (EPA SW-846, Chapter 1, Section 3.4.1).

4.3.4. Definition of "Batch"

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

5. CALIBRATION

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

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5.1. Depth to Groundwater Measurements

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

5.2. Water Quality

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

6. GROUND WATER SAMPLING AND MEASUREMENT OF FIELD PARAMETERS

6.1. Groundwater Head Monitoring

6.1.1. Location and Frequency of Groundwater Head Monitoring

Depth to groundwater shall be measured quarterly in the following wells and piezometers:

- a) All Point of Compliance wells listed in paragraphs 6.2.1 a), b) and c) below;
- b) Monitoring wells MW-20 and MW-22;
- c) All piezometers (P-1, P-2, P-3, P-4 and P-5);
- d) All chloroform contaminant investigation wells required to be monitored during the quarter under State of Utah Notice of Violation and Groundwater Corrective Action Order UDEQ Docket No. UGQ-20-01, not already included in paragraph (a). On November 17, 2006, such chloroform contaminant investigation wells were the following:
 - MW-4
 - TW4-1
 - TW4-2
 - TW4-3
 - TW4-4
 - TW4-5
 - TW4-6
 - TW4-7
 - TW4-8

- TW4-10
- TW4-11
- TW4-12
- TW4-13
- TW4-14
- TW4-16
- TW4-18
- TW4-19
- TW4-20

- TW4-9 TW4-21 TW4-22;
- e) In any other wells or piezometers required by the Executive Secretary of the Utah Radiation Control Board, as indicated by the Mill's RSO.

6.1.2. Equipment Used For Groundwater Head Monitoring

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

6.1.3. Field Sampling Procedure for Groundwater Head Monitoring

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

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

6.2. Ground Water Compliance Monitoring

6.2.1. Location and Frequency of Groundwater Compliance Monitoring

Groundwater quality shall be measured in the following wells at the following frequencies:

- a) Semi-annually in the following Point of Compliance wells: MW-1, MW-2, MW-3, MW-5, MW-12, MW-15, MW-17, MW-18 and MW-19;
- b) Quarterly in the following Point of Compliance wells: MW-11, MW-14, MW-20, MW-22, MW-26 and MW-32; and
- c) Quarterly in the following new Point of Compliance wells, until 8 quarters of background data are obtained: MW-23, MW-24, MW-25, MW-27, MW-28, MW-29, MW-30 and MW-31. Thereafter, these wells will be sampled on a quarterly or semi-annual basis, as required by the GWDP.

d) Chloroform Investigation sampling will collected from the locations and at the frequencies listed at Item 2) in the Chloroform Investigation Monitoring Quality Assurance Program (Appendix A to this document)

In addition, quarterly or monthly sampling may be required for certain parameters in certain wells for which accelerated monitoring is required under paragraph I.G.1 or I.G.2 of the GWDP. It is important to confirm with the Mill's RSO prior to conducting any monitoring well sampling, whether or not any parameters in any wells are subject to this accelerated monitoring.

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

All quarterly and semi-annual samples collected under paragraphs 6.2.1 a), b) and c) above (paragraphs I.E.1.a) or I.E.1.b) of the GWDP) shall be analyzed for the following parameters:

- a) Field parameters depth to groundwater, pH, temperature, specific conductance, redox potential (Eh) and turbidity in the manner specified in paragraph 6.2.7 d) (v); and
- b) Laboratory Parameters:
 - (i) All parameters specified in Table 2 of the GWDP; and
 - (ii) General inorganics chloride, sulfate, carbonate, bicarbonate, sodium potassium, magnesium, calcium, and total anions and cations.
- 6.2.3. Quarterly or Monthly Sampling Required Under Paragraphs I.G.1 or I.G.2 of the GWDP

Any quarterly or monthly sampling required under paragraphs I.G.1. or I.G.2. of the GWDP shall be in the wells and for the specific parameters required by those paragraphs of the GWDP, as specified by the Mill's RSO.

6.2.4. Sampling Equipment for Groundwater Compliance Monitoring

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

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

- <u>Dedicated Bailer</u>: A bailer that is dedicated to be used at one specific well for the use of purging or sampling. Said bailer well remain with and in side the well casing suspended and secured.
- <u>Non Dedicated Bailer</u>: A bailer that is used for purging and sampling at one or more well.
- <u>Dedicated Pump</u>: A pump that is dedicated to one specific well for the use of purging or sampling. Said pump well remain with and in side the well casing suspended and secured.
- <u>Non Dedicated Pump</u>: A pump that is used for purging and sampling at one or more wells.

Groundwater compliance monitoring is accomplished by using the equipment, or the equivalent listed below

- a) Bailer made of inert materials for purging (DTG, 7.3, page 7-10)
- b) If a dedicated pump is installed in the well, use the dedicated pump, otherwise use a 1.8 inch (outside diameter) air-driven sampling pump, or equivalent;
- c) 150 psi air compressor and ancillary equipment, or equivalent;
- d) Field parameters shall be measured using a YSI-556 with Flow Cell Multi-Parameter Meter system or equivalent that allows a continuous stream of water from the pump to the meter that enables measurements to be taken on a real-time basis without exposing the water stream to the atmosphere. The Field Parameter Meter measures the following parameters:

(i) Water temperature;
(ii) Specific conductivity;
(iii)Total Dissolved Solids (TDS);
(iv)Standard pH;
(v) Redox potential (Eh).

Field parameters are measured by using a flow cell system that enables the measurements to be taken on a real-time basis without exposing the water stream to the atmosphere;

- e) Turbidity measuring instrument capable of determining if turbidity is \leq 5 NTU;
- f) 0.45 micron high capacity disposable inline filters;
- g) Field preservation chemicals (as provided by the Analytical Laboratory);
- h) Five gallon calibrated sample bucket;

i)Stopwatch;

- j)Sealed sterile Polyethylene sample containers as provided by the Analytical Laboratory;
- k) De-ionized water;
- 1) One new, unused, clean disposable single check valve bailer, or the equivalent, for each well to be sampled for VOCs; and
- m) If any portable (non-dedicated) pumps are used, the following equipment, supplies and solutions, or the equivalent, necessary for decontamination procedures:
 - (i) 15 gallons of de-ionized water
 - (ii) 5 gallons of de-ionized water/nonphosphate detergent (such as Liqui-Nox);
 - (iii)5 gallons of de-ionized water/HNO3 solution (a mixture of approximately 4 and 1/2 gallons of de-ionized water and ½ gallon of HNO3);
 - (iv)Rubber gloves; and
 - (v) Sterile sample containers from the Mill laboratory.

6.2.5. Decontamination Procedure

If a portable (non-dedicated) pump is to be used, prior to each sampling event, at the beginning of each day during the sampling event, and between each sampling location (well), decontaminate the portable (non-dedicated) sampling pump prior to its use for purging or sampling using the following procedure:

- a) wash the pump probe, probe sheath and other pump equipment that may come in contact with the sampling well inner casing or well water (the "Sampling Equipment") with a nonphosphate detergent;
- b) rinse the Sampling Equipment with de-ionized water;
- c) rinse the Sampling Equipment with dilute (.1N) hydrochloric or nitric acid; and

d) rinse the Sampling Equipment with de-ionized water.

The probe should then be placed in the decontaminated probe sheath, or otherwise protected from contamination until used for purging or sampling.

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

All sampling and purging equipment that has been decontaminated as per the foregoing procedure shall be covered with a plastic sheet to shield such equipment from dust or other materials that may contaminate the equipment when traveling to and between purging/sampling locations.

6.2.6. Pre-Purging/ Sampling Activities

- a) If a portable (non-dedicated) pump is to be used, prior to commencing the event's sampling activities, check the pumping equipment to ensure that no air is leaking into the discharge line, in order to prevent aeration of the sample;
- b) If a portable (non-dedicated) pump is to be used, prior to each sampling event and at the beginning of each day during the sampling event, decontaminate the sampling pump using the procedure set forth in Section 6.2.5;
- c) If a portable (non-dedicated) pump is to be used, after completion of decontamination and prior to the beginning of each day of each sampling event, prepare one Equipment Rinsate Sample by following the procedure set forth in Section 4.3.2; and
- d) Prior to leaving the Mill office, place the Trip Blank(s) into a cooler that will preserve the VOC samples. The Trip Blank(s) will accompany the groundwater samplers throughout the monitoring event.

6.2.7. Well Purging/Measurement of Field Parameters

- a) Remove the well casing cap and measure and record depth to groundwater by following the procedures set out in paragraph 6.1.3 above;
- b) Determine the casing volume (V) in gallons, where h is column height of the water in the well (calculated by subtracting the depth to groundwater in the well from the total depth of the well), V = 0.653*h, for a 4" casing volume and V = .367*h for a 3" casing volume. Record the casing volume on the Field Data Worksheet;
- c) If the RSO has advised the field technician that immiscible contaminants (i.e., LNAPLs or DNAPLs) are known to occur or could potentially occur in the

subsurface at the location of the well, follow the additional procedures, to be provided by the RSO, prior to well purging;

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

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

- (i) Commence pumping;
- (ii) Determine pump flow rate by using a stopwatch and a calibrated bucket by measuring the number of seconds required to fill to the one-gallon mark. Record this in the "pumping rate" section of the Field Data Worksheet;
- (iii)Calculate the amount of time to evacuate two casing volumes;
- (iv)Evacuate two casing volumes (if possible) by pumping for the length of time determined in paragraph (iii);
- Take measurements of field parameters (pH, specific conductance, (\mathbf{v}) temperature, redox potential and turbidity) during well purging, using the Field Parameter Meter and turbidity measuring instrument. These measurements will be recorded on the Field Data Worksheet. Purging is completed after two casing volumes have been removed and the field parameters pH, temperature, specific conductance, redox potential (Eh) and turbidity have stabilized to within 10% over at least two consecutive measurements. The groundwater in the well should recover to within at least 90% of the measured groundwater static surface before sampling. In addition, turbidity measurement in the water should be ≤ 5 NTU prior to sampling (DTG Well Development 6.7, page 6-48) unless the well is characterized by water that has a higher turbidity. A flow-cell needs to be used for field parameters. If the well is purged to dryness or is purged such that full recovery exceeds two hours, the well should be sampled as soon as a sufficient volume of groundwater is available to fill sample containers (DTG, Well Purging, 7.2.4, page 7-9);
- (vi) If the well yields two casing volumes, the individual performing the sampling should immediately proceed to Section 6.2.8);

- (vii) If the well cannot yield two casing volumes,
 - A. Evacuate the well to dryness and record the number of gallons evacuated on the Field Data Worksheet; and
 - B. Prior to sampling, measure and record depth to groundwater on the Field Data Worksheet following the procedures set out in paragraph 6.1.3 above;
- e) Purging, Where Use of Pump is Not Effective

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

- (i) Use the sound level instrument to determine the water column and figure the amount of water that must be evacuated;
- (ii) Attach a 3" disposable bailer to a rope and reel;
- (iii)Lower the bailer into the well and listen for contact with the solution. Once contact is made, allow the bailer to gradually sink in the well, being careful not to allow the bailer to come in contact with the bottom sediment;
- (iv) After the bailer is full, retrieve the bailer and discharge the water from the bailer into 5 gallon buckets. By doing this, one can record the number of gallons purged;
- (v)After the bailer is emptied, lower the bailer back into the well and gain another sample as before. This process will continue until the two casing volumes have been collected or until no more water can be retrieved. When the process is finished for the well, the bailer will be disposed of; and
- (vi)Take field measurements referred to in paragraph 6.2.7 (v) above from the water in the buckets;

6.2.8. Samples to be taken and order of taking samples

For each sampling event, unless sampling for a specific parameter under the accelerated monitoring requirements of paragraphs I.G.1 or I.G.2 of the GWDP as specified by the RSO, the following separate samples shall be taken in the following order from each monitoring well:

- a) VOCs, 3 sample containers, 40 ml each, (a bailer is used);
- b) Nutrients (ammonia, nitrate and nitrite), 1 sample container, 100 ml (a bailer is used);
- c) Heavy metals, 1 sample container, 250 ml, filtered;
- d) All other non-radiologics (fluoride, general inorganics, TDS, total cations and anions), 1 sample container, 250 ml, filtered; and
- e) Gross alpha, 1 sample container, 1,000 ml, filtered.
- f) The sample collection containers and sample volumes for chloroform sampling are specified at Item 3) of the Chloroform Investigation Monitoring Quality Assurance Program (Appendix A to this document)

The number of sample containers and the quantities taken shall be as set out above, unless otherwise dictated by the Analytical Laboratory, as specified by the RSO.

6.2.9. Field Duplicate Samples

- a) One duplicate set of samples is required for each Batch of samples (see Section 4.3.4) for definition of Batch) (EPA SW-846, Chapter 1, Section 3.4.1). Field duplicate samples will be analyzed for the contaminants listed in Table 2 of the GWDP;
- b) The duplicate samples should be as near to split samples as reasonably practicable, rather than merely taking a second set of samples from the same well after the field samples have been taken from that well. This can be accomplished by alternately partially filling the field sample containers and duplicate containers until both sets of containers are full.

6.2.10. VOCs and Nutrient Sampling

When sampling for VOCs and Nutrients, the following procedure shall be followed:

- a) Obtain specifically identified sample containers for the type of sample to be taken, as provided by the Analytical Laboratory;
- b) Add the quantity of specified preservative provided by the Analytical Laboratory to each sample container;
- c) Sample the well using an unused, clean, disposable, single check valve bailer, or the equivalent;
- d) Sample water should be transferred to sample containers in a controlled manner that will minimize sample agitation and aeration;
- e) In the case of VOC samples, be sure that the sample containers are filled as full as possible with no airspace in the containers;
- f) After each sample container is filled, rinse the lid of the container with water, and tighten lid onto container; and,
- g) Discard the bailer.

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

When sampling for heavy metals, all other non-radiologics and for gross alpha, the following procedure shall be followed:

- a) Obtain the specifically identified sample container for the type of sample to be taken, as provided by the Analytical Laboratory;
- b) Add the quantity of specified preservative provided by the Analytical Laboratory to each sample container;
- c) When using a pump to sample (wells without shallow water columns, i.e., where the water column is more than five feet above the bottom of the well casing or the well takes less than two days to recover from purging):
 - (i) Place a new 0.45 micron filter on the sample tubing;

- (ii) Pump the sample through the filtration unit, and into the sample container at the same rate or a lesser pumping rate than was used to purge the well;
- (iii)The pump should be operated in a continuous manner so that it does not produce samples that are aerated in the return tube or upon discharge;
- (iv)Remove pump from the well; and
- (v) If using a portable (non-dedicated pump), decontaminate pump as per Section 6.2.5. Do not place decontaminated pump on the ground or on other contaminated surfaces;
- d) When using a bailer to sample (wells with shallow water columns, i.e., where the water column is less than five feet above the bottom of the well casing or the well takes over two days to recover from purging), then one of the following two procedures will be used:
 - (i) Filtering Water Samples at the Well Head
 - A. The sample water is collected by use of a 3 inch Teflon bailer, or the equivalent, that is capable of being attached to a hand-operated pressure pump, or the equivalent. Only disposable parts of the pressure pump may come into contact with the sample water;
 - B. Attach the pump to the disposable bailer and activate the pump in accordance with manufacturer's instructions, such that the sample water in the bailer is forced through a clean, un-used, disposable 0.45 micron filter into a clean previously unused sample container, in a manner such that only disposable parts of the pump mechanism come into contact with the sample water;
 - C. Sample water should be transferred to sample containers in a controlled manner that will minimize sample agitation and aeration;
 - D. Rinse lid of sample container with any remaining filtered water, after container is filled with filtered water, and tighten lid onto container;
 - E. Unless dedicated to a particular well, dispose of the bailer, filter and any parts of the pump mechanism that come into contact with the sample water; and
 - F. No rinsate sample is needed, because everything that comes into contact with the sample water is clean and unused prior to sampling, and disposed of after sampling the well;
 - (ii) Filtering Water Samples at the Mill Laboratory

- A. A new, clean 1 gallon raw sample container must be used to capture waters needed to be filtered;
- B. The sample water is collected by use of a 3 inch Teflon bailer, or the equivalent, and then discharged into the 1 gallon container;
- C. After all the samples have been collected for the well and placed in the field sample container, which contains blue ice to keep the samples at the required temperature, the sampler will then proceed directly back to the Mill laboratory and perform the filtration on the sample;
- D. Unless the bailer is dedicated to a particular well, it will be disposed of after completion of sampling in the well;
- E. Upon arrival at the administration building, all other samples from the well (that do not require filtration) will be placed in the sample holding refrigerator in the locked sample storage room;
- F. The sampler will then carry the sample that requires filtration in the cooler to the laboratory and set up the equipment to be used for filtration of the sample;
- G. The equipment needed for this process consists of:
 - 2000 ml glass filter flask
 - 250 ml bell and glass frit for a micro-filtration 0.45 micron filter setup
 - 0.45 micron filter paper
- H. The glass filter flask and micro-filtration equipment will go through a cleaning and rinsate process. The processing will included the following:
 - Rinsing of the equipment using DI water
 - Rinsing the equipment with a mixture of DI water and HNO₃
 - Rinsing the equipment with a mixture of DI water and Liqui-Nox soap
 - Rinsing the equipment with DI water
 - Finally the collection of the final process rinsate solutions are placed in the sample collection cooler and labeled as a filtration equipment rinsate sample;
- I. The flask is attached to the vacuum system in the laboratory using Tygon Vacuum Tubing, or the equivalent;
- J. The micro-filtration system is then inserted into the filter flask;
- K. A 0.45 micron filter paper is then placed between the bell and the glass frit and clamped in place to prevent solution leaking out;
- L. The water sample is then slowly added into the bell and the vacuum is turned on;
- M. As the vacuum draws the water through the filter paper, additional solutions are added until the flask is full;

- N. When the flask is full, the vacuum is turned off and the bell is unclamped from the frit. The Tygon tubing is then removed from the flask. The glass frit is then pulled out of the flask;
- O. The filtered solutions are then poured into the various remaining sample collection bottles. Sample water should be transferred to sample containers in a controlled manner that will minimize sample agitation and aeration;
- P. Rinse lid of sample container with any remaining filtered water, after container is filled with filtered water, and tighten lid onto container;
- Q. If additional filtered water is required to complete the sample requirements, the sample bottles will be placed in the field cooler along with the raw sample and housed there while the filtration system is being hooked back up and the procedures set out in paragraphs I to P above are repeated until sufficient sample water has been filtered to fill up the required number of sample bottles;
- R. After all samples from the well that require filtration have been filtered in accordance with the foregoing procedure and placed in the proper sample bottles, the remainder of the raw sample is then discharged into the laboratory sink, which runs to tails; and
- S. The filtered samples are then transported to the locked sample storage room and placed in the sample holding refrigerator.

The time lapse between the actual sampling times to the completion of the filtration process is approximately ½ hour. Samples are always in the field sample container, except for when the raw sample is pulled from the cooler and poured in the bell on the filter flask.

6.2.12. Procedures to Follow After Sampling

- a) In each case, once a sample is taken, identify and label the sample container with:
 - Sample location/facility
 - Date and time of sample
 - Any preservation method utilized
 - Sampler's initials
 - Filtered or unfiltered
 - Parameters requested to be analyzed
- b) Place each sample in an ice-packed cooler, immediately upon taking the sample and labeling the sample container;
- c) Replace the casing cap on the well. Lock the well;

- d) Before leaving the sampling location, thoroughly document the sampling event on the Field Data Worksheet, by recording the items required in paragraph 7.1; and
- e) Upon returning to the office, the samples must be stored in a refrigerator at less than or equal to 6° C. These samples shall be received by the Analytical Laboratory at less than or equal to 6° C. Samples will then be re-packed in the plastic ice-packed cooler and transported via these sealed plastic containers by postal contract services to the Analytical Laboratory.

7. SAMPLE DOCUMENTATION TRACKING AND RECORD KEEPING

7.1. Field Data Worksheets

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

The Field Data Worksheets will contain the following information:

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

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- weather conditions and external air temperature
- name of certified Analytical Laboratory.

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

7.2. Chain-Of-Custody and Analytical Request Record

A Chain-of-Custody and Analytical Request Record form (the "COC Form"), provided by the Analytical Laboratory, will accompany the samples being shipped to the Analytical Laboratory. An example of the Analytical Laboratory's Chain of Custody Form is attached as Attachment 2. If the Chain of Custody Form changes at any time, the Company shall provide a copy of the new or revised Chain of Custody Form to the Executive Secretary and substitute the new form for the old form in Attachment 2. Standard Chain-of-Custody protocol is initiated for each sample set. A COC Form is to be completed for each set of samples collected in a shipping container (cooler) and is to include the following:

- sampler's name
- company name
- date and time of collection
- sample type (e.g., water)
- sample location
- number of sample containers in the shipping container
- analyses requested
- signatures of persons involved in the chain of possession
- internal temperatures of the shipping container when opened at the laboratory
- remarks section to identify potential hazards or to relay other information to the Analytical Laboratory.

Chain-of-Custody reports will be placed inside a re-sealable bag and taped to the inside lid. Custody seals will be placed on the outside of each cooler.

The person shipping the samples to the Analytical Laboratory will sign the COC Form, document shipment method, and send the original and the second copy of the COC Form with the samples. Upon receipt of the samples, the person receiving the samples will sign the COC Form and return the second copy to the Mill's RSO.

Copies of the COC Forms and other relevant documentation will be retained at the Mill.

7.3. Record Keeping

The Field Data Worksheets are retained at the Mill.

Original Certificates of Analysis from the Analytical Laboratory, showing the laboratory analytical results for the water samples, are maintained at the Mill.

Once all the data for the quarter (all wells sampled during the quarter) is completed, key data from the Field Data Worksheets and from the Certificates of Analysis are typed into a computer file. Key data entered into the computer file will include well I.D., sample date, depth to groundwater, average field data, and all laboratory analytical data. These computer files are maintained at the Mill.

8. ANALYTICAL PROCEDURES AND QA/QC

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

8.1. Analytical Quality Control

Analytical QA/QC will be governed by the QA/QC program of the Analytical Laboratory. In choosing and retaining the Analytical Laboratory, DUSA shall ensure that the Analytical Laboratory is certified by the State of Utah and by NELAP and/or NAVLAP, is capable of performing the analytical procedures specified in Section 8.2, and that the QA/QC program of the Analytical Laboratory includes the spikes, blanks and duplicates described in Section 8.1.2.

8.1.2. Spikes, Blanks and Duplicates

Analytical Laboratory QC samples will assess the accuracy and precision of the analyses. The following describes the type of QC samples that will be used by the Analytical Laboratory to assess the quality of the data. The following procedures shall be performed at least once with each Batch of samples:

a) <u>Duplicate Spike (Matrix Spike)</u>

A split/spiked field sample shall be analyzed with every analytical batch. Analytes stipulated by the analytical method, by applicable regulations, or by other specific requirements must be spiked into the sample. Selection of the sample to be spiked and/or split depends on the information required and the variety of conditions within a

typical matrix. The duplicate spike (matrix spike) sample serves as a check evaluating the effect of the sample matrix on the accuracy of analysis.

b) <u>Blanks</u>

Each batch shall be accompanied by a reagent blank. The reagent blank shall be carried through the entire analytical procedure. Contamination detected in analysis of reagent blanks will be used to evaluate any Analytical Laboratory contamination of environmental samples which may have occurred.

c) <u>Field Samples/Surrogate Compounds</u>

Every blank, standard, and environmental sample (including matrix spike/matrix duplicate samples) shall be spiked with surrogate compounds prior to purging or extraction. Surrogates are organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromatography, but which are not normally found in environmental samples. Surrogates shall be spiked into samples according to the appropriate organic analytical methods.

d) <u>Check Sample</u>

Each analytical batch shall contain a number of check samples. For each method, the Analytical Laboratory will normally analyze the following check samples or their equivalents: a method blank, a laboratory control spike, a matrix spike, and a matrix spike duplicate, or the equivalent, with relative percent difference reported.

8.2. Analytical Laboratory Procedures

The analytical procedures to be used by the Analytical Laboratory will be as specified in Table 1, or as otherwise authorized by the Executive Secretary. With respect to Chloroform Investigation sampling, the analytical procedures for parameters monitored under that program are specified at Item 4) of the Chloroform Investigation Monitoring Quality Assurance Program (Appendix A to this document)

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Table 1

Contaminant	Analytical Methods to be Used	Reporting Limit ¹	Maximum Holding Times	Sample Preservation Requirements	Sample Temperature Requirements
Nutrients					
Ammonia (as N)	A4500- NH3 G	0.05 mg/L	28 days	H_2SO_4 to pH<2	$\leq 6^{\circ}C$
Nitrate & Nitrite (as N)	E353.2	0.1 mg/L	28 days	H ₂ SO ₄ to pH<2	$\leq 6^{\circ}C$
Heavy Metals					
Arsenic	E200.8	5 μg/L	6 months	HNO ₃ to pH<2	None
Beryllium	E200.8	0.50 μg/L	6 months	HNO ₃ to pH<2	None
Cadmium	E200.8	0.50 μg/L	6 months	HNO ₃ to pH<2	None
Chromium	E200.8	25 μg/L	6 months	HNO ₃ to pH<2	None
Cobalt	E200.8	10 µg/L	6 months	HNO ₃ to pH<2	None
Copper	E200.8	10 µg/L	6 months	HNO ₃ to pH<2	None
Iron	E200.7	30 µg/L	6 months	HNO ₃ to pH<2	None
Lead	E200.8	1.0 µg/L	6 months	HNO ₃ to pH<2	None
Manganese	E200.8	10 µg/L	6 months	HNO ₃ to pH<2	None
Mercury	E200.8	0.50 μg/L	28 days	HNO ₃ to pH<2	None
Molybdenum	E200.8	10 µg/L	6 months	HNO ₃ to pH<2	None
Nickel	E200.8	20 μg/L	6 months	HNO ₃ to pH<2	None
Selenium	E200.8	5 μg/L	6 months	HNO ₃ to pH<2	None
Silver	E200.8	10 μg/L	6 months	HNO ₃ to pH<2	None
Thallium	E200.8	0.50 μg/L	6 months	HNO ₃ to pH<2	None
Tin	E200.8	100 μg/L	6 months	HNO ₃ to pH<2	None
Uranium	E200.8	0.30 µg/L	6 months	HNO ₃ to pH<2	None
Vanadium	E200.8	15 μg/L	6 months	HNO ₃ to pH<2	None
Zinc	E200.8	10 μg/L	6 months	HNO ₃ to pH<2	None
Radiologics					
Gross Alpha	E900.1	1.0 pCi/L	6 months	HNO ₃ to pH<2	None
Volatile					
Organic Compounds					
Acetone	SW8260B	20 µg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Benzene	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
2-Butanone	SW8260B	20 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$

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Contaminant	Analytical	Reporting	Maximum	Sample	Sample
Contaminant	Methods	Limit ¹	Holding	Preservation	Temperature
	to be Used		Times	Requirements	Requirements
(MEK)	to be Used	<u></u>	1 mics	Requirements	Requirements
Carbon	SW8260B	1.0 µg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Tetrachloride	5 W 8200D	1.0 µg/L	14 days		
Chloroform	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Chloromethane	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Dichloromethane (Methylene Chloride)	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Naphthalene	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Tetrahydrofuran	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Toluene	SW8260B	1.0 μg/L 1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Xylenes (total)	SW8260B	1.0 μg/L 1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Aylones (total)	D W 8200D	1.0 µg/L	1+ days		
Others					
Field pH (S.U.)	А4500-Н В	0.01 s.u.	Immediate	None	None
Fluoride	A4500-F C	0.1 mg/L	28 days	None	None
TDS	A2540 C	10 mg/L	7 days	None	$\leq 6^{\circ}C$
General Inorganics					
Chloride	A4500-Cl B	1 mg/L	28 days	None	None
Sulfate	A4500- SO4 E	1 mg/L	28 days	None	$\leq 6^{\circ}C$
Carbonate as CO3	A2320 B	1 mg/L	14 days	None	$\leq 6^{\circ}C$
Bicarbonate as HCO3	A2320 B	1 mg/L	14 days	None	$\leq 6^{\circ}C$
Sodium	E200.7	0.5 mg/L	6 months	HNO ₃ to pH<2	None
Potassium	E200.7	0.5 mg/L	6 months	HNO ₃ to pH<2	None
Magnesium	E200.7	0.5 mg/L	6 months	HNO ₃ to pH<2	None
Calcium	E200.7	0.5 mg/L	6 months	HNO ₃ to pH<2	None

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

9. INTERNAL QUALITY CONTROL CHECKS

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

9.1. Field QC Check Procedures

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

9.1.1. Review of Compliance With the Procedures Contained in this Plan

Observation of technician performance is monitored by the QA Manager on a periodic basis to ensure compliance with this Plan.

9.1.2. Analyte Completeness Review

The QA Manager will review all Analytical Results to confirm that the analytical results are complete (i.e., there is an analytical result for each required constituent in each well). The QA Manager shall also identify and report all instances of non-compliance and non-conformance (see Part I.E.1.(a) of the Permit. Executive Secretary approval will be required for any completeness (prior to QA/QC analysis) less than 100 percent. Non-conformance will be defined as a failure to provide field parameter results and analytical results for each parameter and for each well required in Sections 6.2.2 and 6.2.3, for the sampling event, without prior written Executive Secretary approval.

9.1.3. Blank Comparisons

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

9.1.4. Duplicate Sample Comparisons

The following analyses will be performed on duplicate field samples:

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a) <u>Relative Percent Difference.</u>

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

b) <u>Radiologics Counting Error Term</u>

All gross alpha analyses shall be reported with an error term. All gross alpha analysis reported with an activity equal to or greater than the GWCL, shall have a counting variance that is equal to or less that 20% of the reported activity concentration. An error term may be greater than 20% of the reported activity concentration when the sum of the activity concentration and error term is less than or equal to the GWCL.

c) <u>Radiologics</u>, Duplicate Samples

Comparability of results between the original and duplicate radiologic samples will be evaluated by determining compliance with the following formula:

$$| A-B | /(sa^2+sb^2)^{-2} < 2$$

Where:

A = the first duplicate measurement B = the second duplicate measurement sa^2 = the uncertainty of the first measurement squared sb^2 = the uncertainty of the second measurement squared

Non-conformance exists when the foregoing equation is ≥ 2 .

(EPA Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and Procedures Quality Assurance, January 2005, EPA 815-R-05-004, p. VI-9).

If the QA Managers review finds any situations of non-conformance, see Section 10.

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9.2. Analytical Laboratory QA Reviews

Full validation will include recalculation of raw data for a minimum of one or more analytes for ten percent of the samples analyzed. The remaining 90% of all data will undergo a QC review which will include validating holding times and QC samples. Overall data assessment will be a part of the validation process as well.

The Analysis Monitor or data validation specialist will evaluate the quality of the data based on SW-846, the applicable portions of NRC guide 4.14 and on analytical methods used. The reviewer will check the following: (1) sample preparation information is correct and complete, (2) analysis information is correct and complete, (3) appropriate Analytical Laboratory procedures are followed, (4) analytical results are correct and complete, (5) QC samples are within established control limits, (6) blanks are within QC limits, (7) special sample preparation and analytical requirements have been met, and (8) documentation is complete.

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

9.3. QA Manager Review of Analytical Laboratory Results and Procedures.

The QA Manager shall perform the following QA reviews relating to Analytical Laboratory procedures:

a) <u>Reporting Limit (RL) Comparisons</u>

The QA Manager shall confirm that all reporting limits used by the Analytical Laboratory are in conformance with the reporting limits set out on Table 1. Non-conformance shall be defined as: 1) a reporting limit that violates these provisions, unless the reporting limit must be increased due to sample matrix interference (i.e., due to dilution gain); or 2) a reporting limit that exceeds the respective GWQS listed in Table 2 of the GWDP.

b) Laboratory Methods Review

The QA Manager shall confirm that the analytical methods used by the Analytical Laboratory are those specified in Table 1, unless otherwise approved by the Executive Secretary. Non-conformance shall be defined when the Analytical Laboratory uses analytical methods not listed in Table 1 and not otherwise approved by the Executive Secretary.

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c) <u>Holding Time Examination</u>

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

d) <u>Sample Temperature Examination</u>

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

9.4. Analytical Data

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

Analytical data submitted by the Analytical Laboratory should contain the date/time the sample was collected, the date/time the sample was received by the Analytical Laboratory, the date/time the sample was extracted (if applicable), and the date/time the sample was analyzed.

All out-of-compliance results will be logged by the Analysis Monitor with corrective actions described as well as the results of the corrective actions taken. All raw and reduced data will be stored according to the Analytical Laboratory's record keeping procedures and QA program. All Analytical Laboratory procedures and records will be available for on-site inspection at any time during the course of investigation.

If re-runs occur with increasing frequency, the Analysis Monitor and the Mill's QA Manager will be consulted to establish more appropriate analytical approaches for problem samples.

10. CORRECTIVE ACTION

10.1. When Corrective Action is Required

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

When non-conformance is identified, DUSA shall:

- a) When non-conformance occurs as specified in Sections 9.1.3, 9.1.4 or 9.3, the data shall be qualified to denote the problem. In addition, DUSA shall determine the root cause, and provide specific steps to resolve problems(s) in accordance with the procedure set forth in Section 10.2. Any non-conformance with QAP requirements in a given quarterly ground water monitoring period will be corrected and reported to the Executive Secretary on or before submittal of the next quarterly ground water monitoring report.
- b) When a sample is lost, sample container broken, or the sample or analyte was omitted, resample within 10 days of discovery and analyze again in compliance with all requirements of this Plan. The results for this sample(s) should be included in the same quarterly monitoring report with other samples collected for the same sampling event; and
- c) For any other material deviation from this Plan, the procedure set forth in Section 10.2 shall be followed.

10.2. Procedure for Corrective Action

The need for corrective action for non-conformance with the requirements of this Plan, may be identified by system or performance audits or by standard QA/QC procedures. The procedures to be followed if the need for a corrective action is identified, are as follows:

- a) Identification and definition of the problem;
- b) Assignment of responsibility for investigating the problem;
- c) Investigation and determination of the cause of the problem;
- d) Determination of a corrective action to eliminate the problem;
- e) Assigning and accepting responsibility for implementing the corrective action;
- f) Implementing the corrective action and evaluating its effectiveness; and
- g) Verifying that the corrective action has eliminated the problem.

The QA Manager shall ensure that these steps are taken and that the problem which led to the corrective action has been resolved. A memorandum explaining the steps outlined above will be placed in the applicable monitoring files and the Mill Central Files, and the corrective action will be documented in a Report prepared in accordance with Section 11.

11. **REPORTING**

As required under paragraph I.F.1 of the GWDP, the Mill will send a groundwater monitoring report to the Executive Secretary on a quarterly basis. Both the Routine Groundwater Monitoring Reports (pertinent to Part I.F.1 of the Permit) and Chloroform Investigation Reports shall be submitted according to the following schedule:

Quarter	Period	Due Date
First	January – March	June 1
Second	April – June	September 1
Third	July – September	December 1
Fourth	October – December	March 1

The Routine Groundwater Monitoring Reports (pertinent to Part I.F.1 of the Permit) will include the following information:

- Description of monitor wells sampled
- Description of sampling methodology, equipment an decontamination procedures to the extent they differ from those described in this Plan
- A summary data table of historic groundwater levels for each monitor well and piezometer
- A summary data table showing the results of the sampling event, listing all wells and the analytical results for all constituents and identifying any constituents that are subject to accelerated monitoring in any particular wells pursuant to Part I.G.1 of the GWDP or are out of compliance in any particular wells pursuant to Part I.G.2 of the GWDP
- Copies of Field Data Worksheets
- Copies of Analytical Laboratory results
- Copies of Chain of Custody Forms
- - A Water Table Contour Map showing groundwater elevation data for the quarter will be contemporaneous for all wells on site, not to exceed a maximum time difference of five calendar days.
- Evaluation of groundwater levels, gradients and flow directions
- Quality assurance evaluation and data validation description (see Section 9 for further details)
- All non-conformance with this Plan and all corrective actions taken.
- Recommendations and Conclusions.

With respect to the chloroform investigation reporting requirements, these are specified at Item 5) of the Chloroform Investigation Monitoring Quality Assurance Program (Appendix A to this document.

In addition, an electronic copy of all analytical results will be transmitted to the Executive Secretary in comma separated values (CSV) format, or as otherwise advised by the Executive Secretary.

Further reporting may be required as a result of accelerated monitoring under paragraphs I.G.1 and I.G.2 of the GWDP. The frequency and content of these reports will be defined by DUSA corporate management working with the Executive Secretary.

12. SYSTEM AND PERFORMANCE AUDITS

12.1. QA Manager to Perform System Audits and Performance Audits

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

12.2. System Audits

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

12.3. Performance Audits

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

12.4. Follow-Up Actions

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

12.5. Audit Records

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

13. PREVENTIVE MAINTENANCE

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

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

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

14. QUALITY ASSURANCE REPORTS TO MANAGEMENT

14.1. Ongoing QA/QC Reporting

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

a) The Sample and QC Monitors shall report to the QA Manager regularly regarding progress of the applicable sampling program. The Sample and QC Monitors will

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also brief the QA Manager on any QA/QC issues associated with such sampling activities.

- b) The Analytical Laboratory shall maintain detailed procedures for laboratory record keeping. Each data set report submitted to the Mill's QA Manager or his staff will identify the analytical methods performed and all QA/QC measures not within the established control limits. Any QA/QC problems will be brought to the QA Manager's attention as soon as possible; and
- c) After sampling has been completed and final analyses are completed and reviewed, a brief data evaluation summary report will be prepared by the Analytical Laboratory for review by the QA Manager, by a Sampling and QC Monitor or by such other qualified person as may be designated by the QA Manager. The report will be prepared in accordance with NELAP and/or NAVLAP requirements and will summarize the data validation efforts and provide an evaluation of the data quality.

14.2. Periodic Reporting to Management

The QA Manager shall present a report to DUSA's ALARA Committee at least once per calendar year on the performance of the measurement system and the data quality. These reports shall include:

- a) Periodic assessment of measurement quality indicators, i.e., data accuracy, precision and completeness;
- b) Results of any performance audits, including any corrective actions;
- c) Results of any system audits, including any corrective actions; and
- d) Significant QA problems and recommended solutions.

15. AMENDMENT

This Plan may be amended from time to time by DUSA only with the approval of the Executive Secretary.

16. **REFERENCES**

16.1. United States Environmental Protection Agency, November 2004, Test Methods for Evaluating Solid Waste, EPA SW-846.

16.2. United States Environmental Protection Agency, September, 1986, RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD), Office of Solid Waste and Emergency Response, OSWER-9950.1.

16.3. United States Environmental Protection Agency, November 1992, RCRA Groundwater Monitoring Draft Technical Guidance (DTG), Office of Solid Waste.

16.4. Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. American Public Health Association, American Water Works Association, Water Environment Federation. Washington, D.C. p. 1-7.

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

Description of Sampling Event:	
	Sampler Name and initials
Date and Time for Purgingan	d Sampling (if different)
Well Purging Equip Used:pump orbailer	Well Pump (if other than Bennet)
Sampling Event	Prev. Well Sampled in Sampling Event
pH Buffer 7.0	pH Buffer 4.0
Specific ConductanceuMHOS/cm	Well Depth
Depth to Water Before Purging	Casing Volume (V) 4" Well:(.653h) 3" Well:(.367h)
Conductance (avg)	pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
Weather Cond Ext'l A	Amb. Temp.(prior to sampling event)
Time:Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
Turbidity	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Mill – Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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Turbidity	Turbidity				
Volume of Water Purged When Field Parameters are Measured					
Pumping Rate Calculation					
Flow Rate (Q), in gpm. S/60 =	Time to evacuate two casing volumes (2V) T = 2V/Q =				
Number of casing volumes evacuated (if other than two)					
If well evacuated to dryness, number of gallons evacuated					

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

Type of Sample	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	<u>Preservative Added</u> (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	Y N	100 ml	Y N	H ₂ SO ₄ Y N
Heavy Metals	Y N	250 ml	Y N	HNO ₃ Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments _____

Appendix A Chloroform Investigation Monitoring Quality Assurance Program White Mesa Uranium Mill Blanding, Utah Chloroform Investigation Monitoring Quality Assurance Program White Mesa Uranium Mill Blanding, Utah

This document sets out the quality assurance plan to be used by Denison Mines (USA) Corp. for Chloroform Investigation conducted pursuant to State of Utah Notice of Violation and Groundwater Corrective Action Order (UDEQ Docket No. UGW-20-01) (the "Order).

Specifically, the mill will use the same sampling regimen for the Chloroform Investigation that is utilized for groundwater sampling under its groundwater discharge permit, as set forth in the attached groundwater discharge permit Quality Assurance Plan (QAP), except as set forth below:

1) Dedicated Purge Pump

Chloroform Investigation samples are collected by means of dedicated bailer(s) that remain inside the well casing (suspended and secured with a rope) or by means of a disposable bailer used only for the collection of a sample only from an individual well and disposed subsequent to the sampling. The wells are purged by means of a portable pump. Each quarterly pumping and sample collection event begins at the location least affected by chloroform (based on the previous quarters sampling event) and proceeds by affected concentration to the most affected location. -. Decontamination of All sampling equipment will follow the decontamination procedure outlined in section 6.2.5 of the QAP.

2) Chloroform Investigation Sampling Frequency, Order and Locations

The chloroform investigation wells listed below are required to be monitored on a quarterly basis under State of Utah Notice of Violation and Groundwater Corrective Action Order UDEQ Docket No. UGQ-20-01. Chloroform wells shall be collected from the least contaminated to the most contaminated as based on the most recent quarterly results.

- MW-4
- TW4-1
- TW4-2
- TW4-3
- TW4-4
- TW4-5
- 2......
- TW4-6
- TW4-7

- TW4-11
- TW4-12
- TW4-13
- TW4-14
- (MW-26)
- TW4-16
- (MW-32)
- TW4-18
- TW4-19

- TW4-8
- TW4-9
- TW4-10

TW4-20

.

- TW4-21
- TW4-22
- TW4-23
- TW4-24
- TW4-25

<u>Note:</u> Wells MW-26 and MW-32may be monitored under either the Chloroform Investigation Program or the Groundwater Discharge Permit Monitoring Program.

3) Chloroform Investigation Sample Containers and Collection Volume

The chloroform investigation sampling program requires a specific number of sampling containers and the collection of specific volumes of sample. Accordingly, the following sample volumes are collected by bailer from each sampling location:

- For Volatile Organic Compounds (VOC), collect three samples into three separate 40 ml containers.
- For Nitrate/Nitrite determinations, collect one sample into a 100 ml container.
- For inorganic Chloride, collect one sample into a 100 ml container.
- 4) <u>Laboratory Requirements</u>

Collected samples which are gathered for chloroform investigation purposes are delivered to an outside laboratory where the requisite analyses are performed. At the laboratory the following analytical specifications must be adhered to:

Analytical Parameter	Analytical Method	Reporting Limit	Maximum Holding Times	Sample Preservation Requirement	Sample Temperature Requirement
Nitrate & Nitrite (as N)	E353.2	0.1 mg/L	28 days	H_2SO_4 to pH<2	$\leq 6^{\circ}C$
Carbon Tetrachloride	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Chloroform	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}$ C
Dichloromethane (Methylene Chloride)	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}C$
Chloromethane	SW8260B	1.0 μg/L	14 days	HCl to pH<2	$\leq 6^{\circ}$ C
Inorganic Chloride	A4500-CI B	1 mg/L	28 days	None	$\leq 6^{\circ} C$

5) Field Parameters

In the case of chloroform pumping wells only one set of field parameters is

required to be measured prior to sampling. This includes the following weills: MW-4, MW-26, TW-4-19 and TW-4-20.

6) Chloroform Investigation Reports

The Chloroform Investigation Reports will include the following information:

- a) Introduction
- b) Sampling and Monitoring Plan
 - Description of monitor wells
 - Description of sampling methodology, equipment and decontamination procedures
 - Identify all quality assurance samples, e.g. trip blanks, equipment blanks, duplicate samples
 - ٠
- c) Data Interpretation
 - Interpretation of groundwater levels, gradients, and flow directions. Interpretations wold include a discussion on: 1) A current site groundwater contour map, 2) hydrographs to show groundwater elevation in each monitor well over time, 3) depthe to groundwater measured and groudnwateelevation form each monitor well summarized in a data table, that includes historic groundwater level data for each well, and 4) an evaluation of rhe effectiveness of hydraulic capture of all contaminants of concern.
 - Interpretation of all analytical results for each well, including a discussion on: 1) a current chloroform isoconcentration map with one of the isosconentration lines showing the 70 ug/L boundary, 2) graphs showing chloroform concentration trends in each well thru time and, 3) analytical results for each well summarized in a data table, that includes historic analytical results for each well.
 - Calculate chloroform mass removed by pumping wells. Calculations would include: 1) total historic chloroform mass removed, 2) total historic chloroform mass removed for each pumping well, 3) total chloroform mass removed for the quarter and, 4) total chloroform mass removed form each pumping well for the quarter.
- d) Conclusions and Recommendations
- e) Electronic copy of all laboratory results for groundwater quality monitoring conducted during the quarter.
- f) Copies of DUSA field records, laboratory reports and chain of custody forms.

Except as otherwise specified above, the Mill will follow the procedure set out in the Mill's groundwater discharge permit QAP.

Attachment 4 Initial Nitrate Monitoring Report

White Mesa Uranium Mill

Initial Nitrate Monitoring Report

State of Utah Stipulated Consent Agreement Docket No. UGW09-03

2009 Sampling Events

Prepared by:

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

December 30, 2009

1. INTRODUCTION

This is the Initial Nitrate Monitoring Report pertaining to sampling and data collection efforts which were completed for the purposes of conducting a Nitrate Investigation pursuant to the Stipulated Consent Agreement between Denison Mines USA Corp ("Denison") and the State of Utah Department of Environmental Quality ("UDEQ"), Docket No.UGW09-03. Due to the fact that elevated chloride concentrations appear to be associated with the elevated concentrations of nitrate, an investigation of the elevated concentrations of chloride is also included in the nitrate investigation.

Data interpretation and evaluative findings related to the Investigation are included in the Nitrate Contamination Investigation Report prepared by INTERA, Inc., to which this Report is attached. Presentation, evaluation and validation of field and laboratory data obtained during the course of the Investigation are included in this Initial Nitrate Monitoring Report.

2. SAMPLING AND MONITORING PLAN

2.1. **Description of Monitor Wells Sampled During the Quarter**

During the Quarter, the following nitrate contaminant investigation groundwater samples and measurements were taken:

2.1.1. Groundwater Monitoring Locations

Groundwater Monitoring was performed in all of the nitrate monitoring wells which were completed for the purposes of the nitrate investigation, being the following wells:

- TWN-1
- TWN-2 •
- TWN-3 .
- TWN-4
- TWN-5
- TWN-6
- TWN-7 .
- TWN-8 •
- TWN-9 ٠
- **TWN-10**

- **TWN-11** .
- **TWN-12** •
- **TWN-13** .
- **TWN-14** .
- **TWN-15**
- **TWN-16** .
- **TWN-17** .
- **TWN-18** .
- **TWN-19**
- The locations of these wells are indicated on the map attached under Tab A.

2.1.2 Additional Investigatory Measurements

In addition to these locations, certain measurements and samples were obtained from peizometers; P1, P2, P3, P4, P5; the upper wildlife pond & "frog pond"; MW18; and MW19. The laboratory results of these samplings are included with the results of

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laboratory analysis and quality assurance documentation under Tab F of this report, and the Field Data Worksheets for those samplings are provided at Tab B.

Regularly scheduled sampling of compliance monitoring wells under the Mill's State of Utah Groundwater Discharge Permit No UGW370004 (the "GWDP") and under the chloroform investigation for nitrate and chloride are reported in the applicable quarterly groundwater monitoring reports for those sampling events.

2.1.3 <u>Constituents Monitored</u>

Wells sampled as an element of the Nitrate Investigation were analyzed for the following constituents:

- Nitrogen, Nitrate + Nitrite as N
- Chloride

2.1.4 Groundwater Head Monitoring

Depth to groundwater measurements were taken in the following wells and/or piezometers at the time of sample collection for the purposes of the Nitrate Investigation:

- a) All nitrate contaminant investigation wells listed in paragraph 2.1.1 above; and
- b) Site Piezometers P-1, P-2, P-3, P4, and P5 (Routine GWDP 12-11-09)

2.2. Sampling Methodology, Equipment and Decontamination Procedures

The sampling methodology, equipment and decontamination that were applied to the nitrate contaminant investigation can be summarized as follows:

2.2.1 <u>Well Purging and Depth to Groundwater</u>

a) A list was prepared of the wells in order of increasing nitrate contamination. The order for purging was established in accordance with this listing. Mill personnel started purging with the lowest concentration well (as initially determined by nitrate field test strips and later by means of laboratory results as the Investigation proceeded) and then moved to the more contaminated wells in order of nitrate contamination; and

With respect to sampling that was done prior to October 29, 2009, before leaving the Mill office, the pump and hose were decontaminated utilizing the cleaning agents described in Section 6.2.5 of the White Mesa Mill Groundwater Monitoring Quality Assurance Plan (QAP) (the "QAP"). Mill personnel then proceeded to the first well, that being the well indicating the lowest concentration of nitrate either at the time of well construction or by means of further laboratory analyses as the project proceeded. Well depth measurements were taken and the two casing volumes were calculated (measurements were made using the same.

instrument used for the monitoring wells under the GWDP). The Grundfos pump (a 6 gpm pump) was then lowered to the bottom of the well and purging was begun. At the first well, the purge rate was established for the purging event by using a calibrated 5 gallon bucket. After the evacuation of the first well had been completed, the pump was removed from the well and the process was repeated at each well location moving from least contaminated to most contaminated location. All wells were capped and secured prior to leaving the sampling location.

For wells sampled during the 3rd and 4th Quarter Events, and subsequent to discussion with UDEQ on October 29, 2009, the procedure of advancing the sampling sequence in order of least contaminated to most contaminated was followed but the decontamination process was modified to include the cleansing agents specified at Section 6.2.5 of the QAP. More specifically, prior to October 29, 2009 the sampling technicians believed that decontamination pursuant to Section 6.2.5 of the QAP was to be conducted prior to each sampling event and each sampling day. However, the discussions with UDEQ on October 29, 2009 revealed that this practice was in error. Instead, decontamination of non-dedicated sampling equipment is required between each sample location. Accordingly, for the October sampling event technicians decontaminated the pumping equipment between each sample location, this in addition to the event and daily cleaning practices that were already in place.

2.1.2 <u>Well Sampling</u>

- a) Following the purging of all nitrate investigation wells, the sampling took place (usually the next morning). Prior to leaving the Mill office to sample, a cooler containing ice was prepared. A trip blank was not required as the sampling event did not include analyses for Volatile Organic Compounds. Once Mill Personnel arrived at the well sites, labels were filled out for the various samples to be collected. All personnel involved with the collection of water and samples were outfitted with rubber gloves to avoid sample contamination. Nitrate investigation samples were collected by means of disposable bailers and the wells were purged by means of a non-dedicated portable pump.
- b) As described in 2.2.1.b) above, each pumping and sample collection event began at the location least affected by nitrate and proceeded by affected concentration to the most affected location. With respect to sampling done prior to October 29, 2009, the non-dedicated portable pump was decontaminated prior to each purging/sampling event and between sample locations, and the QA rinsate sample was collected after said decontamination but prior to the commencement of the next sample collection. In response to discussions held with UDEQ on October 29, 2009 relative to purging and decontamination of sampling equipment, Mill sampling personnel were re-instructed as to decontamination procedures in accordance with Section 6.2.5 of the QAP and the purging practices required by Section 6.2.7.e). Accordingly, samples collected after

October 29, 2009 were compliant with the QAP requirements as to decontamination between sampling events. Prior samplings were collected under past practices which were found to be errant in discussions with UDEQ on October 29, 2009 and subsequent to those sample collections. Purging volumes and field parameter stability are discussed in further detail under Section 3.3.3.b) below.

- c) Mill personnel used a disposable bailer to sample each well. The bailer was attached to a reel of approximately 150 feet of nylon rope and then lowered into the well. After coming into contact with the water, the bailer was allowed to sink into the water in order to fill. Once full, the bailer was reeled up out of the well and the sample bottles provided by the Analytical Laboratory were filled as follows;
 - a) A 500 ml sample was collected for Nitrate/Nitrite. This sample was not filtered but was preserved with H₂SO₄; and
 - b) A 500 ml sample was collected for Chloride. This sample was not filtered and was not preserved
- d) After the samples had been collected for a particular well, the bailer was disposed of and the samples were placed into the cooler containing ice for sample preservation during transit to the Mill's contract analytical laboratory. The well was then recapped and Mill personnel proceeded to the next well.
- 2.1.3. Ponds and Piezometers
 - a) Upper Wildlife Pond and Frog Pond

Grab samples were taken from the Upper Wildlife Pond using a disposable bailer. Sample bottles were filled as per Section 2.1.2(c) above. After the samples were taken, the procedures described in Section 2.1.2 (d) above were followed.

b) Piezometers

The Plan and Schedule for Nitrate Contamination Investigation Report and Groundwater Corrective Action Plan, White Mesa Uranium Mill Site, Blanding Utah, dated November 2008, prepared by INTERA, Inc., contemplates Denison taking samples from piezometers 2 and 3, if possible. In fact, Mill staff were able to sample piezometers, 1, 2 and 3 by use of a disposable bailer, following the procedures described in Section 2.1.2(c) above. However, due to the difficulty in obtaining samples from the piezometers, the purging protocols set out in the QAP were not able to be followed.

After the samples were taken, the procedures described in Section 2.1.2(d) above were followed.

2.3 Field Data Worksheets

Attached under Tab B are copies of all Field Data Worksheets that were completed in 2009 during the nitrate investigation for the sampling locations listed in paragraph 2.1.1 above and sampled during the course of the investigation. Investigation samples were collected during six sampling events:

- February 6, 2009 and received by the Laboratory on February 10, 2009;
- July 21, 2009 and received by the Laboratory on July 23, 2009;
- August 25, 2009 and received by the Laboratory on August 28, 2009;
- September 21 & 22, 2009 and received by the Laboratory on September 23, 2009;
- October 27 & 28, 2009 and received by the Laboratory on October 29, 2009; and
- November 2, 3 & 4 received by the Laboratory on November 6, 2009 and November 10, 2009 received by the Laboratory on November 12, 2009.

2.4 Depth to Groundwater

Depth to Water for the monitoring of Nitrate Investigation wells during the period of the investigation was recorded on the Field Data Work Sheet for each well sampled. Depth-to-groundwater measurements were collected for each sampling event and were utilized for the Investigation to depict groundwater contours (Tab C) and are included on the Field Data Worksheets at Tab B of this report.

3. DATA INTERPRETATION

3.1. Interpretation of Groundwater Levels, Gradients and Flow Directions.

3.1.1 Current Site Groundwater Contour Map

The contour map (Tab C) uses data for the wells and peizometers listed in Sections 2.1.1 and 2.1.2 above, based on groundwater levels taken on December 11 and 14, 2009.

3.1.2 Hydrographs

Attached under Tab D are hydrographs showing groundwater elevation in each nitrate contaminant investigation monitor well and piezometer listed in Sections 2.1.1 and 2.1.2, based on groundwater levels taken on December 11 and 14, 2009.

3.1.3 Depth to Groundwater Measured and Groundwater Elevation

Attached under Tab E are tables showing the depth to groundwater measured during the course of the Nitrate Investigation for each of the wells and piezometers listed in Sections 2.1.1 and 2.1.2 above.

3.1 Analytical Results

3.2.1 <u>Copy of Laboratory Results</u>

Included under Tab F of this Report are copies of all laboratory analytical results for the groundwater quality samples collected in 2009 during the Nitrate Investigation.

3.2.2 <u>Electronic Data Files and Format (Tab G)</u>

DUSA is providing the Executive Secretary an electronic copy of all laboratory results for groundwater quality monitoring conducted under the Nitrate Investigation, in Comma Separated Values (CSV). These transmissions will be sent via email on or before January 4, 2010.

3.2.3 Current Nitrate Isoconcentration Map

Included under Tab C of this Report are current nitrate and chloride isoconcentration maps for the Mill site.

3.2.4 Data and Graphs Showing Nitrate and Chloride Concentration

Attached under Tab H is a table summarizing nitrate and chloride values reported in 2009 for each sampling point under investigation.

Attached under Tab I are graphs showing nitrate and chloride concentration trends in each sampling point during 2009

3.3. Quality Assurance Evaluation And Data Validation

Quality assurance evaluation and data validation procedures described in the Mill's Quality Assurance Program for Groundwater Monitoring (QAP) were in effect at the time of sampling events and were deemed applicable to the Nitrate Investigation. These procedures involve three basic types of evaluations: Field QC checks; Analytical Laboratory checks; and checks performed by DUSA personnel, as described below.

3.3.1 Field QC Checks

Field Quality Control samples for the Nitrate Investigation consisted of a field duplicate samples, DI blank samples and equipment rinsate samples. The results of these analyses are included with the routine analyses under Tab F.

3.3.2 <u>Analytical Laboratory QA/QC Procedures</u>

The Analytical Laboratory has provided summary reports of the analytical quality assurance/quality control (QA/QC) measurements necessary to maintain conformance

with NELAC certification and reporting protocols. The Analytical Laboratory QA/QC Summary Report, including copies of the Mill's Chain of Custody and Analytical Request Record forms, for the Nitrate Investigation, are included under Tab F.

3.3.3 <u>Mill QA Manager Review</u>

The Mill QA Manager, which, for these sampling events was DUSA's Manager of Environmental Affairs, performed four types of reviews: a determination of whether Mill sampling personnel followed Mill sampling procedures; a review of the results from the Field QC Checks; a review of analytical reports for holding times and qualifying indicators for the data; and a review of the Analytical Laboratory QA/QC analysis. The results of the QA Manager's review are discussed below.

a) Adherence to Mill Sampling SOPs

On a review of adherence by Mill personnel to the sampling procedures summarized in Section 2.2 above, the QA Manager concluded that the preparation of samples, transfer to the Laboratory, and chain of custody procedures were adhered to. Matters related to purging of wells and field parameter measurements are evaluated under Section 3.3.3.b) below.

b) Results From Field QC Checks

The QA Manager has implemented a documented review of field data which is displayed on the Field Parameter Evaluation Table below:

Location	Date	Field Sheet Note of Interest	2 X Casing Vol ?	Field Parameters within 10%?	QA Exception
TWN-1	2-6-09	66 gal pumped 78 required	No	Only one set Parameters	Purge VolStable Conditions not determined
TWN-2	2-6-09	Purge data not recorded	No	Only one set Parameters	Purge VolStable Conditions not determined
TWN-3	2-6-09	Purge volume sufficient	Yes	Only one set Parameters	Stable Conditions not determined
TWN-4	2-6-09	96 gal pumped 97.42 required	No	Only one set Parameters	Purge VolStable Conditions not determined
MW-18	7-14-09	Pumped to Dryness	No	Yes	Purge Vol.
MW-19	7-14-09	Pumped to Dryness	No	Yes	Purge Vol.
TWN-1	7-21-09	Purge volume sufficient	Yes	Only one set Parameters	Stable Conditions not determined
TWN-2	7-21-09	102 gal pumped 103 required	No	Only one set Parameters	Purge VolStable Conditions not determined
TWN-3	7-21-09	81.6 gal pumped 82 required	No	Only one set Parameters	Purge VolStable Conditions not determined

Field Parameter Evaluation Table

Location	Date	Field Sheet Note of Interest	2 X	Field Parameters within	QAException
			Casing	= 10%?	
TWN-4	7-21-09	Purge volume sufficient	Vol.? Yes	Only one set Parameters	Stable Conditions not
1 11 11-1	/-21-07		105	Only one set ratameters	determined
TWN-5	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge Vol Stable Conditions
				y	not determined
TWN-6	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge VolStable Conditions not
					determined
TWN-7	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge VolStable Conditions not
TWN-8	0.07.00				determined
1 WIN-8	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge VolStable Conditions not determined
TWN-9	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge VolStable Conditions not
1 111 2	0 27 05	initial rest raige volume enknown	110	Only one set I afameters	determined
TWN-10	8-27-09	Purge volume sufficient	Yes	Only one set Parameters	Stable Conditions not
				,	determined
TWN-1	9-22-09	75.6 gal pumped 76 required	No	Only one set Parameters	Purge VolStable Conditions not
					determined
TWN-2	9-22-09	102 gal pumped 103 required	No	Only one set Parameters	Purge VolStable Conditions not
THAT O	0.00.00		77	0.1	determined
TWN-3	9-22-09	Purge volume sufficient	Yes	Only one set Parameters	Stable Conditions not
TWN-4	9-22-09	114 gal pumped 115.44 required	No	Only one set Parameters	determined Purge VolStable Conditions not
1 1114-4	<i>J-22-0)</i>	114 gai pumpeu 115,44 required	110	Only one set I afameters	determined
TWN-5	9-22-09	102 gal pumped 103.6 required	No	Only one set Parameters	Purge VolStable Conditions
TWN-6	9-22-09	Purge volume sufficient	Yes	Only one set Parameters	Stable Conditions not
				,	determined
TWN-7	9-22-09	Purge volume sufficient	Yes	Only one set Parameters	Stable Conditions not
				<u> </u>	determined
TWN-8	9-22-09	108 gal pumped 108.54 required	No	Only one set Parameters	Purge VolStable Conditions not
TWN-9	9-22-09	Denne an lange av fille in st	37		determined
1 WIN-9	9-22-09	Purge volume sufficient	Yes	Only one set Parameters	Stable Conditions not determined
TWN-10	9-22-09	Purging Info Not Recorded	No	Only one set Parameters	Purge VolStable Conditions not
101010	5 22 05		110	Only one set I arameters	determined
TWN-1	10-28-09	Pumped for 14 minutes instead of	No	Only 1 Set of Parameters	Rounding Error Purge Vol
		14.25 minutes		,	Stable Conditions
TWN-2	10-28-09	Purge volume sufficient	Yes	4 Sets of Parameters	Conditions not stable for
					turbidity and turbidity exceeds 5
				1.0	NTU
TWN-3	11-2-09	Purge volume sufficient	Yes	4 Sets of Parameter	Conditions not stable for
					turbidity and turbidity exceeds 5 NTU
TWN-4	10-28-09	Min Pumped 19 vs. 19.5 required	No	Only one set Parameters	Rounding error Purge Vol.
1 11 1	10 20 09	ninit unpour 15 to: 15.5 required	.10	Only one set I utumeters	Conditions for stability test not
					met.
TWN-5	11-10-09	102 gal pumped vs. 103.64 required	No	4 Sets of Parameters	Rounding error Purge
			ľ		Conditions for stability test not
-	11.0.00				met for pH and Turbidity
TWN-6	11-3-09	Purge volume sufficient	Yes	4 Sets of Parameters	Conditions for stability test not
TWN-7	11-10-09	18 gal pumped 19 gal required	No	4 Sets of Parameters	met for Turbidity
T AA TA-1	11-10-09	to gai pumpeu 19 gai required	091	+ Sets of Parameters	Rounding error Purge Vol.
					Conditions for stability test not met for Turbidity and turbidity

Location	Date	Field Sheet Note of Interest	2 X	Field Parameters within	QA Exception
			Casing	10%?	
			Vol.?		
TWINT O	11-3-09	Deres and here a CC's '			exceeds 5 NTU
TWN-8	11-3-09	Purge volume sufficient	Yes	4 Sets of Parameters	Conditions for stability test not met for Turbidity
TWN-9	11-10-09	Purge volume sufficient	Yes	4 Sets of Parameters	Conditions for stability test not met for pH and Turbidity and Turbidity exceed 5 NTU
TWN-10	11-10-09	45.26 gal required 42gal pumped	No	4 Sets of Parameters	Rounding error Purge. Conditions for stability test not met for pH and Turbidity and Turbidity exceed 5 NTU
TWN- 11	11-3-09	Purge volume sufficient	Yes	4 Sets of Parameters	Conditions for stability test not met for Turbidity and Turbidity exceed 5 NTU
TWN-12	11-3-09	90 gal pumped 91.5 required	No	4 Sets of Parameters	Rounding error Purge Conditions for stability test not met for Turbidity and Turbidity exceed 5 NTU
TWN-13	11-4-09	90 gal pumped 94.8 required	No	4 Sets of Parameters	Rounding error Purge. Conditions for stability test not met for Turbidity and Turbidity exceed 5 NTU
TWN-14	11-4-09	90 gal pumped 93.6 required	No	4 Sets of Parameters	Rounding error Purge Stable Conditions achieved but Turbidity exceed 5 NTU
TWN-15	11-10-09	Purge volume sufficient	Yes	4 Sets of Parameters	Conditions for stability test not met for Turbidity and Turbidity exceed 5 NTU
TWN-16	11-4-09	Purge volume sufficient	Yes	4 Sets of Parameter s	Conditions for stability test not met for Turbidity and Turbidity exceed 5 NTU
TWN-17	11-4-09	96 gal pumped 97.16 required	No	4 Sets of Parameters	Rounding error Purge. Conditions for stability test not met for Conductance and Turbidity. Turbidity exceed 5 NTU
TWN-18	11-2-09	108 gal pumped 112.8 required	No	4 Sets of Parameters	Rounding error. Conditions for stability test not met for Turbidity and Turbidity exceed 5 NTU
TWN-19	11-2-09	Purge volume sufficient	Yes	4 Sets of Parameters	Conditions for stability test not met for Turbidity and Turbidity exceed 5 NTU

As is indicated on the Table, some samples collected for the Nitrate Investigation failed to meet the minimum purge volume requirement and two sets of stable field parameters were not recorded for samples collected prior to the 4th Quarter event. For the 4th Quarter event, subsequent to the discussions with UDEQ regarding decontamination and purging, four sets of field parameters were recorded and evacuation of two casing volumes was intended for all wells but fell short in some instances by 1-5 gallons due to the technicians rounding the amount of pumping time required. While more than one set of

field parameters were recorded for the 4^{th} Quarter event, several locations did not comport with the 10% stability requirement for turbidity (and in one instance conductance) and turbidity measurements were often greater than 5 NTU.

With regard to decontamination, sampling personnel believed that the process of decontaminating prior to each sampling day and proceeding from the least contaminated to most contaminated well was within the QAP guidelines. In recent discussions with UDEQ on October 29, 2009 it became apparent that the sampling pump must be decontaminated between each sample location in accordance with Section 6.2.5 of the QAP. Decontamination between sample locations was initiated with the 3rd Quarter event and continued for the 4th Quarter event. Rinsate samples collected for the 3rd and 4th Quarter sampling events revealed trace chloride residual in some instances but no nitrate.

De-ionized blank water samples, rinsate samples, and field duplicate samples were collected during the Nitrate Investigation as indicated below:

<u>February Event-Initial Sampling after completion of TWN-1 through TNW-4</u> TWN-60-DI Blank-Nitrate and Chloride were not detected TWN-63-Rinsate Sample- Nitrate and Chloride were not detected

July Event-Normal Sampling Event

TWN-60- DI Blank-Nitrate and Chloride were not detected TWN-63-Rinsate Sample-Nitrate and Chloride were not detected TWN-64-Rinsate Sample-Nitrate and Chloride were not detected TWN-65-Duplicate of TWN-4-RPD within +/- 20% guidance

<u>August Event-Initial Sampling after well completion (TWN-5 through TWN-10)</u> No duplicates, DI Blanks or Rinsate Samples were collected

September Event-Normal Sampling Event TWN-0- DI Blank-Nitrate and Chloride were not detected TWN-6D-Duplicate of TWN-6- RPD within +/- 20% guidance

It is noted by this review that duplicate samples were not collected for the initial sampling events but were collected for routine sampling episodes.

c) Review of Laboratory Analytical Information

A review of the analytical results and accompanying Laboratory QA data indicated that all parameters were within specified holding times, the temperature of samples on receipt at the Lab was within specification, some qualifiers were attached for increasing the detection limit due to matrix interference but the parameters being analyzed were detected, and laboratory duplication (RPD) and recovery data were within acceptable Laboratory guidance. The QA Manager reviewed the Analytical Laboratory's QA/QC Summary Reports and made the following conclusions;

i. Check samples were analyzed for each method used in analyzing the Nitrate investigation samples. These methods were:

Parameter	Method	
Nitrogen, (Nitrate + Nitrite as N)	E353.2	
Chloride	A4500-CL B and E300.0	

- ii. The check samples included at least the following: a method blank, a laboratory control spike (sample), a matrix spike and a matrix spike duplicate;
- iii. All qualifiers, if any and the corresponding explanations in the summary reports are reviewed by the QA Manager. The only qualifiers reported were for matrix interference in some of the analyzed monitoring location samples. However, despite the increase in detection limit, sample results were detected.

The laboratory holding time for all analyses was within specification and sample temperature was acceptable upon receipt.

4.0 Corrective Actions

Based upon the review of sample procurement and the exceptions noted in Section 3.3.3.b) above, sample collection activities require improvement. Accordingly, necessary corrective actions in accordance with Section 10 of the QAP are as described below:

4.1 Identification and definition of the problem

The problems identified during the review of Field Data Worksheets included:

- Failure to decontaminate non-dedicated pumping equipment between sampling locations during the February, July and August sampling events.
- Failure to evacuate 2 casing volumes during purging operations,
- Failure to measure at least 2 field parameter data sets within +/- 10%, and
- Failure to maintain turbidity below 5 NTU in collected samples.

4.2 Assignment of responsibility for investigating the problem

The problem is being investigated by the QA Manager.

4.3 Investigation and determination of cause of the problem

The following findings and steps have been taken in response to the QAP exceptions noted by the QA Manager.

a) Sampling Equipment Decontamination

Sampling personnel believed that the process of decontaminating prior to each sampling day and proceeding from the least contaminated to most contaminated well was within the QAP guidelines. However, in discussions with UDEQ on October 29, 2009 it became apparent that the sampling pump must be decontaminated between each sample location in accordance with Section 6.2.5 of the QAP. Further investigation as to why turbidity was not measured in all wells is ongoing at the time of this writing.

b) Evacuation of 2 Casing Volumes and Attaining Stable Conditions Prior to Sampling

Prior to the 4th Quarter sampling event sampling personnel believed that sampling could occur if either 2 casing volumes had been evacuated or if stable parameters were indicated. However, in discussions with UDEQ on October 29, 2009 it became apparent that both conditions (evacuation of 2 casing volumes and attainment of stable parameters) must occur before a sample can be collected. Accordingly, for the 4th Quarter it was intended that these conditions would be met. As to casing volumes, the technicians rounded sampling times such that small quantities (1-5 gallons) were often missed during the evacuation process. Regarding stable parameters, with the exception of one conductance test, the stability of sample collection efforts when compromised was the result of unstable turbidity measurements.

c) Turbidity in Excess of 5 NTU at Sample Collection

Sample technicians have not been diligent with regard to samples meeting the 5 NTW turbidity specification.

4.4 **Determination of a corrective action to eliminate the problem**

Sampling personnel have been informed that the procedures outlined in the QAP for well purging with regard to evacuation of 2 casing volumes and at least 2 sets of field parameters within 10% RPD must be adhered to. In addition, sampling personnel have been informed that non-dedicated sampling equipment must be decontaminated before each sampling event and between each individual sample location in accordance with Section 6.2.5 of the QAP. Sampling personnel have been informed that turbidity measurements must be below 5 NTU prior to sample collection and that filed parameters, including turbidity, must fall within +/- 10% prior to sampling. Sampling personnel are required to read the QAP at least annually and as required in order to ensure compliance.

4.5 Assigning and accepting responsibility for implementing the corrective action

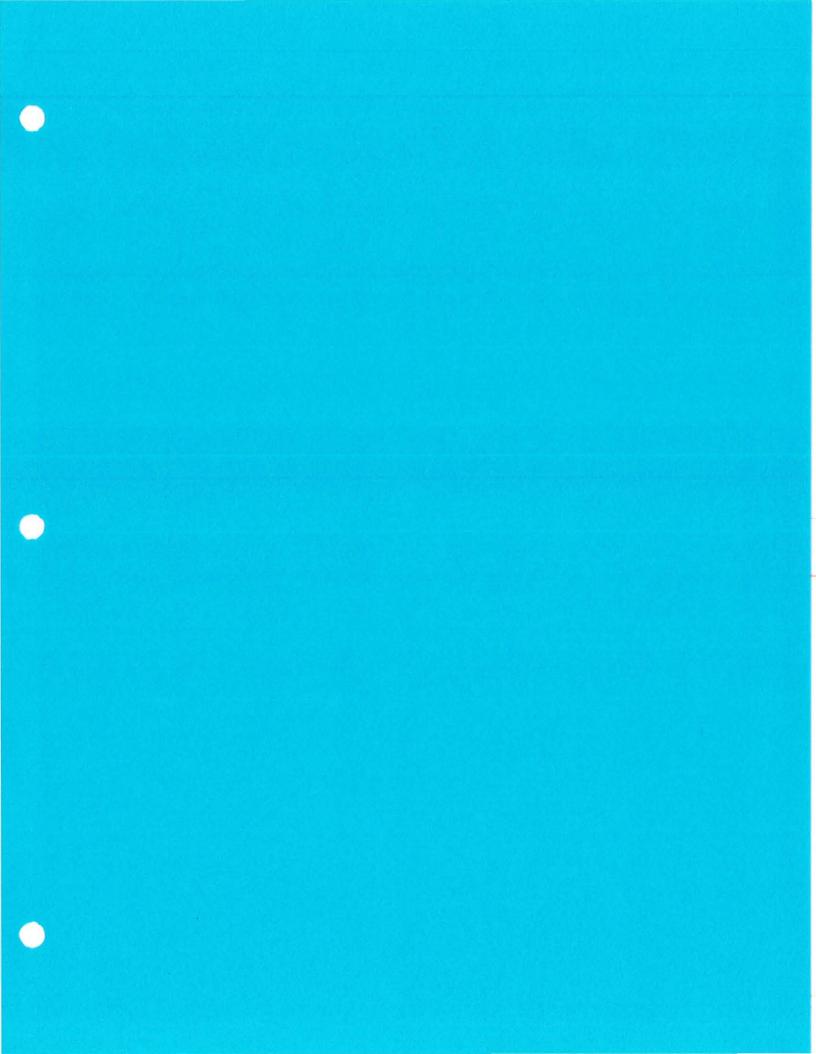
It will be the responsibility of the RSO and sampling technicians to implement the corrective action.

4.6 Implementing the corrective action and evaluating its effectiveness

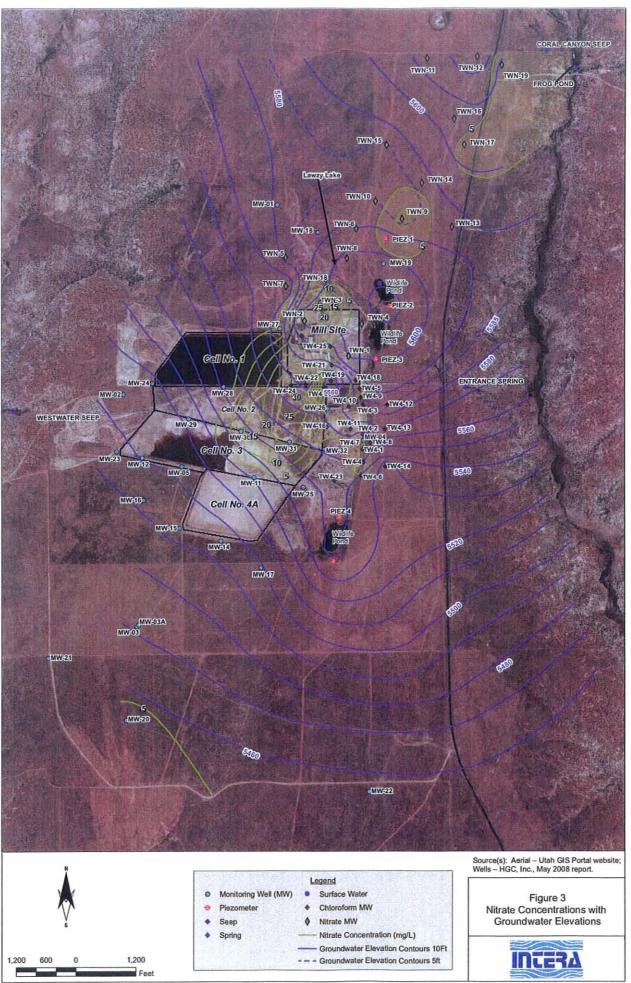
Implementation of the corrective action has occurred by means of the notifications cited under item 4.4 above.

4.7 Verifying that the corrective action has eliminated the problem

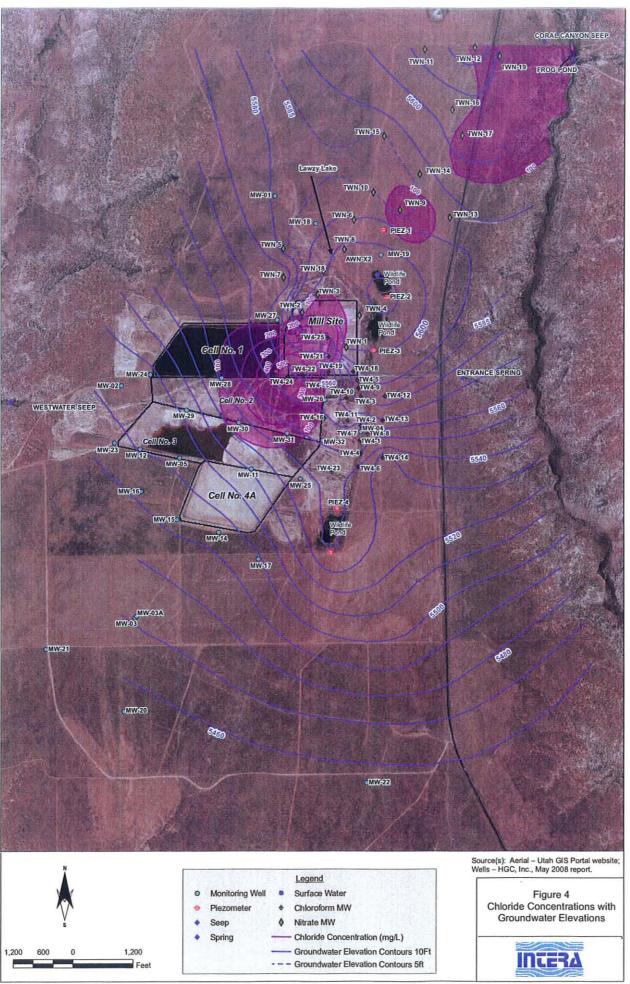
Verification that the corrective action has eliminated the problem will occur subsequent to the receipt of all field sheets for the next sampling event.



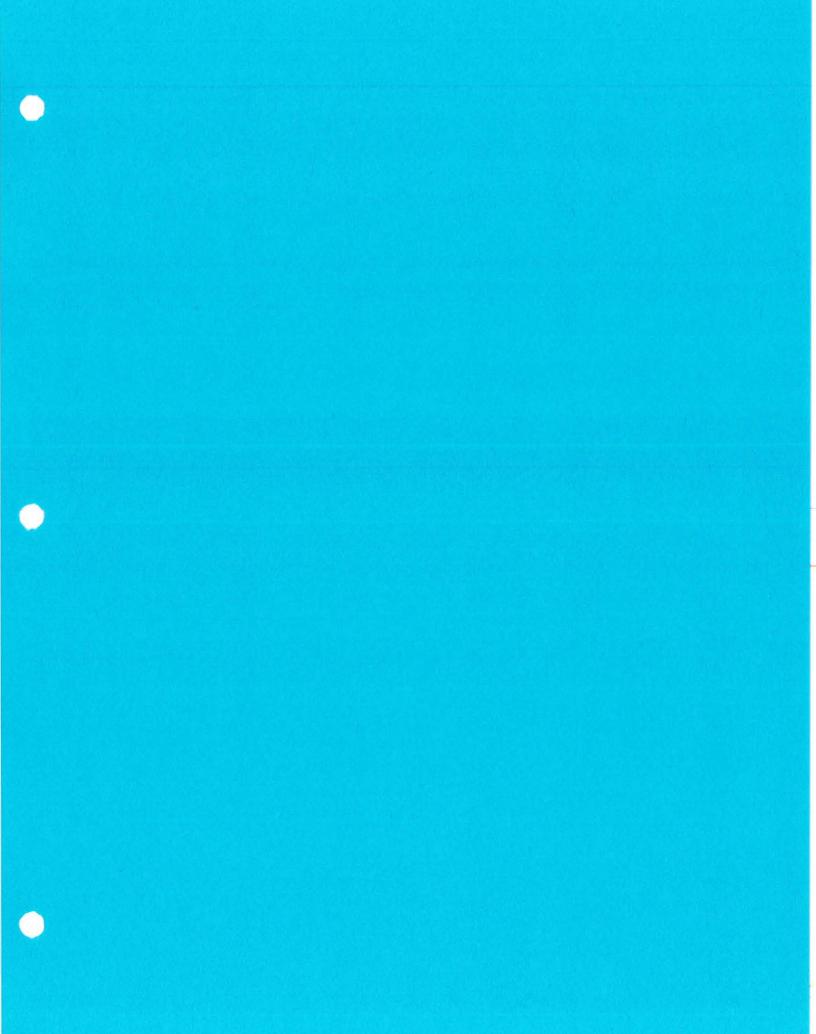
Tab A



S:\Projects\IUC-001-01-001 Denison Mines\GIS\mapdocs\20091223NitrateMap.mxd



S:\Projects\IUC-001-01-001 Denison Mines\GIS\mapdocs\20091223ChlorideMap.mxd



Tab B

February Sampling Event

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Mill – Groundwater Discharge Permit Groundwater Monitoring	Date: 2.25.07 Revision: 2
Quality Assurance Plan (QAP)	Page 40 of 41
2	a set of set of
	<u>itachment 1</u> Iesa uranium mill
	ILSA URANIONI WILL KSHEET FOR GROUND WATER
Description of Sampling Event: Nitrate	
Location (well name) 700-1	Sampler Name and initials Janner H. Ryan P.
10 A C	and Sampling (if different)
Well Purging Equip Used: bail	iler Well Pump (if other than Bennet) Grand Fos
Sampling Event <u>N # C</u>	
pH Buffer 7.0 7.6	pH Buffer 4.0 <u>4.0</u>
Specific Conductance 998 uMHOS/cm	Well Depth 112.5 (106 FT
Depth to Water Before Purging 47.71	Casing Volume (V) 4" Well: 34.14 (.653h)
	3" Well:(.367h)
Conductance (avg)	pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
Well Water Temp. (avg)	Redox Potential (Eb)Turbidity Amb. Temp.(prior to sampling event) / S
Well Water Temp. (avg) Weather Cond Ext'l	Redox Potential (Eb)Turbidity Amb. Temp.(prior to sampling event) / S C
Well Water Temp. (avg) Weather Cond Ext'l Time: Gal. Purged Conductance732.]	Redox Potential (Eh)Turbidity Amb. Temp.(prior to sampling event) / & C Time: Gal. Purged
Well Water Temp. (avg) Weather Cond Ext'l Time: Gal. Purged Conductance732	Redox Potential (Eh) Turbidity Amb. Temp.(prior to sampling event) _/ & C Time: Gal. Purged Conductance Conductance
Well Water Temp. (avg) Weather Cond Ext'l Time:Gal. Purged Conductance732.] pH7.62	Redox Potential (Eb) Turbidity Amb. Temp.(prior to sampling event) _/ & C Time: Gal. Purged Conductance pH
Well Water Temp. (avg) Weather Cond Ext'l Time:Gal. Purged Conductance732.] pH7.62 Temperature]4.45	Redox Potential (Eh) Turbidity Amb. Temp.(prior to sampling event) _/ & C Time: Gal. Purged Conductance
Well Water Temp. (avg) Weather Cond Ext'l Time:Gal. Purged Conductance732.] pH7.62 Temperature14.45 Redox Potential (Eh)_405	Redox Potential (Eh) Turbidity Amb. Temp.(prior to sampling event) _/ & 'C. Time: Gal. Purged Conductance pH
Well Water Temp. (avg) Weather Cond Ext'l Time:Gal. Purged Conductance732.] pH7.62 Temperature14.45 Redox Potential (Eh)405 Turbidity7.00	Redox Potential (Eh) Amb. Temp.(prior to sampling event) / 8 °C Time:Gal. Purged Conductance pH Temperature Redox Potential (Eh) Turbidity
Well Water Temp. (avg) Weather Cond Ext'l Time:Gal. Purged Conductance732.] pH7.62 pH7.62 Temperature14.45 Redox Potential (Eh)405 Turbidity7.100 Fime:Gal. Purged	Redox Potential (Eh) Amb. Temp.(prior to sampling event) _/ & 'C Time: Gal. Purged Conductance pH Temperature Redox Potential (Eh) Turbidity Time: Gal. Purged
Well Water Temp. (avg) Weather Cond Ext'l Time:Gal. Purged Conductance732.] pH7.62 Temperature14.45 Redox Potential (Bh)_405 Turbidity7 100 Fime:Gal. Purged Conductance	Redox Potential (Eh)Turbidity Amb. Temp.(prior to sampling event) / & 'C. Time:Gal. Purged Conductance pH Temperature Redox Potential (Eh) Turbidity
Well Water Temp. (avg) Weather Cond Ext'l Time:Gal. Purged Conductance32.] pH7.62 TemperatureUUS Redox Potential (Eh)UOS Turbidity7 100 Fime:Gal. Purged Conductance OH	Redox Potential (Eh)

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 Turbidity______
 Turbidity______

 Volume of Water Purged When Field Parameters are Measured______

Date: 11.17.06 Revision: 1

Pumping Rate Calculation

Flow Rate	e (Q), in gpm.	1	Time to evacuate two casing volumes (2V)
S/60 = =		6	T = 2V/Q = // m/n
		and the stars	
Number o	t casing volum	es evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated_____

Name of Certified Analytical Laboratory if Other Than Energy Labs____

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<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> <u>(circle)</u>	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N ~~	HCL Y N
Nutrients	Ø N	100 ml	Y (N)	H ₂ SO ₄ ON
Heavy Metals	Y N	250 ml	YN	HNO3 Y N
All Other Non- Radiologics	OP N	250 ml	Y 🕼	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	YN	Sample volume	YN	Y N
•		a filmen ander i		If a preservative is used, Specify Type and Quantity of Preservative:
	· .			Cat and the second second
	a star			8

47.71 Jut 61.20 End Page 48.10 Sample Comments ample 0944 100K 250 Sample 29 = 03 lefr-S 305

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Mill - Groundwater Discharge Permit	Date: 2.25.07 Revision: 2	•
Groundwater Monitoring		1
Quality Assurance Plan (QAP)	Page 40 of 41	
	<u>CACHMENT 1</u> SA URANIUM MILL	
FIELD DATA WORKS Description of Sampling Event: <u>///wate</u>	sheet For GROUND WATER \$ chloride	
•	Sampler Name and initials Tonner H. Ryan P.	
Date and Time for Purging 2-6-2009 a	nd Sampling (if different)	
Well Purging Equip Used:pump orbaile	r Well Pump (if other than Bennet) Grand Fes	
Sampling Event <u>N & C</u>	Prev. Well Sampled in Sampling Event_TWN-4	le s _e ri
pH Buffer 7.07_0	pH Buffer 4.0	N V
Specific Conductance <u>998</u> uMHOS/cm	Well Depth 95 90	FT
Depth to Water Before Purging 15.32	Casing Volume (V) 4" Well: <u>48.76</u> (.653h) 3" Well: (.653h)	
Conductance (avg)	Casing Volume (V) 4" Well: <u>7076</u> (.653h) 3" Well: (.367h) pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity	\mathcal{C}
Weather Cond. <u>Clean Breeze</u> Ext'l A Sunny, WARMA	Amb. Temp.(prior to sampling event) <u>2 [U</u>	
Time: 1054 Gal. Purged 84	Time: Gal. Purged	
Conductance 3685	Conductance	
рн6.65	рН	
Temperature 13.76	Temperature	
Redox Potential (Bh) 404	Redox Potential (Eh)	
Turbidity88.9	Turbidity	8 8 5
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	591
рН	рН	
Temperature	Temperature	
Redox Potential (Eh)	Redox Potential (Eh)	1 .2
L		

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Turbidity______ Turbidity______

Date: 11.17.05 Revision: 1

Volume of Water Purged When Field Parameters are Measured

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) S/60 = - T = 2V/Q = - T

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Number of casing volumes evacuated (if other than two)_____

If well evacuated to dryness, number of gallons evacuated_

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	OD N	100 ml	YON	H ₂ SO ₄ OF N
Heavy Metals	Y. N	250 ml	YN	HNO3 Y N
All Other Non- Radiologics	N N	250 ml	Y (N)	No Preservative Added
Gross Alpha	YN	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:
		n seren		

15.32 Depart -16.75 End purge. Sample Comments furge PaningTers San 16.21 The Samples she Took DIOTH \$ Sit ST

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Mill - Groundwater Discharge Permit	Date: 2.25.07 Revision: 2	
Groundwater Monitoring		1
Quality Assurance Plan (QAP)	Page 40 of 41	
ATT	CACHMENT 1	
	SA URANIUM MILL	
	SHEET FOR GROUND WATER	
Description of Sampling Event: Nitrate 7	chloride	
	C-umban -	
Location (well name) 76N-3	Name and initials Tanner H. Ryon P	
	nd Sampling (if different)	
	r Well Pump (if other than Bennet) Grund Fes	
Sampling Event N & C	Prev. Well Sampled in Sampling Event <u>N-A</u>	1.44-1
pH Buffer 7.0 7.0	pH Buffer 4.0 4. O	TWN
Specific Conductance 998 uMHOS/cm	Well Depth 10 $60FT?$	TWN-2
Depth to Water Before Purging 30.73	Casing Volume (V) 4" Well: <u>5/. 76</u> (.653h) 3" Well: (.367h)	Two .3
Conductance (avg)		
Well Water Temp. (avg)	Redox Potential (Eh) Turbidity	ter
Weather Cond. Gurran Cod Ext'l A	Amb. Temp.(prior to sampling event) 18 2	Co
		247 - 10 - 14 14
Time: <u>1915</u> Gal. Purged 42	Time: Gal. Purged	
Conductance 2261	Conductance	
рН7.24	pH	
Temperature 13.59	Temperature	
Redox Potential (Eh) 446	Redox Potential (Bh)	
Turbidity	Turbidity	•
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	pH	
Temperature	Temperature	
Redox Potential (Eh)	Redox Potential (Eh)	3. 1 - 13

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Turbidity_____ Turbidity_____

Date: 11.17.06 Revision: 1

Volume of Water Purged When Field Parameters are Measured_

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) $S/60 = - T = 2V/Q = - \frac{3}{2} min$

Number of casing volumes evacuated (if other than two)_

If well evacuated to dryness, number of gallons evacuated_____

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

<u>Type of Sample</u>	Sample Sample Volume Taken (indicate if other (circle) thin as specified below)	<u>Filtered</u> (circle)	<u>Preservative Added</u> (circle)
VOCs	Y N 3x40 ml	Y N	HCL Y N
Nutrients	🕅 N 100 ml	YO	H ₂ SO ₄ ON
Heavy Metals	Y N 250 ml	Y N	HNO3 Y N
All Other Non- Radiologics	8 N 250 ml	Y N	No Preservative Added
Gross Alpha	Y N 1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

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	Mill – Groundwater Discharge Permit Groundwater Monitoring	Date: 2.25.07 Revision: 2	ı
	Quality Assurance Plan (QAP)	Page 40 of 41	1
Also Erg 4	White Me	<u>FACHMENT 1</u> ESA URANIUM MILL SHEET FOR GROUND WATER	
	-	Sampler Name and initials Tanner H. Man P.	
		nd Sampling (if different)	
	Well Purging Equip Used:pump orbaile	er Well Pump (if other than Bennet) Grund Fos	
	Sampling Event N # C	Prev. Well Sampled in Sampling Event TWN-B	
	pH Buffer 7.07-0	pH Buffer 4.0	
	Specific Conductance 998 uMHOS/cm	Well Depth13615	
	Depth to Water Before Purging 40.40	Casing Volume (V) 4" Well: <u>48.7</u> (.653h) 3" Well: <u>(.653h)</u>	
	Conductance (avg)	pH of Water (avg)	
	Well Water Temp. (avg)	Redox Potential (Eb)Turbidity	C.
	Weather Cond Ext'l A	Amb. Temp.(prior to sampling event)	(
	Time: 1006 Gal. Purged 36	Time: Gal. Purged	
	Conductance 997	Conductance	
	pH7.46	рН	
	Temperature 14.29	Temperature	
H	Redox Potential (Bh) 400	Redox Potential (Eh)	
ans ofter Davilly 7	Turbidity//_	Turbidity	· ,
	Time: Gal. Purged	Time: Gal. Purged	
	Conductance	Conductance	
	рН	pH	
(a c)	Temperature	Temperature	
	Redox Potential (Eh)	Redox Potential (Eh)	(3
•			Lat

Mill – Groundwater Discharge Permit Date: 11.17.06 Revision: 1 Groundwater Monitoring Opality Assurance Plan (QAP)

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Turbidity______Turbidity_____

Volume of Water Purged When Field Parameters are Measured

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) S/60 = - $T = 2V/Q = -\frac{16}{100} min$

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated_____

Name of Certified Analytical Laboratory if Other Than Energy Labs____

the second s				
<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	<u>Preservative Added</u> (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	Ó N	100 ml	YØ	H ₂ SO ₄ (E N
Heavy Metals	Y N	250 ml	YN	HNO3 Y N
All Other Non- Radiologics	Ó N	250 ml	Y A	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:
		n - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -		

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Mill – Groundwater Discharge Permit	Date: 2.25.07 Revision: 2
Groundwater Monitoring	
Quality Assurance Plan (QAP)	Page 40 of 41
۳A	TACHMENT 1
	ESA URANIUM MILL
and the second	SHEET FOR GROUND WATER
Description of Sampling Event: Nitrole 3	: deloride
	Sampler Name and initials Tanner H. Ryon P.
	and Sampling (if different)
Well Purging Equip Used:pump orbail	er Well Pump (if other than Bennet) Grand Fas
Sampling Event Nitrate & delinide	Prev. Well Sampled in Sampling Event_1/A
	pH Buffer 4.0 4.0
Specific Conductance <u>998</u> uMHOS/cm	Well Depth
Depth to Water Before Purging	Casing Volume (V) 4" Well:(.653h)
Conductance (avg)	3" Well:(.36/h) pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
Weather Cond Ext'l	Amb. Temp.(prior to sampling event)
Time: 0837 Gal. Purged	Time:Gal. Purged
Conductance6	Conductance
рн6.35	pH
Temperature 13.04	Temperature
Redox Potential (Eh) 489	Redox Potential (Eh)
Turbidity_ ()_ ()	Turbidity
Time: Gal. Purged	Time:Gal. Purged
Conductance	Conductance
рН	pH
Temperature	Temperature

Redox Potential (Eh)____

•

Redox Potential (Eh)_ : *

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12-23-2009

Turbidity______ Turbidity______

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Volume of Water Purged When Field Parameters are Measured

Pumping Rate Calculation

Flow Rate (Q), in gpm.			Time to evacuate two casing volumes (2V)	
S/60 =	=	<u> </u>	T = 2V/Q =	

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs____

		Norther Sugar		a desta a companya da a
<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	N N	100 ml	Y	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	YN	HNO ₃ Y N
All Other Non- Radiologics	(P) N	250 ml	Y (N)	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Hyrived samaler k 84 DI. = Zero paper Test = < 1 CE-1 DT RIAK

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Mill - Groundwater Discharge Permit Date: 2.25.07 Revision: 2 Groundwater Monitoring Quality Assurance Plan (QAP) Page 40 of 41 ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER Description of Sampling Event: Nitrate + chloride Sampler Name and initials Tanner H. Ryan P Location (well name) TUN-63 Date and Time for Purging 2-6-2009 and Sampling (if different) Well Purging Equip Used: __pump or __bailer Well Pump (if other than Bennet) Grund Fos Sampling Event Nitrate chlorid Prev. Well Sampled in Sampling Event_____ pH Buffer 7.0 7.0 pH Buffer 4.0 4.0 Specific Conductance 998 uMHOS/cm Well Depth____ NA Depth to Water Before Purging _____ Casing Volume (V) 4" Well: _(.653h) 3" Well: (.367h) pH of Water (avg)_ Conductance (avg)____ Redox Potential (Eh) _____ Turbidity _____ Well Water Temp. (avg)_ former and the second 1 Weather Cond. lastly cloudy (on Ext'l Amb. Temp.(prior to sampling event) S Time: Gal. Purged Time: Gal. Purged Conductance_____ Conductance_ 0.1 pH pH Temperature___ 5 Temperature_ 529 Redox Potential (Eh) Redox Potential (Eh)_____ 16 Turbidity Turbidity_ Gal. Purged Gal. Purged Time: Time: Conductance Conductance pH_____ pH___ Temperature Temperature Redox Potential (Eh)_____ Redox Potential (Eh)

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 Turbidity_____
 Turbidity_____

 Volume of Water Purged When Field Parameters are Measured______

Pumping Rate Calculation

Flow Rate (Q), in gpm.	Time to evacuate two casing volumes (2V)
S/60 = =6	T = 2V/Q =

the second states of the second states of the

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated_____

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> <u>(circle)</u>	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N at	HCL Y N
Nutrients	(D) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	YN	HNO ₃ Y N
All Other Non- Radiologics	(1) N	250 ml	Y NO	No Preservative Added
Gross Alpha	Y N	1,000 ml	Ý N	H ₂ SO ₄ Y N
Other (specify)	YN	Sample volume	Y N	YN
		nga ^{an} mananangan Mananan anga		If a preservative is used, Specify Type and Quantity of Preservative:
		en en al ^{en e} racea		and a second second
	1 296. 8			

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Mill-Groundwater Discharge Permit	Date: 2.25.07 Revision: 2	
Groundwater Monitoring		Ŧ
Quality Assurance Plan (QAP)	Page 40 of 41	ć
TA	TACHMENT 1	
WHITE M	ESA URANHIMMELL	
FIELD DATA WORK	SHEET FOR GROUND WATER	
Description of Sampling Event: Alityate	& chlogide_check	
	Sampler	
Location (well name) fizz /	Name and initials yan Almer	
S. M. S. During O. A		
Date and Time for Purging <u>2.21.2009</u>	and Sampling (II different)	
Well Purging Equip Used: number Xhail	er Well Pump (if other than Bennet)	
	in the sening of some wan bounded	
Sampling Event Sxplutation	Prev. Well Sampled in Sampling Event_M	
pH Buffer 7.0 7.0	pH Buffer 4.0	
Specific Conductance 948 uMHOS/cm	Well Depth	
Depthito Water Before Purging		
Conductance (avg)	3* Well: <u>~.4 (</u> .367h) pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eb)	pr
	Amb. Temp. (prior to sampling event) 18 . Apres.	(1)
Weather Cond. Offer Col Bittere Ext 1	Amb. 1 emp.(pedor 10 sampling event) 19 Approve.	~
Time: Gal. Purged	Time: Gal. Purged	
Conductance_2382	Condition of the second s	
Confinerative 2007	Conductance	
рн7.6/	PHHq	
1/4 -2-7	- \ /	
Temperature 10.27	Temperature	
Redox Potential (Bh) 374	Redox Potential (Eh)	
Turbidity/0.3	Turbidity	
Turbinity	(
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	pH	
·		
Tempenture	Temperature	
Redox Potential (Eh)	Redox Potential (Eh)	· `.

Mill – Choundwatez Discharge Permit Date: 11.17.05 Revision: 1 Groundwater Monitoring Quality Assurance Plan (QAP)

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Turdidity______ Turdidity______

Volume of Water Purged When Field Parameters are Measured

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = =_____ Time to even the two casing volumes (2V) $T = 2V/Q = _$

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs

The second s

<u>Type of Sample</u>	Sample Taken (circle)	Sample Volume (indicate if other than as specified below)		Preservative Added (circle)
VOCs	Y N	3x40 ml	YN	HCL Y N
Nutrients	N N	100 ml	YO	H2SO4 OP N
Heavy Metals	Y N	250 ml	YN	HNO3 Y N
All Other Non- Radiologics	Ý N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify) Genelal Intergrain	() N	Samplé volume	A D	Y If a preservative is used, Specify Type and Quantity of Preservative:
	i and the			electra in the

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Mill – Groundwater Discharge Permit Groundwater Monitoring	Date: 2.25.07 Revision: 2	
Quality Assurance Plan (QAP)	Page 40 of 41	ł
<u>۵ دېمې</u>	PA CERSHEND 1	
	<u>FACHMENT 1</u> ESA URANHUM MILL	
	SHEET FOR GROUND WATER	
Description of Sampling Event: Alitrate	* chlereide	
Location (well name) fire 2	Sampler Name and initials Ryan Palmer	
Date and Time for Purging <u>2.21.09</u> a	nd Sampling (if different)	
	er Well Pump (if other than Bennet)	
	Prev. Well Sampled in Sampling Event_MA	
pH Buffer 7.0 7-0	pH Buffer 4.0	
Specific Conductance 998 uMHOS/cm	Well Depth	
Depth to Water Before Purging	Casing Volume (V) 4" Well:(.653h) 3" Well:(.367h)	
Conductance (avg)	pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity	0
Weather Cond. day, Col brune Ext'l	Amb. Temp.(prior to sampling event) 11 Agrag	(<u></u> ,
Time:Gal. Purged	Time: Gal. Purged	
Conductance 536	Conductance	
рн8.93	рН	
Temperature 10.14	Temperature	
Redox Potential (Bh) 326	Redox Potential (Eh)	
Turbidity_29.5	Turbidity	
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	pH	
Temperature	Temperature	
Redox Potential (Eh)	Redox Potential (Eh)	7 .
		\bigcirc

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 Turbidity______
 Turbidity______

 Volume of Water Purged When Field Parameters are Measured______

 Pumping Rate Calculation

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Flow Rate	(Q), in gpm.	Time to evacuate two casing volumes (2V)
S/60 =	B	T = 2V/Q =

(1) 解释的 (有些缺端的)。

Number of casing volumes evacuated (if other than two)_

If well evacuated to dryness, number of gallons evacuated_____

Name of Certified Analytical Laboratory if Other Than Energy Labs_

<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	OP N	100 ml	Y N)	H ₂ SO ₄ OP N
Heavy Metals	Y N	250 ml	YN	HNO3 Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Ø N	Sample volume	Y Ø	Y (Y) If a preservative is used, Specify Type and Quantity of Preservative:
	na si Nga			

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paper head at = ND.

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Mill - Groundwater Discharge Permit Date: 2.25.07 Revision: 2 Groundwater Monitoring Quality Assurance Plan (QAP) Page 40 of 41 ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER Description of Sampling Bvent: Netrole * Chloride Sampler Location (well name) Vier. luner Name and initials_ Date and Time for Purging 2.21. 2009 and Sampling (if different) Well Purging Equip Used: __pump or <a>bailer Well Pump (if other than Bennet)_ Sampling Event Wolocation Prev. Well Sampled in Sampling Event 7:0 40 pH Buffer 7.0_ pH Buffer 4.0_ Specific Conductance uMHOS/cm Well Depth_ Depth to Water Before Purging, Casing Volume (V) 4" Well: (.653h) 3" Well: (.367h) pH of Water (avg) Conductance (avg)_ Redox Potential (Eh) Turbidity Well Water Temp. (avg) well. Ext'l Amb. Temp.(prior to sampling event) Weather Cond. Time: Gal. Purged Time: Gal. Purged_ 951 Conductance Conductance 1.80 pH pH 88 Temperature_ Temperature. Redox Potential (Eh)___ 363 Redox Potential (Eh) -86 S Turbidity_ Turbidity.

Time: _____ Gal. Purged_____ Conductance_____ pH_____ Temperature_____ Redox Potential (Eh)_____

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Mill – Groundwater Discharge Permi Groundwater Monitoring	Date: 11.17.05 Revision: 1	
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Turbidity	Turbidity	· · · · · · · · · · · · · · · · · · ·
Volume of Water Purged When Field	Parameters are Measured	
Pumping Rate Calculation	en en greger ing	
Flow Rate (Q), in gpm S/60 = =	Time to evacuate two casi $T = 2V/Q =$	ng volumes (2V)
Number of casing volumes evacuated	(if other than two)	

If well evacuated to dryness, number of gallons evacuated____

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

C

1.4.100	1. 2. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	· Annak Magna		and the second second
<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circlé)	Sample Volume (indicate if other than as specified below)	Filtered (circle)	<u>Preservative Added</u> (circle)
VOCs	ê	3x40 ml	YN	HCL Y N
Nutrients	(D) N	100 ml	YO	H ₂ SO ₄ OP N
Heavy Metals	Y N	250 ml	YN	HNO3 Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	(V N	Sample volume	Y M	Y (19) If a preservative is used, Specify Type and Quantity of Preservative:

Comments 900 nel was dinner NAS Samples where 1730 cia 07 SF

tente paque test = ND

July Sampling Event

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<u>A</u> T	TACHMENT 1	
	esa uranium mill	
	Sheet For Ground water	
Description of Sampling Event: Nitrate.		
Location (well name) TWN-1	_ Name and initials Tanur H. A Ryan P.	
Date and Time for Purging 7.21.09	and Sampling (if different)	
Well Purging Equip Used: Vpump orbaile	er Well Pump (if other than Bennet) Grund Fos	
Sampling Event Mitrale & chloride	Prev. Well Sampled in Sampling Event N/A 1ST well	
pH Buffer 7.07.0	pH Buffer 4.04_0	
Specific Conductance 998 uMHOS/cm	Well Depth	
Depth to Water Before Purging 48.10	Casing Volume (V) 4" Well: <u>57./537(</u> .653h) 3" Well: <u>(.367h</u>)	
Conductance (avg)	pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eh)	C.
Weather Cond. Duescast Ext'l	Amb. Temp.(prior to sampling event) 27.3 c	<u> </u>
Time: 1009 Gal. Purged 36	Time: Gal. Purged	
Conductance 752.	Conductance	
рн6.84	pH	
Temperature 17.74	Temperature	
Redox Potential (Eh) 330	Redox Potential (Eh)	. • •
Turbiditylo_6	Turbidity	•
Tims: Gal. Purged	Time; Gal. Purged	
Conductance	Conductance	
рН	pH	
Temperature	Temperature	
Redax Potential (Eh)	Redox Potential (Eh)	••

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<u>Mill</u> – Groundwater Discharge Permit Groundwater Monitoring	Date: 11.17.06 Revision: 1
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Turbidity	Turbidity
Volume of Water Purged When Field F	annuters and Measured 74 gullars
Pumping Rate Calculation	
Flow Rate (Q), in gpm. S/60 = =	Time to evacuate two casing volumes (2V) $T = 2V/Q = \frac{12.4}{5}$
Number of casing volumes evacuated (if	f other than two)
If well evacuated to dryness, number of	gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

This is a statistic statistic

<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> <u>(circle)</u>	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	<u>Preservative Added</u> (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	() N	100 ml	YN	H2SO4 W N
Heavy Metals	Y N	250 ml	YN	HNO3 Y N
All Other Non- Radiologics	6D N.	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Oiher (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Tanks H & Chan Paresent For For 12 Min Muge Ender an Comments SNEUT VUINED. well Sampling lett Sike at 101 Jurge Bayan AT 1000 •.' Sample: Arrive at 1300 Bailer Used to Collect Sample Sample was Collected AT 1523

Mill – Groundwater Discharge Permit	Date: 2.25.07 Revision: 2
Groundwater Monitoring Quality Assurance Plan (QAP)	Fage 40 of 41
	ATTACHMENT 1 TE MESA URANIUM MILL YORKSHEET FOR GROUND WATER
Location (well name) TWN-2.	Name and initials Tanar H. A. Ryan P.
Date and Time for Purging 7.21.09	and Sampling (if different)
Well Purging Equip Used:pump or	bailer Well Pump (if other than Bennet) Grund Fes
Sampling Event Witrale & chloride	Prev. Well Sampled in Sampling Event_TWN-/
pH Buffer 7.07.0	pH Buffer 4.0 4.0
Conductance (avg) Well Water Temp. (avg)	Casing Volume (V) 4" Well: 5/.54 (.653h) 3" Well: (.367h) pH of Water (avg)
Time: <u>1035</u> Gal. Purged	Ext*l Amb. Temp.(prior to sampling event) ZC.C.C. Time: Gal. Purged
Time: <u>1035</u> Gal. Purged <u>90</u> Conductance <u>3105</u>	Time: Gal. Purged
Time: <u>1035</u> Gal. Purged <u>90</u> Conductance <u>3105</u> pH <u>6.91</u>	Conductance pH
Time: <u>1035</u> Gal Purged <u>90</u> Conductance <u>3105</u> pH <u>6.91</u> Temperature <u>15.75</u>	Time: Gal. Purged Conductance pH Temperature
Time: 1035 Gal. Purged 90 Conductance 3 (05 pH 6.91 Temperature 15.75 Redox Potential (Eli) 327	Time: Gal. Purged Conductance pH Temperature Redox Potential (Eh)
Time: 1035 Gal. Purged 90 Conductance 3 (05 pH 6.91 Temperature 15.75 Redox Potential (Eh) 327 Turbidity 15.1	Times Gal. Purged Conductance pH pH Temperature Redox Potential (Eh)
Time: 1035 Gal. Purged 90 Conductance 3 (05 pH 6.91 Temperature 15.75 Redox Potential (Eh) 327 Turbidity 15.1 Time: Gal. Purged	Time: Gal. Purged DH DH PH DH Temperature Redox Potential (Eh) Turbiolity DH
Time: 1035 Gal. Purged 90 Conductance 3105 pH 6.91 Temperature 15.75 Redox Potential (Eh) 327 Turbidity 15.1 Time: Gal. Purged Conductance Conductance	Time: Gal. Purged DH
Time: 1035 Gal. Purged 90 Conductance 3 (05 pH 6.91 Temperature 15.75 Redox Potential (Eh) 327 Turbidity 15.1 Time: Gal. Purged Onductance 0H	Time: Gal. Purged Conductance
Time: 1035 Gal. Purged 90 Conductance 3105 pH 6.91 Temperature 15.75 Redox Potential (Eh) 327 Turbidity 15.1 Time: Gal. Purged Conductance Conductance	Time: Gal. Purged DH

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Tusbidity	Turbidity		•	·
Volume of Water Purged Whon-Pield-Permut		103	-	
Pumping Rate Calculation				3 8 .)
	$(-2, \varepsilon, \omega_{1}^{\prime}(D_{0}^{\prime})) \otimes \mathbb{P}^{1} = 0$			

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) $S/60 = - T = 2V/Q = - \frac{7}{7} miN$

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

<u>Type of Sample</u>	<u>Saimple</u> <u>Taken</u> (circle)	Sample Volume (Indicate if other then as specified below)	<u>Filtered</u> (circle)	Preservative Added (clicke)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	GO N	100 ml	YN	H ₂ SO ₄ OP N
Heavy Metals	Y N	250 ml	Y N	HNO3 Y N
All Other Non- Radiologics	ON.	250 ml	Y N	No Preservative Added
Gross Alpha	YN	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N	Samplé volume	YN	YN
	· · ·	S. Constanting		If a preservative is used, Specify Type and
		in e transmitter († 1995) 1997 - Stan Berner, 1995)		Quantity of Preservative:
		Sec. 1		

ar 101 Comments * DANGE Tanner PLUMED Sampling Svent well 17 March Copart Cadados Fire Described. acoulter unge Decan AT AT MIGE Pro 10 40 TE Sample · Arrive at 1330 Samptes taken 334 11

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	AESA URANIUM MILL.
Description of Sampling Event: <u>Whate</u>	KSHEET FOR GROUND WATER
	Sampler
Location (well name) TWN-3	Name and initials Taner H. & Ryan P.
Date and Time for Purging 7.21.09	
Well Purging Equip Used:	iler Well Pump (if other than Bennet). Grund Fes
Sampling Event <u>Mitrale 3 Chloride</u>	Prev. Well Sampled in Sampling Event
pH Buffer 7.0 7.0	pH Buffer 4.0
Specific Conductance 998 ul/HOS/cm	n Well Depth
Depth to Water Before Purging 32.13	Casing Volume (V) 4" Well: <u># 45 4 (.653h)</u>
Conductunce (avg)	3" Well:(.367h).
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
Weather Cond. <u>UVEYCES</u> Ext ²	Amb. Temp.(prior to sampling event) <u>3/</u>
an enclosed a constraint and a constraint and a constraint and a constraint a const	
Time: /25.7 Gal. Purged 66	Time:Gal. Purged
Conductance 2697	Conductance
рн 6.91	pH
Temperature 15.72	Temperature
Redox Potential (Bh) 309	Redox Potential (Eh)
Turbidity 275	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
рН	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
)	

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			1	
Turbidity	4	Turbidity_	10.0	
		0		

Volume of Water Purged When Field Parameters are Measured____

Pumping Rate Calculation

Flow Rate (Q), in gpm.	1	Time to evacuate two casing volumes (2V)
S/60 = =	6	T = 2V/Q = /3.6

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs

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<u>Type of Samüle</u>	<u>Saimple</u> Taken <u>(chrclé)</u>	Sample Volume (indicate if other that as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	Ø N	100 ml	YN	H2SO4 N
Heavy Metals	Y N	250 ml	YN',	HNO3 Y N
All Other Non- Radiologics	ØN	250 ml	Y Ø	No Preservative Added
Gross Alpha	Y N	1,000 m1	YN	H ₂ SO ₄ Y N
Other (specify)	Y N	Sample volume	Y N	YN
. * *		ng Strangala	lovia).	If a preservative is used, Specify Type and
	ă n		De Parte	Quantity of Preservative:
		n n Para		And the second
1		and the second s		and a start of the

Comments_ PAresent t than Sampling Min. Muse Ender SNEUT LUMED FUR 13 1259 GT. 1302 DANGES letT 246 Site ar Egger A Sauple AT: 1355 13.50 Sample: Herrin at

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Mill - Groundwater Discharge Permit	Date: 2.25.07 Revision: 2
Groundwater Monitoring Quality Assurance Plan (QAP)	Page 40 of 41
WHUTE N	<u>ITACHIMENT 1</u> MESA URANIUM MILL KSHEET FOR GROUND WATER B Chloride
Location (well name)_TWN-4	Sampler Name and initials Tancer H. 7 Ryan P.
Date and Time for Purging 7.21.09	_and Sampling (if different)
Well Purging Equip Used: _/punip orba	iler Well Pump (if other than Bennet). Grand Fas
Sampling Event Nitrale 3 chloride	Prev. Well Sampled in Sampling Event N/A Kisate Taw-6
pH Buffer 7.0 7.0	pH Buffer 4.0
Specific Conductance 998 uMHOS/cm	1 Well Depth. 124. 7
Depth to Water Before Purging 37.61	Casing Volume (V) 4" Well: <u>56, 86(.653h)</u> 3" Well: <u>(.367h)</u>
Conductance (avg)	pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
Weather Cond. UVINCAST Bar Bat'l	Amb. Temp.(prior to sampling event) 31 C
Time: <u>/2.3.7</u> Gal. Purged <u>/</u>	Time:
Conductance 984.3	Conductance
рн 6.73	pn
Temperature 15.46	Temperature
Redox Potential (Eh) 318	Redox Potential (Eh)
Turbidity <u>4.7</u>	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
рН	pH
Temperature	Temperature
	The second se
Redox Potential (Eh)	Redox Potential (Eh)

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Turbidity

Turbidity_

Volume of Water Purged When-Field Parameters are Measured

Pumping Rate Calculation

Time to evacuate two casing volumes (2V) Flow Rate (Q), in gpm. T = 2V/Q = <u>19 Min</u>\$/60 = 20

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

		We what is sugar		
<u>Type of Smmple</u>	<u>Sample</u> <u>Taken</u> (circlé)	Sample Volume (indicate if other thin as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N **	HCL Y N
Nutrients	Ø N	100 ml	YN	H2SO4 OF N
Heavy Metals	Y N	250 mt	YN',	HNO3 Y N
All Other Non- Radiologics	Ø N	250 ml	Y NO	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N	Sample volume	YN	YN
			2 11 11 15	If a preservative is used, Specify Type and
		AND SUPPORT AND		Quantity of Preservative:
		1995. 1995		
		14. V S		and shares a second

Aresent Comments Sampling SNEWT Musse Ender and Virig 15/1 1240 1245 PHRYE Began AT 22 Sile GT. appar Cathor AT Sample AT 1343 at 1359 . . Amil Sample

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WINDITE	<u>ATTACHMENT 1</u> MESA URANIUM MILL
ITTIELD DATA WOR Description of Sampling Event: <u>//itara</u>	RKSHEET FOR GROUND WATER
Location (well name) TWN-65	Sampler
Date and Time for Purging 7.21.09	
Well Purging Equip Used:pump orb	ailer Well Pump (if other than Bennet) Grund Fos
Sampling Event_Withale 3 chloride	Prev. Well Sampled in Sampling Event TWN - 4
pH Buffer 7.0 7.0	pH Buffer 4.0 4.0
Specific Conductance 99.8 uMHOS/c	
Depth to Water Before Purging	Casing Volume (V) 4" Well:(.653h)
Conductance (avg)	3" Well:(.367h) pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh) Turbidity
Weather Cond Bxt	"I Amb. Temp.(prior to sampling event)
Time:Gal, Purged	Time:Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Bh)
Turbidity	Turbidity
Time: Gal. Purged	Time:Gal. Purged
Conductance	Conductance
рНевинализирательные во соород заправля	in a pH <u>-management of the second second</u>
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
Duplicate of Tavar-4	³ 2 <u>%</u> =

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Turbidity____

Turbidity____

Contractive states and the state of the stat

Volume of Water Purged When Field Permeters are Measured

Pumping Rate Calculation

Flow Rate (Q), in gpm.Time to evacuate two casing volumes (2V)S/60 = =T = 2V/Q =

Number of casing voluines evacuated (if other than two)_____

If well evacuated to dryness, number of gallons evacuated

TWN-4

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Comments

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other that as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N at	HCL Y N
Nutrients	Ø N	100 ml	YN	H ₂ SO ₄ N
Heavy Metals	Y N	250 mf	Y N	HNO3 Y N
All Other Non- Radiologics	ØN	250 ml	Y Ø	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify)	Y N	Samplé volume	YN	YN
:*	2 P 2	Bergerskert Berken og se en til se	5 - 1 5 - 1	If a preservative is used, Specify Type and Quantity of Preservative:
				- f.as
1	6.01.08.1	1. N. 1.		States and the second second

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Construction of the second	<u>IACHIMENT 1</u>
	ESA URANIUMI MILLI. Suuretetti hyden (Michael en allered)
Description of Sampling Event: Nitrate	Sheet For Ground Water K. Churde
	Sampler
Location (well name) TWN-60	Name and initials Tanner H. & Kyan P.
5	A Grand Res (CE APPENDIX)
Date and Time for Purging 7.21.09 s	
Well Furging Equip Used:pump orbaile	er Well Pump (if other than Bennet) Grund Fes
Sampling Event Witrale 3 chloride	Prev. Well Sampled in Sampling Event
pH Buffer 7.0 7.0	pH Buffer 4.0
Specific Conductance 998 uMHOS/cm	Well Depth
Depth to Water Before Purging	_ Casing Volume (V) 4" Well:(.653h)
Conductance (avg)	3" Well:(.367h) pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
mer in and Allowers to have me in	2/3%
Weamer Cond. (2 Derces 1, Uraid BRT 17	Amb. Temp.(prior to sampling event) <u>26.3</u> C
1. Construction of the second state of the	an and a second seco
Time:Gal. Purged	Times Gal. Purged
Conductance DEED 4.8	Conductance
pH7.02	pH
Temperature 25.56	Temperature
Redox Potential (Eb) 198	Redox Potential (Eh)
TurbidityO	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	рн
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
DT Rlack	
	- · · · · · · · · · · · · · · · · · · ·

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Pumping Rate Calculation

Flow Rate (Q), in gpm.	1	Time to evacuate two casing volumes (2V)
S/60 = =	6	T = 2V/Q =

State of the state

Number of casing volumes evacuated (if other than two)_____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

Type of Sample	<u>Sample</u> <u>Taken</u> (circlé)	Sample Volume (Indicate if other than as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	YN	3x40 ml	Y N	HCL Y N
Nutrients	Ø N	100 ml	YN	H2SO4 OP N
Heavy Metals	Y N	250 mf	Y N ',	HNO3 Y N
All Other Non- Radiologics	ØN.	250 ml	Y Ø	No Preservative Added
Gross Alpha	YN	1,000 ml	YN	H ₂ SO ₄ Y N
Oiher (specify)	YN	Samplé volume	YN	Y N
			lighter	If a preservative is used, Specify Type and
		n na stan general		Quantity of Preservative:

Aresent Comments_ wive Sampling Event 10 ZOSAAZOD ES aun 09.57 pleve Taller 30 lott site ar

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LA.	<u>TACHIMENT I</u>
	IESA URANIUM MILL
FIELD DATA WOR	SSHEET FOR GROUND WATER
Description of Sampling Event: <u>Nitrare</u>	<u>Sampler</u>
Location (well name) TWW-63	Name and initials Tanner H. & Ryan P.
Date and Time for Purging 7.21.09	
Well Purging Equip Used: Voump or bai	ler Well Pump (if other than Bennet) Grund Fes
Sampling Event_Nitrale & chluside	Prev. Well Sampled in Sampling Event
pH Buffer 7.0 7.0	pH Buffer 4.0
Specific Conductance 998 uMHOS/cm	Well Depth
Depth to Water Before Purging	Casing Volume (V) 4" Well:(.653h)
Conductance (avg)	3" Well: (.367h) pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eb)Turbidity
Weather Cond QVC/CoST Bat'l	Amb. Temp.(prior to sampling event) 26.3 C
in the same with the same w	
Time: Gal. Purged	Time: Gal, Purged
Conductance 20.9	Conductance
рн6.68	pH
Temperature 26.21	Temperature
Redox Potential (Bh) 211	Redox Potential (Eh)
Turbidity()	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	рн
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
$\gamma - \gamma$	
LINSATE	· · · · · · · · · · · · · · · · · · ·

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Turbidity______ Turbidity______

Volume of Water Purged When Field Formueters are Measured

Pumping Rate Calculation

Flow Rate (Q), in gpm	. /	Time to evacuate two casing volumes (2V)		
s/60 = =	6	T = 2V/Q =		

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Buergy Labs_____

14. · · · ·		1. Charles Strange		in the state of the second
<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circlé)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N ~	HCL Y N
Nutrients	Q N	100 ml	YN	H2SO4 OP N
Heavy Metals	Y.N	250 ml	YN',	HNO3 Y N
All Other Non- Radiologics	ØN.	250 ml	Y Ø	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N	Samplé volume	Y N	Y N
		$(i_{1},i_{2}) \in \mathbb{R}^{n \times n}$	· · ·	If a preservative is used, Specify Type and
			- 68°	Quantity of Preservative:
		n saidh		
		Sec. 10		· 24月1月11日 16

Aresent Comments It & thean WIVE Canald Sampling SNEUT. UNGED well MABE FIRE PLAN. Where Taken at 0948 lett Site at. Full AL nurs1 Ser of pavamerals Were Taken AT 1 CAY

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	<u>FACHMENT 1</u>
	CSA URANIUM MILL SHEET FOR GROUND WATER
Description of Sampling Event:	STATES I FOR GROUTIN WAY I BIR
Location (well name) TWN - 6 4	Sampler 1 1
Date and Time for Purging 7.21.09 a	
Well Purging Equip Used:pump orbaile	er Well Pump (if other than Bennet) Grund Fos
Sampling Event	Prev. Well Sampled in Sampling Event
pH Buffer 7.0 7.0	pH Buffer 4.0 4.0
Specific Conductance 998 uMHOS/cm	Well Depth
Depth to Water Before Purging	Casing Volume (V) 4" Well:(.653h) 3" Well:(.367h)
Conductance (avg)	pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh) Turbidity
Weather Cond. OK ((asT Bat'))	Amb. Temp.(prior to sampling event) 26.6 C
Time: Gal. Purged	Time: Gal. Purged
Conductance 5.7	Conductance
рн 7.45	pH
Temperature 25.46	Temperature
Redox Potential (Eh) 273	Redox Potential (Eh)
TurbidityO	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	рН
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
Rivisate #2	

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Turbidity	Turbidity	

Volume of Water Purged When Field Parameters are Measured_____

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) S/60 = - T = 2V/Q = -

Number of casing volumes evacuated (if other than two)_____

If well evacuated to dryness, number of gallons evacuated_

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N ~	HCL Y N
Nutrients	O N	100 ml	Y OP	H2SO4 ON
Heavy Metals	Y N	250 ml	Y N	HNO3 Y N
All Other Non- Radiologics	Ø N	250 ml	YO	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Hynn on Immer Carameraes Julled & Hen & Fill last Container of DE Alm P HAO TO Wait D.I. WASH WE aT AT 1202 Site

Mill – Grandwater Discharge Permit GroundwaterMonitoring Quality Assume Plan (QAP)

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A	TACHIMENT 1	
	ESA URANIUM MILL SHEET FOR GROUND WATER	
Description of Sampling Event:		
Location (well name) Piez 1	Sampler Name and initials Towner H. & Pyon P.	
	and Sampling (if different) 7.14.09	
Well Parging Equip Used:pump orbails	er Well Pump (if other than Bennet)	
Sampling Bren Alitvark & chloride	Prev. Well Sampled in Sampling Event MA	
pH Buffer 739 7.0	pH Buffer 4.0	
Specific Louisstance 997 uMHOS/cm	Well Depth	
Depth to Water Before Purging 62.86	_ Casing Volume (V) 4" Well:(.653h) 3" Well:(.367h)	
Conductance (avg)	pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eb)Turbidity	 i
Weather End	Amb. Temp.(prior to sampling event)	
Time: <u>//4.2</u> Gal. Purged	Timo; Gal, Purged	
and the second		
	Conductance	
рн 7.48	pH	
Temperature 8.95	Temperature	
Redox Potential (Bh) 321	Redox Potential (Eh)	
Turbidity34.8	Turbidity	•
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	рн	
Temperature	Temperature	
Redge Potentish (Eh)	Redox Potential (Eh)	

<u>Mill</u> – Groundwater Discharge Pennit Groundwater Monitoring	Date: 11.17.05 Revision: 1
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00. 21 8ite	
Turbidity	Turbidity

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Volume of Water Purged When Rield Parameters are Mensured

Pumping Rate Calculation

Flow Rate	(Q), in gpm.	Time to evacuate two casing volumes (2V)
S/60 =	8	T=2V/Q=

Number of casing volumes evacuated (if other than two)_____

If well evacuated to dryness, number of gallons evacuated_

Name of Certified Analytical Laboratory if Other Than Energy Labs

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Alover present For Sampling

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Type of Sample	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	<u>Preservative Added</u> (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	60 N	100 ml	Y Ø	H_2SO_4 (D) N
Heavy Metals	Y N	250 ml	Y N .	HNO3 Y N
All Other Non- Radiologics	O N	250 ml	Y Ø	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify)	YN	Samplé volume	YN	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Mr. SET OF PAVAMETERS Tallen

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Mill – Groundwater Discharge Permit GroundwaterMonitoring Quality Assurance Plan (QAP)

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A	TACHIMENT 1	
	esa uranium mill Sheet for Ground water	
Description of Sampling Event: Nitrata	= 3 chloride	
Location (mell name) Piez 2	Sampler Name and initials Tanner It. A War P.	
	and Sampling (if different) 7.14.09	
Well Parifing Equip Used: or	er Well Pump (if other than Bennet)	
Sampling Even Ni Walk & Alenide	Prev. Well Sampled in Sampling Event M NA	
pH Buffer 730 7-0	pH Buffer 4.0	
Specific Conductance_997_uMHOS/cm	Well Depth	
Depth to Water Before Purging 15. 8/	_ Casing Volume (V) 4" Well:(.653h)	
Conductance (avg)	.3" Well:(.367h) pH of Water (avg)	
Well Waist Temp. (avg)	Redőx Potential (Eb) Turbidity	12
Weather Emd. Rxt'l	Amb. Temp.(prior to sampling event)	ď
- 0001 BAS		6
Time: <u>0940.</u> Gal. Purged	Time:Gal. Purged	
Conductante 652.2	Conductance	
рн 8.37	pH	
Temperature 17.95	Temperature	_
Redox Potential (Bla)_23	Redox Potential (Eh)	
Turbidity15.8	Turbidity	
Time: Gal. Purged	Time: Gal. Purged	
Conduciante	Conductance	
pH	pH	
Temperature	Temperatura	
Redge Potential (Eh)	Redox Potential (Eb)	
		U

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Turbidity

Volume of Water Purged When Field Parameters are Monsued

Pumping Rate Calculation

Turbidity

Flow Rate (Q), in gpm.	Time to evacuate two casing volumes (2V)
\$/60 = =	T=2V/Q=

Number of casing volumes evacuated (if other than two)_____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

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Type of Sample	<u>Sample</u> <u>Taken</u> (circlé)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	YN	3x40 ml	Y - N	HCL Y N
Nutrients	Ø N	100 ml	Y Ø	H ₂ SO ₄ (D) N
Heavy Metals	Y N	250 ml	Y N	HNO3 Y N
All Other Non- Radiologics	Ø N	250 ml	Y 🔕	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify)	YN	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:
1	1943			

MAR. SET OF PANAMETERS Taller Horive on Sike Comments_ 436 ar Dulled left Sike 09.51 sle the. Am ar present For Sampling Almer

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Mill – Groundwater Discharge Permit GroundwaterMonitoring Quality Assumes Plan (QAP)

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	TACHMENT 1	
	esa uranium mill	
	Sheet FOR GROUND WATER	
Description of Sampling Event: Nitrata		
Location (well name) Pice 3	Name and initials Towner It. A Ryan R.	
Date and Time for Purging	and Sampling (if different) 7.14.09	
Well Purging Bauip Used:pump orbail	er Well Pump (if other than Bennet)	
Sampling Bren Ni Wate & chlonide	Prev. Well Sampled in Sampling Event MA	
pH Buffet730 7.0	pH Buffer 4.0	
Specific Conductance 997 uMHOS/cm	Well Depth	
Depth to Water Before Purging 36.05	_ Casing Volume (V) 4" Well:(.653h)	
Conductance (avg)	3" Well:(.367h) pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eb)Turbidity	17
Weather Cond Ext'l.	Amb. Temp.(prior to sampling event)	1.
Time: 102 Gal. Purged	Time Gal. Purged	
1010		
Conductance 12/19	Conductance	
рн12.27	pH	
Temperature 19.78	Temperature	-
Redox Potential (Bh) 213	Redox Potential (Eh)	
Turbidity26.7	Turbidity	· ·
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	pH	
Temperature	Temperature	
Redor Potential (Eth)	Redox Potential (Eh)	~

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Turbidity

Turbidity

Volume of Water Purged When Hield Parameters are Monsured

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) S/60 = - T = 2V/Q = -

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated_

Name of Certified Analytical Laboratory if Other Than Energy Labs

<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N »•	HCL Y N
Nutrients	Ø N	100 ml	Y Ø	H ₂ SO ₄ (D) N
Heavy Metals	Y N	250 ml	YN .	HNO ₃ Y N
All Other Non- Radiologics	🕑 N	250 ml	Y 🔕	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify)	YN	Samplé volume	YN	Y N If a preservative is used, Specify Type and Quantity of Preservative:

19.58 . Comments HAVING ON Sike ()M. SET OF Parameters Tillen Aulled ar 1014 then ste OFT SER Sampling For sto. Meient

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Mill – Groundwater Discharge Permit Groundwatez Monitoring Quality Assumce Plan (QAP)

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	<u>rachment 1</u>	
	ESA URANIUM MILL	
	SHEET FOR GROUND WATER	
Description of Sampling Event: Nitrate		
Location (well aame) Piez 4	Sampler Name and initials Torones It. & Ryan P.	
	and Sampling (if different) 7.14.09	
Well Purging Equip Used:pump orbaile	er Well Pump (if other than Bennet)	
	Prev. Well Sampled in Sampling Event_AP_NA	
pH Buffer 730 7-0	pH Buffer 4.0 4.0	
Specific Conductance 997 uMHOS/cm	Well Depth	
Depth to Water Before Purging 50.74	3" Well:(.367h)	
Conductance (avg)	pH of Water (avg).	
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity	12.
Weather Bond, clean, 5 Slight Ext'l 1 Brecze	Amb. Temp.(prior to sampling event)	1
Time: /// Gal. Purged	Time: Gal. Purged	
Conductance 3474	Conductance	
pH6.82	pH	
Temperature 24.25	Temperature	
Redox Potential (Eb) 354	Redox Potential (Eh)	
Turbidity13_	Turbidity	
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
рн	PH	
Temperature	Temperature	
Redger Potratial (Elh)	Redox Potential (Eh)	
		10 3

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Turbidity	Turbidity
Volume of Water Purged When Field	Parameters are Messured
Pumping Rate Calculation	
Flow Rate (Q), in gpm. S/60 = =	Time to evacuate two casing volumes (2V) T = 2V/Q =
Number of casing volumes evacuated ((if other than two)
If well evacuated to druness number o	f gallone evacuated

(-1)

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

<u>Type of Sample</u>	<u>Sam</u> <u>Tak</u> (cire		Sample Volume (indicate if other than as specified below)		<u>ered</u> cle)		Preserva (circle)	tive Add	<u>eđi</u>
VOCs	Y	N	3x40 ml	Y	N		HCL	Y	N
Nutrients	Ø	N	100 ml	Y	Ø		H ₂ SO ₄	Ø	N
Heavy Metals	Y	N	250 ml	Y	N ·	11 - 14	HNO3	Y	N
All Other Non- Radiologics	0	N	250 ml	Y	0		No Preser	vative A	ided
Gross Alpha	Y	N	1,000 ml	Y	N		H ₂ SO ₄	Y	N
Other (specify)	Y	N	Sample volume	Y	N		Y N If a preser Specify T Quantity o	ype and	

Comments Arrive on Sik at 0800. Our Set of Pavameters Tallene Then Sample pulled at 0807. Pett Sike at 0810 Typin Palmer present For Sampling.

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Mill – Guundwater Discharge Permit Groundwatezklanitoring Quality Accurace Plan (QAP)

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	esa uranium mill sheet for ground water	
Description of Sampling Event:	3 CHIORIZE	
Location (well name) licz 5	Sampler Name and initials Tonney II. & Byan P.	
	and Sampling (if different) 7.14.09	
Well Purging Equip Used:pump orbail	er Well Pump (if other than Bennet)	
Sampling Even Ali trate & chloride	Prev, Well Sampled in Sampling Event_ MA	
pH Buffer 730 7.0	pH Buffer 4.0	
Specific Conductance 997 uMHOS/cm	Well Depth	
Depth to Water Before Purging 45.20	_ Casing Volume (V) 4" Well:(.653h) 3" Well:(.367h)	
Conductunce (avg)	pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eb)Turbidity	17
Weather Could Bat'l	Amb. Temp.(prior to sampling event)	(J
	A CARLES AND A C	
Time: 0898 Gal. Purged	Time: Gal, Purged	
Conductance 84.3	Conductance	
pH 7.75	pH	
Temperature 21.32	Temperature	
Redox Potential (Bh)	Redox Potential (Eh)	
Turbidity	Turbidity	·
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	pH	
Temperature	Temperatura	
Redge Potential (Eth)	Redox Potential (Eh)	4 · ·
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Turbidity	Turbidity
Volume of Water Purged When Hield	Parameters are Monaured
Pumping Rate Calculation	 Anternational
Flow Rate (Q), in gpm. S/60 = =	Time to evacuate two casing volumes (2V) T = 2V/Q =
Number of casing volumes evacuated	(if other than two)
If well evacuated to dryness, number o	f gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs

<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other that as specified below)	Filtered (circle)	Preservative Added (circle)	
VOCs	Y N	3x40 ml	Y N	HCL Y N	
Nutrients	Ø N	100 ml	YØ	H ₂ SO ₄ (D) N	
Heavy Metals	Y N	250 ml	YN'.	HNO3 Y N	
All Other Non- Radiologics	() N	250 ml	Y 🕅	No Preservative Added	
Gross Alpha	YN	1,000 ml	Y N	H ₂ SO ₄ Y N	
Other (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:	
	2.5-53				

Comments Arrive ON Site AT 0845 . ()M. SET OF Parameters Tallen Then Somple pulled at 0852 . Tett Site at 0966 IGyan Pataer present For Sampling

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Mill – Grounihuster Discharge Permit Groundwaterikkanitoring Quality Assurance Plan (QAP)

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E-B-C-C	<u>tachment 1</u> esa uranium milli.
	SHEET FOR GROUND WATER
Description vi Sampling Event: Heate	
Location (well name) MW 18	Sampler Name and initials Tanner Hollidaux
Date and Finnesiar Purging <u>7-14-09</u>	and Sampling (if different)
	er Well Pump (if other than Bennet) QED
Sampling Event bist	Prev. Well Sampled in Sampling Event ///
pH Buffer 7:0 7.0	pH Buffer 4.0 년 0
Specific Conductance <u>198</u> uMHOS/cm	Well Depth
Depth to Water/Before Purging 71.34	Casing Volume (V) 4" Well: <u>40 91</u> (.653h) 3" Well: <u>1/14</u> (.367h)
Conductance (aug) 3587	pH of Water (avg)
Well Water Fenge. (avg) 14.30	Redox Potential (Eh) 171_Turbidity
Weather Cond. <u>Cleac</u> Bat ² 1.	Amb. Temp. (prior to sampling event) <u>19.5°</u>
Time: 0(-3()Gal. Purged	Time: 0700
Conductance 3575	Conductance_3575
рн <u>6.54</u>	pH
Temperature 14.10	Temperature 14.21
Redox Potentialith) 180	Redox Potential (Bh) 161
TurbidityO	Turbidity0
Time: 0730 Gal. Purged 26.4	Time: 0800 Gal. Purged 36.3
Conductance_3595	Conductance 3603
pH 6.54	pH6.5]
Temperature 14.36	Temperature 14.52
Redox Potentistan) 167	Redox Potential (Bh) 177
Turb	Turb

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Volume of Water Purged William Barmeter and Bearthad 39.6

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) S/60 = -3.33 T = 2V/Q = -247 Min

Type of Sample Samp Taker (circle		Sample Volume (indicate if other thair as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)	
VOCs	YN	3x40 ml	Y N **	HCL Y N	
Nutrients	(X N	100 ml	Y (N)	H ₂ SO ₄ (Y) N	
Heavy Metals	Y N	250 ml	Y N	HNO3 Y N	
All Other Non- Radiologics	(Y) N	250 ml	Y (N)	No Preservative Added	
Gross Alpha	YN	1,000 ml	Y N	H ₂ SO ₄ Y N	
Other (specify)	Y N	Samplé volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative	

Janner Holliday Comments Arrived on site at 0559 Dresent and sampling event. Puras beago for 120 UMinutrs Purpe expided 0810 Samples Taken at 0812 Water: Clear throughout Purac Most tiw clouds (Early th in Clear with Mornini

Mill – Grounilwater Discharge Permit Groundwater Elevitoring Quality Assumes Plan (QAP)

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	ATTACHIMENT 1
	TE MESA URANIUM MILL
	ORKSHEET FOR GROUND WATER
Description vi. Sampling Event:	
	Sampler
Location (well mme) MW	9 Name and initials Tronger Hollidary
Date and Time for Purging _7-14-00	and Sampling (if different)
22.20.10.00	11- (* 11 (11 (11)
	bailer Well Pump (if other than Bennet) QED
Sampling Event Nitrola d Chl	orde Prev. Well Sampled in Sampling Event MW 18
pH Buffer 7:07.0	pH Buffer 4.0 Ц.О
Specific Conductance 998 ulMHO	S/cm Well Depth149
Depth to Water Before Purging 1219	51.13 Casing Volume (V) 4" Well: 63.90 (.653h)
Conductance (avg) 1433	3" Well: <u>~/4</u> (.367h) pH of Water (avg) 7 .14
Well Water Temp. (avg) 15.09	Redox Potential (Eb) 293 Turbidity 1.45
Weither Cond Suma	Tell Amb Toma (avior to complian and)8 3
Weather Conto. 2000 1	Ent'l Amb. Temp. (prior to sampling event) 28.3 c
Time: 0840 Gal. Purged 4.95	Time: 0900 Gal. Purged 11.55
Conductance 1493	Conductance 1501.
pH7.09	7.11
Temperature_15.00	Temperature 15.13
Redox Potential (Rh) 2.57	Redox Potential (Eh) 289
TurbidityO	Turbidity8
Time: 0930 Gal. Purged 21.95	Time: 1005 Gal. Purged 33
Conductance1374	Conductance 1363
pH7.15	7.21
Temperature 15.18	Temperature15.05
Redox Potential (Ph) 307	Redox Potential (Bh) 319
-	
Turb3.8	Turb .2

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1.20

Turbidity______ Turbidity______

Volume of Water Purged Willandight Personal 29.6

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) S/60 = -33 T = 2V/Q = -387 Min

If well evacuated to dryness, number of gallons evacuated ______

Name of Certified Analytical Laboratory if Other Than Energy Labs______/4

<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other thai as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	(V) N	100 ml	Y (N)	H2SO4 (V) N
Heavy Metals	YN	250 ml	YN	HNO ₃ Y N
All Other Non- Radiologics	Ý N	250 ml	Y (N)	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Accived on site at 0820. Tanner He	Iliday present for purge
and sampling went. Purge begap at or	
for izd UMinutes Putge explaid at 11	125, 1-19 site at 1000.1032
Water: clear throughout purge	
Weather: Sunny & Hot	
	•

August Sampling Event

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TA	TACHMENT 1	
	esa uranium mill	
FIELD DATA WORK	SHEET FOR GROUND WATER	
Description of Sampling Event: 2 nd Chl	Sampler	
Location (well name) TWN-5	Name and initials Pyan Palmer	
Date and Time for Purging 8:25-09	and Sampling (if different) 8.27.09	0.1
Well Purging Equip Used:pump orbail	er Well Pump (if other than Bennet) Buyles Exploration	Bailed
Sampling Event Initial Test	Prev. Well Sampled in Sampling Event <u>NA</u>	
pH Buffer 7.0 7.0	pH Buffer 4.0 40	
Specific Conductance 998 uMHOS/cm	Well Depth 155.00 150.00	
Depth to Water Before Purging 70. 75	_ Casing Volume (V) 4" Well: (.653h)	
Conductance (avg)	3" Well:(.367h) pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity	C.
Weather Cond Ext'l	Amb. Temp.(prior to sampling event)	
Time: 1638 Gal. Purged	Time:Gal, Purged	
Conductance 3169	Conductance	
рн 6.92	pH	
Temperature 14.28	Temperature	
Redox Potential (Bb) 496	Redox Potential (Eh)	
Turbidity3.5	Turbidity	•
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	pH	
Temperature	Temperature	
Redox Potential (Eh)	Redox Potential (Eh)	<u>.</u>
		<u> </u>

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1.3

Turbidity______ Turbidity______

Volume of Water Purged When Field Parameters are Measured_

Pumping Rate Calculation

Flow Rate	(Q), in gpm.	7	Time to evacuate two casing volumes (2V)
S/60 =	۲. 	'c	T=2V/Q=

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

1		17 or an and a state of	- 11	and the second second
<u>Type of Sample</u>	<u>Saimple</u> Taken (circle)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients Nithate	N N	100 ml	Y N	H ₂ SO ₄ OV N
Heavy Metals	Y Ø	250 mf	YN,	HNO3 Y N
All Other Non- Radiologics	Y Ø	250 ml	YN.	No Preservative Added
Gross Alpha	YN	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify) Chbeidc	N N	Sample volume	Y AD	Y N
	14 M			If a preservative is used, Specify Type and Quantity of Preservative:
		n 1 - 24		
				335 4 F

with Tunner H. Comments_ Dreviuns 1415 7700. ays by Bauld THI to Micaren Her 8 Southales 77.09 0640 ar. He lef? ...

Mill - Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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ATTACHMENT 1 WHITTE MESA URANIUM MILL FIELD DATA WADR FOR GROUND WATE 2nd Description of Sampling Event: livide. Sampler Location (well name) THIN. Name and initials 25 8.209 Date and Time for Purging and Sampling (if different) Sayles lixplorania Barted Well Purging Equip Used: _pump or _bailer Well Pump (if other than Bennet) Sampling Event Initial Test Prev. Well Sampled in Sampling Event m 7.0 40 pH Buffer 7.0 pH Buffer 4.0 998 uMHOS/cm 130: Specific Conductance Well Depth ampte Denth to Water Before Purging Casing Volume (V) 4" Well: (.653h) 3" Well: (.367h) Conductance (avg) pH of Water (avg)_ Redox Potential (Eh)_-Well Water Temp. (avg) Turbidity Ext'l Amb. Temp.(prior to sampling event) Weather Cond. Time: 06 Gal. Purged Time: Gal, Purged Conductance Conductance pH Temperature Temperature 58 Redox Potential (Eh) Redoy Potential (Eh) Turbidity Turbidity Time: Gal. Purged Gal. Purged Time: **Conductance** Conductance pH_ Temperature Temperature Redox Potential (Eh) Redox Potential (Eh)

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Turbidity	Turbidity
Volume of Water Purged When Field Parameter	ers are Measured
Pumping Rate Calculation	
Flow Rate (Q), in gpm. /	Time to evacuate two casing volumes (2V) T = 2V/Q =
Number of casing volumes evacuated (if other t	han two)
If well evacuated to dryness, number of gallons	evacuated
Name of Certified Analytical Laboratory if Othe	er Than Energy Labs

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		a farsin di algada		$= \int_{-\infty}^{\infty} dx^2 = \int_{-\infty}^{\infty} dx \int_{-\infty}^{$
<u>Type of Sample</u>	<u>Sample</u> Taken <u>(circle)</u>	Sample Volume (indicate if other that as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N 24	HCL Y N
Nutrients	Q N	100 ml	YOP	H ₂ SO ₄ (Y) N
Heavy Metals	Y.N	250 ml	Y N ',	
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify) <u>chleride</u>	OB N	Sample volume	Y X	Y ON If a preservative is used, Specify Type and Quantity of Preservative:
	5 X 147			and solution

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Comments H 1 danes nre) Hrrin left augly tala 0657 ENLON Baylis Deys previews by Virge 6x Merchin Way the Unduck 111 7 •.'

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LE JUI	TACHMENT 1
	esa uranium mill Scheet For Ground water
	ide / Nitrate Test / New wells)
Location (well name) TWN-7	Name and initialsPaluer
	and Sampling (if different) 8-27-09
Well Purging Equip Used:pump or 120ail	er Well Pump (if other than Bennet) Bayles Complemation Bailed
Sampling Event Fruited Just	Prev. Well Sampled in Sampling Event_ <u>N4</u>
pH Buffer 7.0 7.0	pH Buffer 4.0
Specific Conductance 948 uMHOS/cm	Well Depth
Depth to Water Before Bunging 96. 70	_ Casing Volume (V) 4" Well:(.653h)
Conductance (avg)	3" Well:(.367h) pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
Weather Cond Ext'l	Amb. Temp.(prior to sampling event)
a an	
Time: <u>0622</u> Gal. Purged	Chine: Gal. Parged
Conductance	Conductance
рн7.65	pH
Temperature 15.64	Temperature
Redox Potential (Eh) 4.89	Redox Potential (Eh)
Turbidity49	Turbidity
Timo: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Recox Potential (Eh)	Redox Potential (Eh)

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Turbidity.

Turbidity_

Volume of Water Purged When Field Parameters are Measured

Pumping Rate Calculation

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Flow Rate	(Q), in gpm.	7	Time to evacuate two casing volumes (2V)
S/60 =	5		T=2V/Q=

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs

		1. A MARINA MARKA		ga 🖞 💯 👘 🖓
<u>Type of Sample</u>	Sample Taken (circlè)	Sample Volume (indicate if other thin as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N **	HCL Y N
Nutrients	OP N	100 ml	Y N	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	YN	HNO ₁ Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify) Chloride	(Y) N	Samplé volume	Y N Y Ø	Y QP
	~ ²	a de la compañía de l		If a preservative is used,
		$\langle d^2 t \rangle = 1 - \epsilon_{\rm g} t t^2 t$		Specify Type and Quantity of Preservative:
	a 1 - 1 ^{- 20}			and a second

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Mill – Groundwater Discharge Permit Groundwater Moaitoring Quality Assurance Plan (QAP)

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Ch. with a	TACHIMIENT 1
	ESA URANIUM MILL
	SHEET FOR GROUND WATER
	Sampler A
Location (well name) TWN-8	Name and initialsAner
	and Sampling (if different) 8-27-09
Well Purging Equip Used:pump orbaile	and Sampling (if different) 0-2+01 Ser Well Pump (if other than Bennet) Bayles loopkravier Build
Sampling Event Initial Jest	Prev. Well Sampled in Sampling Event
pH Buffer 7.07-0	pH Buffer 4.0 4.0
Specific Conductance <u>998</u> uMHOS/cm	Well Depth
Depth to Water Before Burging 62.47	_ Casing Volume (V) 4" Well: (.653h)
Conductance (avg)	3" Well:(.367h) pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eb)Turbidity
Weather Cond Ext'l /	Amb. Temp.(prior to sampling event)
Time: 0705 Gal. Purged	Times Gal. Purged
Conductance_2645	Conductance
рн 7.32	pH
Temperature 14,15	Temperature
Redox Potential (Bh) 492	Redox Potential (Eh)
Turbidity 7.3	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
рн	рн
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
	-

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Volume of Water Purged When Field Parameters are Measured

Pumping Rate Calculation

Flow Rate (Q), in g	pm. 7	Time to evacuate two casing volumes (2V)
S/60 = =		T=2V/Q=

Number of casing volumes evacuated (if other than two)_____

If well evacuated to dryness, number of gallons evacuated_

Name of Certified Analytical Laboratory if Other Than Energy Labs_____

19	$= \frac{1}{2} M_{T}^{2} = 1$	Strendski spisov		· State that -
<u>Type of Sample</u>	<u>Sample</u> Taken (circle)	Sample Volume (indicate if other that as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N **	HCL Y N
Nutrients	Ø N	100 ml	YW	H ₂ SO ₄ (D) N
Heavy Metals	Y.N	250 ml	YN,	HNO3 Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	60 N	Samplé volume	Y (N)	Y (ID) If a preservative is used, Specify Type and
	Ì			Quantity of Preservative:

1\$ Comments Well 1.23 at 0709. MANIM 14 mation . .*

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Mill - Groundwater Discharge Permit	Date: 2.25.07 Revision: 2
Groundwater Monitoring	
Quality Assurance Plan (QAP)	Page 40 of 41
FIELD DATA WORK	TACHMENT 1 ESA URANIUM MILL SSHEET FOR GROUND WATER 1. W. Jule Test New Well
DOST INTER OF CONTRACTING PACIFIC. 7 (10)	Sampler
Location (well name)	_ Name and initials Ryan Polmer
	and Sampling (if different) 8-27-09
Well Purging Equip Used:pump orbail	er Well Pump (if other than Bennet) Bayks bapl. Baikd
Sampling Event Initial Test	Prev. Well Sampled in Sampling Event
pH Buffer 7.0 7.0	pH Buffer 4.0
Specific Conductance 998 uMHOS/cm	Well Depth97.
Depth to Water Before Purging	_ Casing Volume (V) 4" Well:(.653h) 3" Well:(.367h)
Conductance (avg)	pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
Weather Cond Ext'l.	Amb. Temp (prior to sampling event)
And Andrew An	
Time: 0726. Gal. Purged	Time:Gal. Purged
Conductance 3002	Conductance
рн6.33	pH
Temperature <u>14,38</u>	Temperature
Redox Potential (Bh)_ <u>390</u>	Redox Potential (Eh)
Turbidity	Turbidity
Time:Gal. Purged	Time: Gal. Purged
Conductance	Conductance
рН	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

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Mill – Groundwater Di Groundwater Monitoriu		Date: 11.17.05 Rev	rision: l	ж.
Quality Assurance Plan				Page 41 of 41
	-			
Turbidity		Turbidity	0.0	
FF I Chilledon Theorem		P		
Volume of Water Purg	jea when Micia	Parameters are Meas	iureo	
Pumping Rate Calcula	tion			10 1 1
runping tran Calcula		>	1510	and the second states
Flow Rate (Q), in gpm.			vacuate two casing	s volumes (2V)
S/60 = =		T = 2V/O	=	-
Number of casing volui	nes evacuated ((if other than two)		to the second
·		A second backborn		-
If well evacuated to dry	ness, number of	f gallons evacuated		Contraction of the second s
Name of Certified Anal	ution I aborate		A Palada State	
Name of Certifica Anal	vical Laborato	ry if Other A nam Falles	igy Laos	
1 The second	C. PAND	W. Spick was	therefore a state of the state	(南部)的1011年1月2日
Type of Sample	Sample	Sample Volume	Filtered	Preservative Added
and the second s	Taken	(indicate if other	(circle)	(circle)
	(circle)	than as specified		International states with
CIMENT COMPLEX	- Partition Laboration	below)	Children and an and an Arrigan Anna	n an
VOCs	YN	3x40 ml	YN	HCL Y N
Nutrients	N N	100 ml	Y OD	HISO4 OV N
Heavy Metals	Y N	250 ml	Y N	HNO1 OD OD
All Other Non-	Y N	250 ml	Y N	No Preservative Added
Radiologics		And Millereday and and		
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify)	Ø N	Sample volume	Y N	YN
chloride	1		ter i segura de	and the second
CATOPOLO	i anna	. A house and		If a preservative is used,
				Specify Type and
		2 ⁴ 4月19月1日 - 公共的	d a second	Quantity of Preservative:
			2	
		19 ¹¹ -19	e di	a the second
	Status.			and the factor
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15 S S S S S S S S S S S S S S S S S S S		CONTRACTOR CONTRA

Sampling Vance Comments mesent fer Samples Sik 073 left 2 Tallen C W 8-25-09 Splerarie Bayles Bailed and •.*

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AT	TACHIMIENT 1
	ESA URANIUM MILL
and I	SHEET FOR GROUND WATER
TOPOTADICON ON CONTRACTOREN CALOURINE CALIC	Sampler
Location (well name) TWN-10	_ Name and initials //year Parlmer
Date and Time for Purging 8:25.09	and Sampling (if different) 8.27.09
in the second	Plant is a second of the secon
Well Purging Equip Used:pump or _/bail	er Well Promp (if other than Bennet) Baylis lixplanti Bailed Well
Sampling Event Justial Test	Prev. Well Sampled in Sampling Event
pH Buffer 7.0 7.0	pH Buffer 4.0 4.0
Specific Conductance 998 uMHOS/cm	Well Depth
Depth to Water Before Purging	Casing Volume (V) 4" Well:(.653h)
Conductance (avg)	pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
Weather Cond Brt'l	Amb. Temp.(prior to sampling event)
Time: <u>071.3</u> Gal. Purged	TimesGal, Purged
a second and called a balance of a second	
Conductance 4054	Conductance
pH4.73	pH
Temperature 14.18	Temperature
1110	Temperature
Redox Potential (Bh) 402	Redox Poténtial (Eh)
Turbidity	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
Conductante	Conductanto
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
	· · · · · · · · · · · · · · · · · · ·

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Turbidity	Turbidity	4	•
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Volume of Water Purged When Field Parameters are Measured

Pumping Rate Calculation

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Flow Rate (Q), in gpm.	Time to evacuate two casing volumes (2V)
S/60 =	T = 2V/Q =
Number of casing volumes evacuated (if oth	er than two)

1

If well evacuated to dryness, number of gallons evacuated____

Name of Certified Analytical Laboratory if Other Than Energy Labs_

	4442	$(1)^{\prime} = (1)^{\prime} (1$		agent har hard in the
<u>Type of Sample</u>	<u>Sample</u> <u>Taken</u> (circle)	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N 💀	HCL Y N
Nutrients	N N	100 ml	Y W	H ₂ SO ₄ (Ø N
Heavy Metals	Y N	250 ml	YN',	HNO3 Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify)	Ó N	Samplé volume	Y (N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Tanner H present. Sampled 1711. Comments an regles hipkrentier 8.75.09 h ...

September Sampling Event

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DH

Time:

pH_

Redox Potential (Eh)

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ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER Description of Sampling Event: 200 Quarter Nitrate/chloride Sampler Name and initials Tanner Holliday & Ryan Palmer Location (well name) TWN-Date and Time for Purging 9-21-09 and Sampling (if different) Well Purging Equip Used: x pump or bailer Well Pump (if other than Bennet) Grandfos Prev. Well Sampled in Sampling Event-TWN-1R Sampling Event Quarterly witrate/chloride pH Buffer 4.0 7.0 pH Buffer 7.0_ Well Depth 106 Specific Conductance 998 uMHOS/cm Depth to Water Before Purging 47.83 Casing Volume (V) 4" Well: 58.17 (.653h) 37.98501 3" Well: N/A (.367h). Conductance (avg)___ pH of Water (avg). Redox Potential (Eb) _____Turbidity Well Water Temp. (avg) Ent'l Amb. Temp (prior to sampling event) Weather Cond. Time: / 823 Gal. Purged Time: Gal, Purged Conductance Conductance____ pH Temperature Temperature, Redox Potential (Bh) 503 Redox Potential (Eh) Turbidity_ Turbidity. Gal. Purged Gal. Purged Time: Conductance Conductance pH Temperature Temperature

Redox Potential (Eh)_

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Turbidity	Turbidity
Volume of Water Purged WHELENERS	eleared and 76 gallars
Pumping Rate Calculation	, the fit is a second
Flow Rate (Q), in gpm. \$/60 =	Time to evacuate two casing volumes (2V) $T = 2V/Q = \frac{2.6}{2.6}$

Number of casing volumes evacuated (if other than two)____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs

7	1402.00	A CONSIGNATION		and the state of the
Type of Sample	Sahiple Taken (circle)	Sample Volume (indicate if other thin as specified below)	<u>Filitored</u> (cticle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	(Y) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	YN	HNO3 Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify) General Inorganic	(Y) N	Samplé volume	Y M	Y (N) If a preservative is used,
	2	$(\mathrm{d} K_{\mathrm{press},\mathrm{d}}) = (1 + 1)^{1/2} $		Specify Type and Quantity of Preservative:
		10 m		
	and states of	· · · · ·		1985 A. G.

Purge Comments Arrived on site at 0810. Tanner Holliday & Ryan Palmer present For the purge. Purge began at 0813. Purged O well for 12-6 Minutes. Purge ended at 0825. Left site at 08:50 Dample: Arrive or 1410 Sourgle 1412 left AT 1414 Mill – Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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<u>A</u> T	TACHIMIENT 1	
WHITTE MI	esa uranium mill	
	SHEET FOR GROUND WATER	
Description of Sampling Event: 3rd Qu	varter Nitrate/chloride	
	Sampler	
Location (well name) TWN-2	Name and initials Tanner Holliday & Ry on Palmer	
Date and Time for Purging 9-21-09		
Well Purging Equip Used: X pump orbaile	er Well Pump (if other than Bennet) Grundfos	
Sampling Event Quarterly without / chloride	Prev. Well Sampled in Sampling Event TWN-RA	
pH Buffer 7.0 7.0	pH Buffer 4.0	
Specific Conductance <u>498</u> uMHOS/cm	Well Depth96	
Depth to Water Before Purging 16-96	Casing Volume (V) 4" Well: $\frac{79.04 \times (.653h)}{3$ " Well: $\frac{37.04 \times (.653h)}{37.04}$	
Conductance (avg)	3" Well: <u>4</u> (.367h) pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity	<u>.</u>
Weather Cond. Sunny	Amb. Temp.(prior to sampling event) <u> 8.8</u> C	
	and the second secon	
Time: 09.16	Times Gal. Purged	
Conductance_2911	Conductance	
рн 7-01	рн	
Temperature 15.87	Temperature	
Redox Potential (Bh) 420	Redox Potential (Eh)	
Turbidity266	Turbidity	•
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
рН	рН	
Temperature	Temperature	
Redox Potential (Eh)	Redox Potential (Eh)	*.
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Turbidity	Turbidity			
Volume of Water Purged WARD DEPARTMENT	is an address and	103	Gallens	

Pumping Rate Calculation

Flow Rate (Q), in gpm.	•	Time to evacuate	two casing volumes (2V)
S/6D =	17	6	T = 2V/Q =	17 min

Number of casing volumes evacuated (if other than two)_____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs_____/A

	1 2 8 1	19 1 White Blacks		and the state of the state of the
<u>Type of Sample</u>	<u>Saimple</u> <u>Taken</u> (circlé)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	<u>Preservative Added</u> (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	(Y) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	Y N	HNO3 Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify) General Inorganic	(Y) N	Samplé volume	Y M	Y (N) If a preservative is used, Specify Type and Quantity of Preservative:

Purge Comments Arrived on site at 0903, Terner Holliday & Ryan Palmer present For the purge. Purge began at CARCE Purged O well for 17 Minutes. Purge ended at 0923. Left site at 0926 Dample: Arrive at 1354 Sample 1356 Later

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	<u>ATTACHMENT 1</u> MESA URANUUM MULL
	RKSHEET FOR GROUND WATER
	Quarter spitrate/chloride
	Sampler
Location (well name) TWN - 3	Name and initials Tanner Holliday & Ryon Palmer
Date and Time for Purging 9.21.09	_and Sampling (if different) 4.22.09
Well Purging Equip Used: X pump orb	ailer Well Pump (if other than Bennet) Grundfos
Sampling Event Quarterly withede/chlorid	Prev. Well Sampled in Sampling Event TWN 3 R
pH Buffer 7.0 7.0	pH Buffer 4.0 H.O.
Specific Conductance 998 uMHOS/c	statistics of statistics
Depth to Water Before Purging	Casing Volume (V) 4" Well: <u>63. 84 + (.653h)</u> 4. 68752
Conductance (avg)	3" Well: <u>//4</u> (.367h)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
	Pl Amb. Temp: (prior to sampling event) <u>21.7</u> C
Time: 1007 Gal. Purged 72	Times Gal, Purged
Conductance 2713	Conductance
1 az	
рн. 6.70	pit
Temperature <u>14.77</u>	Temperature
Redox Potential (Bh) 4 f/	Redox Potential (Eh)
Turbidity37.2	Tufbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
płł	рН
płł Temperature	pH Temperature

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Turbidity	Turbidity	·
E DE	A GEORGE Y	

Volume of Water Purged WRELEARCONCERNMENTED

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) S/60 = - 4 $T = 2V/Q = - \frac{14}{14}$

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Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs

	1.11	·注: (1)推荐: 1944.4	3. A	
<u>Type of Sample</u>	<u>Saimple</u> Taken <u>(circlé)</u> :	Sample Volume (indicate if other than as specified below)	<u>Ellitered</u> (clicke)	Preservative Added (circle)
VOCs	YN	3x40 ml	Y N	HCL Y N
Nutrients	(¥) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	Y N	HNO3 Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	(Y) N	Samplé volume	Y M	Y (N)
General Inurganic		e e construcción de la construcción		If a preservative is used, Specify Type and
	۲	naga sa sa sa sa sa sa sa		Quantity of Preservative:
		i. es		A
		- J		

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Mill – Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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e	IESA URANIUM MILL
FIELD DATA WOR	KSHEET FOR GROUND WATER
Description of Sampling Event: 350 Q	warter Nitrate/chloride
Location (well name) TWN - 4	Sampler Name and initials_ Tanner Holliday & Ryan Palmer
Date and Time for Purging 9.21.09	and Sampling (if different)
Well Purging Equip Used: <u>x_pump</u> orbai	ler Well Pump (if other than Bennet) Grundfos
Sampling Event Quarterly vitrate/chloride	
pH Buffer 7.0 7.0	pH Buffer 4.0 4.0 1/4/6 125. #0 36.85
Specific Conductance 998 uMHOS/cm	
Depth to Water Before Purging 36.85	_ Casing Volume (V) 4" Well: 88.85 x (.653h) _ 57.72
Conductance (avg)	3" Well: <u>~/4</u> (.367h) pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh) Turbidity
Wennier Cond. Clary Windy Bat's	Amb. Temp.(prior to sampling event) 18-10
Time: ///2 Gal. Purged 92	Time: Gal, Purged
982 (1)	
Conductance 785 - 0	Conductance
pH 7.09	pH
Temperature 15.57	Temperature
Redox Potential (Bb) 4//	Redox Potential (Eh)
Turbidity	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	рН
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Bh)

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Tusbidity	Turbidity	······································	_
Volume of Water Purged WHERE WARRANT	Garcel/genure	u 115.44	

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) $S/60 = - G T = 2V/Q = - \frac{19}{miw}$

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs______/A

	· · · · · ·	了行为的标志的转位。	Second D	
<u>Type of Sample</u>	<u>Saimple</u> Taken <u>(circle)</u>	Sample Volume (indicate if other (lum as specified below)	<u>Filtered</u> (circle)	Preservative Added (circle)
VOCs .	YN	3x40 ml	Y N ~	HCL Y N
Nutrients	(Y) N	100 ml	YW	H ₂ SO ₄ (Y) N
Heavy Metals	Y.N	250 mf	Y N .	HNO, Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify) General Inorganic	(Y) N	Samplé volume	Y N	Y (N)
<u> </u>	· · · · · · ·	Regeneration References and the		If a preservative is used, Specify Type and Quantity of Preservative:
		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		
	12 20	1 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 -		ad Alagon .

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IA	TACHMENT 1
WHEN TE A THAT A	ESA URANIUM MULL.
Description of Sampling Event:	SHEET FOR GROUND WATER
	Sampler
Location (well name) TWN - 5	Name and initials Tanner Halliday & Ryan Palmer
	and Sampling (if different) 9.22.09
Well Purging Equip Used: 🗴 pump orbail	er Well Pump (if other than Bennet) Grundfos
Sampling Event Quarterly without / chloride	Prev. Well Sampled in Sampling Event-TWN-5R
pH Buffer 7.0 7.0	pHI Buffen 4.0
Specific Conductance 998 uMHOS/cm	Well Depth
Depth to Water Before Purging 70.67	_ Casing Volume (V) 4" Well: 79.33 (.653h) 5/.86249
Conductance (avg)	9" Well: <u>24 (367h)</u> pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh) Turbidity
Weather Cond. Char, Windy Ent'l	Amb. Temp (prior to sampling event) 20 C
\mathbf{V}	and the second
Time: <u>///3.5</u> Gal. Purged	Time: Gal, Purged
Conductance 3127	Conductance
рН6.6	pH
Temperature <u>17-58</u>	Temperature
Redox Potential (Bb) 358	Redox Potential (Eh)
Turbidityl。之	Turbidity
Tims: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
:	
Redox Potential (Eh)	Redox Potential (Bh)

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Volume of Water Purged WREEDERSPECTER Processing 103

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = -6 Time to evacuate two casing volumes (2V) $T = 2V/Q = -17 M_{\odot}$

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs______A___

· ,	-1 3 A. C.	1月1月1日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日		
<u>Type of Samule</u>	<u>Saimple</u> <u>Taken</u> <u>(circlè)</u>	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (Chicle)
VOCs	Y'N	3x40 ml	Y N or	HCL Y N
Nutrients	(Y) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	ŶŇ,	HNO ₃ Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify) General Inorganic	(Y) N	Samplé volume	Y N	Y (N)
Canera Interganic	· ***	$\sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i$		If a preservative is used, Specify Type and
	•	als francisci, peð		Quantity of Preservative:
		- 10 est		
	a Sa gadha a			and at in a

Comments Arrive VavaED FOR 17 Min GT 1418 AT 1470 lgan 1437 1340 Sample 1344 lett 1346 Jumples

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WART	<u>ATTACHMENT 1</u> TTE MESA URANIUM MULI.	
FIELD DATA	YORKSHEET FOR GROUND WATER	
Description of Sampling Event: 30		
Location (well name) TWN - 6	Name and initials Janner Holliday & Ryan Palmer	
Date and Time for Purging 9.22.0	· · · · · · · · · · · · · · · · · · ·	
Well Purging Equip Used: 'X pump or	Bailer Well Rump (if other than Bennet)_Grandfos	
Sampling Event Quarter ly witred / ch	londe Prov. Well Sampled in Sampling Event	1.
pH Buffer 7.0 7.0	pH.Buffen4.0	
Specific Conductance 998 uMHC	S/cm Well Depth/30	
Depth to Water Before Purging 75.	48 Casing Volume (V) 4" Well: 51.52 × (.653h) 35. 60154	
Conductance (avg)	3" Well:	
CONDICISION OF AND A CONTRACTOR OF	DET DEW MET (IVE)	
Well Water Temp. (avg)	Redox Potential (Eh) Turbidity	in .
Wenther Cond. Chan; Sunn	Ent'l Amb. Temp (prior to sampling event) 15°C	1 ·
and the second		N.
Time: <u>12.</u> Gal. Purged	Time:Gal, Purged	4.
	\sim 1	
Conductance 15 40	Conductance	
pH 7.21	PH	
Temperature	e datasti panata ang eng eng eng eng eng eng eng eng eng e	
د مرست ال د	Temperature	
Redox Potential (Bh) 458	Redox Potential (Eh)	
Turbidity 6.5	Turbidity	•
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	pH	
Temperature	Temperature	
Retion Potential (Eh)	Redox Potential (Bh)	
		2.500

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Turbidity		Turbidity		
Volume of Water Purged WR32226		eranal/eistral_	71	
_	1	and the second sec		
Pumping Rate Calculation	- ¹ t _x d _a t _x ,	di katan		

Mow Rate	(Q), in gpm.	Time to evacuate two casing volumes (2V)
S/60 =	=	$T = 2V/Q = \frac{12}{12}$ min

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Buergy Labs . I water the

	140201	17月19月1日日日 1月1日日 1月1日 1月1日日 1月1日日 1月1日日 1月1日日 1月1日日 1月1日日 1月1日日 1月1日 1月1日日 1月1日 1月1日日 1月1日日 1月1日日 1月1日日 1月1日 1月11日 1月11111111	125.4.2.4	
Type of Sample	Sample Taken (circlè)	Sample Volume (indicate if other than as specified below)	<u>Filitered</u> (circle)	Preservative Added (ctrcle)
· · · · · · · · · · · · · · · · · · ·		de adamentaria a compo	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	Contraction of the second second
VOCs	YN	3x40 ml	Y N	HCL Y N
Nutrients	(Y) N	100 ml	X (N)	H_2SO_4 (Y) N
Heavy Metals	Y.N	250 ml	Y N	HNO3 Y N
All Other Non- Radiologics	Y STAN	250 ml	YN	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify)	(Y) N	Sample volume	YN	Y (N)
General Inorganic		n na star (stal	÷ ·	If a preservative is used, Specify Type and
		[1] 10 = [1 + 1] 10 = 0	tyr v −r	Quantity of Preservative:
		· · · · · ·	-4	•
	51			and a second second

ample: Arrive Ar 1318 Samples At 1321 lett + 1225 1 21

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AT	TACHMENT 1	-2.
CLARKE CLARKE	ESA URANIUM MILL	1911 1912
	SHEET FOR GROUND WATER	
	sarter Nitrate/chloride	
	Sampler	
Location (well name) TWN - 7	_ Name and initials Tanner Holliday & Ryon Palmer	
	and Sampling (if different)	
Well Purging Equip Used: 🗴 journp orbail	er Well Pump (if other than Bennet) Grundfos	
Sampling Event Quarterly withate/chloride	Prev, Well Sampled in Sampling Event TWN - 28	
pH Buffer 7.0 7.0	pH Buffer 4.0	
Specific Conductance 998 uMHOS/cm	Well Depth	
Depth to Water Before Purging 90.92	Casing Volume (V) 4" Well: <u>/4.08</u> (.653h) 9.19424	•
Conductance (avg)	3" Well: <u>244</u> (.367h) pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity	ж,
Weather Cond. clear & Miney Bat'l.	Amb. Temp (prior to sampling event) <u>20-1</u>	
i shara wa wa wa wa wa sa		
Time: 1337. Gal. Purged	Time: Gal, Purged	
Conductance 1382	Conductance	
р <u>н 737</u>	pH	
Temperature 18.87	Temperature	
Redox Potential (Bh) 353	Redox Potential (Eh)	
Turbidity17.3	Turbidity	
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	рН	
Temperature	Temperature	
Redox Potential (Eh)	Redox Potential (Eh)	

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Turbidity	Turbidity	
Volume of Water Purged WREDERERE	is a rest feasing	a_18

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Pumping Rate Calculation

Flow Rate (Q), in gpm.	Time to evacuate two casing volumes (2V)
s/60 = =	T=2V/Q=

Number of casing volumes evacuated (if other than two)_____

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs______/A

		17. P. 特征的复数形式	Area and	
<u>Type of Sample</u>	<u>Saimple</u> Takén <u>(circle)</u> :	Sample Volume (indicate if other than as specified below)	<u>Filitered</u> (circle)	Preservative Addled (circle)
VOCs	YN	3x40 ml	Y	HCL Y N
Nutrients	(Y) N	100 ml	Y (N)	H2SO4 (Y) N
Heavy Metals	Y N	250 ml	Y N	HNO, Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	YN	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify)	(Y) N	Samplé volume	Y N	Y (N)
General Inorganic		$(r_{i})_{i\in I} \in \mathcal{C}^{(r)}$		If a preservative is used,
	÷	Chipe Leader		Specify Type and Quantity of Preservative:
		5 Kat.		й., и _{л.,}
	an and			and along the second second

Beguns AT 1336 Comments_ PERSONT mi 347 Sample 1349 10 FT 1351 rine •.'

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Mill - Groundwater Discharge Pennit	Date: 2.25.07 Revision: 2
Groundwater Monitoring	
Quality Assurance Plan (QAP)	Page 40 of 41
	ATTACHMENT I
WERE	TE MESA URANIUM MILL
	YORKSHEET FOR GROUND WATER
Description of Sampling Event: 20	
	Sampler
Location (well name) TWN-8	Name and initials Janner Holliday & Ryon Palmer
Date and Time for Purging 9.21.	A9
Date and Time for Purging 9.21.	07_and Sampling (if different)
Well Pussing Rabin Used. X mum or	
Won I unging Logary Cooke. Apanip of	ONINGONINGONING
Sampling Event Quarterly withde/chl	onde Prev. Well Sampled in Sampling Event-war-8R
0	n en hen en finden elemente formente elemente de la finde de finde de finde de la composition de la composition La composition de la c
pH Buffer 7.0 7.0	pH Buffer 4.0
Specific Conductance 998 uMHO	S/cm Well Depth
 Filler Strategy (Strategy Astronomy A Astronomy Astronomy Astro	and the second state of the second
Depth to Water Before Purging 62.3	8 Casing Volume (V) 4" Well: 83.12 (.653h) 54.27736
Strand and the second of	3" <u>Well:4 (.367h)</u>
Conductance (avg)	pH of Waer (avg)
Well Water Temp. (avg)	Redox Potential (Eb)
[1] K. B. M. Barder, and M. Barder, Mathematical Sciences, Appl. Phys. Rev. Lett. 7, 100 (1996).	
[1] K. B. M. Barder, and M. Barder, Mathematical Sciences, Appl. Phys. Rev. Lett. 7, 100 (1996).	Ext'l Aub. Temp.(prior to sampling event) 21.°C
[1] K. B. M. Barder, and M. Barder, Mathematical Sciences, Appl. Phys. Rev. Lett. 7, 100 (1996).	
Weather Cond. Clear, Windy	Ext'l Amb. Temp (prior to sampling event) 21.4
Weather Cond. <u>Clear, Widy</u> Time: <u>1534</u> Gal. Purged. <u>96</u>	Ext'l Amb. Temp (prior to sampling event) <u>21°C</u> Time: Gal, Purged
Weather Cond. Clear, Windy	Ext'l Amb. Temp (prior to sampling event) 21.4
Weather Cond. Clear, Widdy Time: 1534 Gal. Purged 96 Conductance 2426	Ext'l Amb. Temp (prior to sampling event) <u>21°C</u> Time: Gal, Purged
Weather Cond. <u>Clear, Widy</u> Time: <u>1534</u> Gal. Purged <u>96</u> Conductance <u>2426</u> pH 7.47	Ext'l Amb. Temp (prior to sampling event) <u>21°C</u> Time: Gal, Purged
Weather Cond. Clear, Widdy Time: 1534 Gal. Purged 96 Conductance 2426	Ext'l Amb. Temp (prior to sampling event) <u>21°C</u> Time: Gal, Purged
Weather Cond. <u>Clew.</u> , <u>Weather</u> Time: <u>1534</u> Gal Purges <u>96</u> Conductance <u>2426</u> pH747 Temperature <u>15 27</u>	Ext'l Amb. Temp!(prior to sampling event)
Weather Cond. <u>Clew.</u> , <u>Widy</u> Time: <u>1534</u> Gal. Purged <u>96</u> Conductance <u>2426</u> pH <u>7.47</u>	Ext'l Amb. Temp!(prior to sampling event)C
Weather Cond. <u>Clear, Widy</u> Time: <u>1534</u> Gal. Purged <u>96</u> Conductance <u>2426</u> pH <u>7.47</u> Temperature <u>15.27</u> Redox Potential (Bh) <u>321</u>	Ext'l Amb. Temp (prior to sampling event) 21.°C
Weather Cond. Clear, Widy Time: 1534 Gal. Purged 96 Conductance 2426 pH7.47 Temperature 15 27 Redox Potential (Bh) 321 Turbidity 62	Ext'l Amb. Temp (prior to sampling event) 21.°C
Weather Cond. Clew., Widy Time: 1534 Gal. Purged 96 Conductance 2426 pH 7.47 Temperature 15.27 Redox Potential (Bh) 321 Turbidity 62 Time: Gal. Purged	Ext'l Amb. Temp (prior to sampling event) 21.°C
Weather Cond. Clear, Widy Time: 1534 Gal. Purged 96 Conductance 2426 pH 7.47 Temperature 15.27 Redox Potential (Bh) 321 Turbidity 62 Time: Gal. Purged	Ext'l Amb. Temp!(prior to sampling event)
Weather Cond. Clew., Widy Time: 1534 Gal. Purged 96 Conductance 2426 pH 7.47 Temperature 15.27 Redox Potential (Bh) 321 Turbidity 62 Time: Gal. Purged	Ext'l Amb. Temp (prior to sampling event) 21.°C
Weather Cond. <u>Clear</u> , <u>Widy</u> Time: <u>1534</u> Gal. Purged <u>96</u> Conductance <u>2426</u> pH <u>7.47</u> Temperature <u>15.27</u> Redox Potential (Bh) <u>321</u> Turbidity <u>62</u> Time: <u>Gal. Purged</u> Conductance	Ext'l Amb. Temp!(prior to sampling event)
Weather Cond. <u>Clew.</u> <u>Weather Cond.</u> <u>Clew.</u> <u>Weather Cond.</u> <u>Clew.</u> <u>Weather Conductance</u> <u>2426</u> Conductance <u>2426</u> pH <u>7.47</u> Temperature <u>15.27</u> Redox Potential (Bh) <u>32.1</u> Turbidity <u>6.2</u> Time: <u>Gal. Purged</u> Conductance <u>pH</u>	Ext'l Anib. Temp (prior to sampling event)
Weather Cond. Clear, Widy Time: 1534 Gal. Purged 96 Conductance 2426 pH 7.47 Temperature 15.27 Redox Potential (Bh) 321 Turbidity 62 Time: Gal. Purged Conductance pH	Ext'l Amb. Temp (prior to sampling event) 21.°C
Weather Cond. <u>Clew.</u> <u>Weather Cond.</u> <u>Clew.</u> <u>Weather Cond.</u> <u>Clew.</u> <u>Weather Conductance</u> <u>2426</u> Conductance <u>2426</u> pH <u>7.47</u> Temperature <u>15.27</u> Redox Potential (Bh) <u>32.1</u> Turbidity <u>6.2</u> Time: <u>Gal. Purged</u> Conductance <u>pH</u>	Ext'l Anib. Temp (prior to sampling event)

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Mill – Groundwater D Groundwater Monitori		Date: 11.17.06 Rev	vision: 1	
Quality Assurance Plat				Page 41 of 41
<i>2</i> ,		e de la companya de la	a	0
				*
Turbidity	the second	Turbidity	7 	
Volume of Water Pur	ged WHERE	Alexand and a	men 108	
			i lana	
Pumping Rate Calcula	<u>ttion</u>	n and a state of the		÷
		the states of th	Longe to second the	
Flow Rate (Q), in gpm			acuate two casing t	
S/60 = =		1 = 201Q	= 10 min)	<u>an in the sum</u> the set
Number of casing volu	mes evanuated	Of other they two		Cr Februar
Manuaci of exercit.	ALLOS O VEOLEGICOL	(IE OLDER GIRDE ENO)		and the second secon
If well evacuated to dry	vness, number o	f pallons evacuated	hundresses and a	1
		Superior Automation		
		to an an an an an an	the second of the second of	A STATE AND STATE A STATE
Name of Certified Anal	iytical Laborato	bry it Other Than Bne	gy LabsN/	A
Name of Certified Anal				A
States -	1507	1. MAR ENGL	(BRADA CONTRACTOR	and a start of the second
Name of Certified Anal	Saimple	Sámple.Veluine	Flittered	Prescryative Added
States -	Sample Taken	Sámple Volume (indicate R offici	Flittered	and a start of the second
1947	Saimple	Sample Volume (indicate if other than as specified	Flittered	Preservative Added (circle)
State of the second	Sample Taken	Sámple Volume (indicate if offici	Flittered	Prescryative Added
Type of Samuele	Sataphe Taken (circle) Y N	Sample Volume (indicate if other than as specified	Flittered	Preservative Added (circle)
<u>Type of Sample</u> VOCs Nutrients	Saimple Taken (circle)	Sample Volume (indicate it officer than as specified tieldw) 3x40 ml 100 ml	<u>Filitered</u> (circle) Y N ~~~ Y N	Preservative Added (circle) HCL: Y N H2SO4 (Y) N
<u>Type of Sample</u> VOCs Nutrients Heavy Motals	Sataphe Taken (circle) Y N	Sample Volume (indicate it other than as specified below) 3x40 ml 100 ml 250 ml	Y N Y N Y N	Preservative Added (circle) HCL Y N H2SO4 HNO3
Type of Samule VOCs Nutrients Heavy Metals All Other Non-	Sahaphe Taken (circle) Y N (Y N	Sample Volume (indicate if other than as specified below) 3x40 ml 100 ml 250 ml	<u>Filitered</u> (circle) Y N ~~~ Y N	Preservative Added (circle) HCL: Y N H2SO4 (Y) N
Type of Samuele VOCs Nutricats Heavy Metals All Other Non- Rediologics	Saimphe Taken (circle) Y N (Y N Y N Y N	Sample Volume (indicate if other than as specified below) 3x40 ml 100 ml 250 ml	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL Y H ₂ SO ₄ Y No Y No Preservative Added
Type of Samuele VOCs Nutrients Heavy Metals All Other Non- Radiologics Gross Alpha	Saimphe Taken (circle) Y N (Y N Y N Y N Y N	Sample Volume (indicate it other drait as greetified below) 3x40 ml 100 ml 250 ml 300 ml	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL Y N H2SO4 (2) N HNO3 Y N No Preservetive Added H2SO4 Y N
Type of Samuele VOCs Nutrients Heavy Metals All Other Non- Radiologics Gross Alpha	Saimphe Taken (circle) Y N (Y N Y N Y N	Sample Volume (indicate if other than as specified below) 3x40 ml 100 ml 250 ml	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL Y H ₂ SO ₄ Y No Y No Preservative Added
Type of Sample VOCs Nutrients Heavy Metals All Office Non- Radiologics Gross Alpha Other (specify)	Saimphe Taken (circle) Y N (Y N Y N Y N Y N	Sample Volume (indicate it other drait as greetified below) 3x40 ml 100 ml 250 ml 300 ml	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL Y N H2SO4 (2) N HNO3 Y N No Preservetive Added H2SO4 Y N
Type of Sample VOCs Nutrients Heavy Metals All Office Non- Radiologics Gross Alpha Other (specify)	Saimphe Taken (circle) Y N (Y N Y N Y N Y N	Sample Volume (indicate it other drait as greetified below) 3x40 ml 100 ml 250 ml 300 ml	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL: Y No Y
Type of Samiple VOCs Nutrients Heavy Metals All Other Non- Radiologics Gross Alpha Other (specify)	Saimphe Taken (circle) Y N (Y N Y N Y N Y N	Sample Volume (indicate it other drait as greetified below) 3x40 ml 100 ml 250 ml 300 ml	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL: Y H2SO4 Y No Preservative Added H2SO4 Y H2SO4 Y Y N If a preservative is used,
Type of Sample VOCs Nutrients Heavy Metals All Office Non- Radiologics Gross Alpha Other (specify)	Saimphe Taken (circle) Y N (Y N Y N Y N Y N	Sample Volume (indicate it other drait as greetified below) 3x40 ml 100 ml 250 ml 300 ml	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL: Y No Y
<u>Type of Sample</u> VOCs Nutrients Heavy Metals	Saimphe Taken (circle) Y N (Y N Y N Y N Y N	Sample Volume (indicate it other drait as greetified below) 3x40 ml 100 ml 250 ml 300 ml	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL Y N H2SO4 (2) N H3SO4 (2) N H0O3 Y N No Preservative Added H3SO4 Y N No Preservative is used, Specify Type and Quantity of Preservative:
Type of Samiple VOCs Nutrients Heavy Metals All Other Non- Radiologics Gross Alpha Other (specify)	Saimphe Taken (circle) Y N (Y N Y N Y N Y N	Sample Volume (indicate it other drait as greetified below) 3x40 ml 100 ml 250 ml 300 ml	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL: Y H2SO4 Y No Preservative Added H2SO4 Y Y N If a preservative is used, Specify Type and
Type of Samiple VOCs Nutrients Heavy Metals All Other Non- Radiologics Gross Alpha Other (specify)	Saimphe Taken (circle) Y N (Y N Y N Y N Y N	Sample Volume (indicate it other than as specified belaw) 3x40 ml 100 ml 250 ml 3mb 1,000 ml Sample volume	Y N Y N Y N Y N Y N	Preservative Added (circle) HCL Y N H2SO4 (2) N H3SO4 (2) N H0O3 Y N No Preservative Added H3SO4 Y N No Preservative is used, Specify Type and Quantity of Preservative:

urge Comments Arrived on site at 1516. Tanace Holliday & Ryan Palmer present urge For the purge. Purge began at 1518. Purged O well for 18 Minutes. Purge ended at 1336. Left site at 1538 Amin 1314 Samples 47 1317. Left 1318

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Mill - Groundwater Discharge Permit	Date: 2.25.07 Revision: 2
Groundwater Monitoring	
Quality Assurance Plan (QAP)	Page 40 of 41
1	
5 B FY ITH	ATTACHMENT 1
	TE MESA URANIUM MILL.
	ORKSHEET FOR GROUND WATER
Description of Sampling Event: 3-0	
Location (well name) TWN - 9	Name and initials Tonner Holliday & Ryan Palmer
PUPERTURE (AA CIE RECHERCY	Inderes and mensais lanner Hanroad & Ny an Taimer
Date and Time for Purging 9.22.0	9and Sampling (if different)
Well Purging Equip Used: X pump or	bailer Well Pump (if other than Bennet) Grundfos
Sampling Event Quarter ly witrate/chlo	nde Prev. Well Sampled in Sampling Event TWN - 9 R
U	
pH Buffer 7.0 7.0	PH Buffer 4.0 <u>H.O</u>
Specific Conductance 918uMHO	S/cm Well Depth 97 and 1
and the second sec	in the standard with spatial states in the standard states and s
Depth to Water Before Purging 65.3	Casing Volume (V) 4" Well: <u>3. 64 × (.653h)</u> 20.66052
and the state of the of the	3" Well: <u>1/4</u> (.367h) BH of Water (avg)
Conductance (avg)	pH of Water (avg)
Well Water Temp. (avg)	Redax Potential (Eh)Turbidity
wen water remp. (avg)	KCHUK FOICHEIM FILIDIUITY
Weather Cond. Clear, Sunny 1	Bat'l Amb. Temp.(prior to sampling event) <u>14. /· C</u>
	in the second
Time: 0802 Gal. Purged 30	Times Gal. Purged
	I IIIG
Conductance 2662	Conductance
1 94	
H6.11	PH
remperature 14-18	Temperature
Party of Constraint of the Party	Yemperature
tedox Potential (Bh) 452	Redox Potential (Eh)
1197	
urbidity	Turbidity
0.1 8	Time: Gal. Purged
ime: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
н	pH
emperature	Temperature
Cemperature	Temperature Redox Potential (Eh)

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Mill – Groundwater D Groundwater Monitori		Date: 11.17.05 Re	vision: l		•••
Quality Assurance Plan				Page 41 of 41	
2 2 1 9 in .					
Tembidity		Turbidity	<u></u>	A PARK ALL TO	
Volume of Water Par	ged VARDAR		and 41		
	,	1.1	i	1.78 1.74.00	
Pumping Rate Calcula	<u>tion</u>				
		ensale sectionale	a loss a secondaria de la	and the second	
Flow Rate (Q), in gpm S/60 = =	· · /	Time to et	nacuate two casi = <u>7 mi</u> ⊿	ng volumes (2V)	
3/00 = '*		1=24/Q	- T Min		
Number of casing volu	mes evacuated	(if other than two)	territor de com	and the second of the second	44
If well evacuated to dry	ness, number o	f gallons evacuated	Clearly and a second	<u>a</u>	
Name of Certified Anal	vtical Laborato	ry if Other Than Fre	roy Lans	A Manager and	
Name of Certified Anal					e ^{it.}
1997-1947 - 1947	$-r^{\frac{1}{2}}(r^{\frac{1}{2}})$	Presidentes (and the second		
	Sehaple	Sample Volume	Filtered	Preservative Added	, L
	$-r^{\frac{1}{2}}(r^{\frac{1}{2}})$	Sample Volume (indicate if other	Filtered	Preservative Added (circle)	
	<u>Sebinple</u> Taken	Sample Volume	Filtered	Preservative Added	24
<u>Type of Sample</u>	Seimple Taken (circle)	Sample Volume (indicate if other (thin as specified (below)	Filtered (circle)	Preservative Added (citcle)	
<u>Evpe of Sample</u>	Semple Taken (circle)	Sample Volume (indicate it office (linit as specified below) 3x40 ml	Filtered (circle)	Preservative Added (circle) 	
Fype of Sanaple VOCs	Schmple Taken (circle)	Sample Volume (indicate if other (thin as specified (below)	<u>Filtered</u> (circle)	Preservative Added (citcle)	
Type of Sample TOCs Intrients Jeavy Metals	Seimple Taken (circle) Y N X N Y N Y N	Sample Volume (indicate if other thin as specified below) 3x40 ml 100 ml 250 ml 250 ml	Filtered (circle) Y N	Preservative Added (circle) HCL Y H2SO4 (2) H0O3 Y HOO3 Y No Preservative Added	
Type of Sample OCs Juirients leavy Metals II Office Non- adiologics ross Alpha	Seimple Taken (circle) Y N Y N Y N Y N	Sample Volume (Indicate if other clinin as specified below) 3x40 ml 100 ml 	Filtered (circle) Y N Y N X N	<u>Preservative Added</u> (circle) 	
Type of Sample OCs Juirients leavy Metals II Office Non- adiologics ross Alpha	Seimple Taken (circle) Y N X N Y N Y N	Sample Veluane (indicate if other than as specifical below) 3x40 ml 100 ml 250 ml 250 ml	Filtered (circle) Y N Y N X N Y N Y N	Preservative Added (citcle) - HCL Y H2SO4 (2) HNO3 Y No Preservative Added	
Type of Sample /OCs Intrients Icavy Metals Il Other Non- adjologics moss Alpha ther (specify)	Seimple Taken (circle) Y N Y N Y N Y N	Sample Volume (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other)) (i	Y N Y N Y N Y N Y N Y N	Preservative Added (citcle) - HCL Y H2SO4 (2) HNO3 Y No Preservative Added	
Type of Sample /OCs Intrients Icavy Metals Il Other Non- adjologics moss Alpha ther (specify)	Seimple Taken (circle) Y N Y N Y N Y N	Sample Volume (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other)) (i	Y N Y N Y N Y N Y N Y N	Preservative Added (cincle)	
Name of Certified Anal <u>Evpe of Sample</u> <u>VOCs</u> <u>Nutrients</u> <u>Reavy Metals</u> <u>Nutrients</u> <u>Reavy Metals</u> <u>Non-</u> <u>Reavy Metals</u> <u>Reavy Metals</u> <u>Non-</u> <u>Reavy Metals</u> <u>Reavy Metals</u> <u>R</u>	Seimple Taken (circle) Y N Y N Y N Y N	Sample Volume (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other)) (i	Y N Y N Y N Y N Y N Y N	Preservative Added (citcle) HCL Y N H2SO4 (2) N H003 Y N H3SO4 Y N H3 N N N H3 N N N H3 N N N H3 N N N N H3 N N N N N H3 N N N N N N H3 N N N N N N </td <td></td>	
<u>Fype of Sample</u> /OCs /urrients leavy Metals Ileavy Metals adjologics Moss Alpha Mer (specify)	Seimple Taken (circle) Y N Y N Y N Y N	Sample Volume (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other)) (i	Y N Y N Y N Y N Y N Y N	Preservative Added (citcle) HCL Y H2SO4 Y H3SO4 Y H3SO4 Y H3SO4 Y H3SO4 Y H3SO4 Y H3SO4 Y Y N If a preservative is used,	
Evoc of Sample /OCs Nutrients leavy Metals All Other Non- adiologics Hoss Alpha Mher (specify)	Seimple Taken (circle) Y N Y N Y N Y N	Sample Volume (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other (indicate if other)) (indicate if other)) (i	Y N Y N Y N Y N Y N Y N	Preservative Added (citcle) HCL Y N H2SO4 (2) N H003 Y N H3SO4 Y N H3 N N N H3 N N N H3 N N N H3 N N N N H3 N N N N N H3 N N N N N N H3 N N N N N N </td <td></td>	

Comments Arrived on Site at 0754. Janner Helliday & Ryan Palmer present For the purge Parge began at 0757. Purgad O well for 7 Minutes. Purge ended at 0804. Left site at 0807. urge Imple: Arrive 1336 14.51 1331 1334 Sample left 1.1 ÷

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Mill - Groundwater Discharge Permit	Date: 2.25.07 Revision: 2
Groundwater Monitoring	provide the second seco
Quality Assurance Plan (QAP)	Page 40 of 41
1. S.	
	ATTACHMENT 1
WHITE	MESA URANIUM MILL
	RKSHEET FOR GROUND WATER
Description of Sampling Bvent: 312	Quarter sutrate/chloride
Location (well name) TWN - 10	Name and initials Tanner Holliday & Ryan Palmer
Date and Time for Purging 9-22-09	and Sampling (if different)
Well Purging Equip Used: × pump orb	vailer Well Pump (if other than Bennet) Grundfos
Sampling Event Quarterly withat / chlorid	e Prev. Well Sampled in Sampling Event-TWN - 10 R
pH Buffer 7.0 7.0	pH Buffer 4.0 4.0
Specific Conductance 998 uMHOS/c	m Well Depth
Depth to Water Before Purging_82.58	Casing Volume (V) 4" Well: <u>22 42 ×(</u> .653h) 14.64026 3" Well: <u>~44</u> (.367h)
Conductance (avg)	pH of Water (avg)
Well Water Temp. (avg):	Redox Potential (Eb) Turbidity
Weather Cond. Clear, Suins Ext	t'l Amb. Temp (prior to sampling event) <u>14.7</u> C
Time: 09//Gal. Purged_/8	Time: Gal. Purged
11/51 /	
Conductance 40.66	Conductance
3.20	
рнЗ.20	PH
Temperature 14.30	Temperature
All all on the second second second	
F 11mm	2 cmpcrature
Redox Potential (Bh) 29.	
Redox Potential (Bh) <u>393</u>	Redox Potential (Eh)
Redox Potential (Bh) 54.5 Turbidity 19.4	
Turbidity <u>19.4</u> Time:Gal. Purged	Redox Potential (Eh)
Turbidity <u>19.4</u>	Redox Petential (Eh)
Turbidity <u>19.4</u> Time:Gal. Purged	Redox Potential (Eh) Turbidity Time: Gal. Purged Conductance
Turbidity <u>19.4</u> Time:Gal. Purged Conductance pH	Redox Potential (Eh) Turbidity Time: Gal. Purged Conductance pH
Turbidity <u>19.4</u> Time:Gal. Purged	Redox Potential (Eh) Turbidity Time: Gal. Purged Conductance

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Mill – Groundwater D Groundwater Monitori		Date: 11.17.06 B	levision: l	*
Quality Assurance Plan				Page 41 of 41
from here			Selection and the	2080 12 02 12
Turbidity	2-42	Tubidi	ily	
Volume of Water Pur	ged WARDE	·	<u>29</u>	
D. to Data Calenta	tion.			
Pumping Rate Calcula	LEOIE	national and a state		
Flow Rate (Q), in gpm			evacuate two casing	Trakinga (AN)
S/60 = = =	· (T-28//	0 = 5 min	, voinines (2 a)
,9700 - ····		E - 2000	2- <u>2</u> -1-1N	<u> Andreas Andreas Andreas</u>
Number of casing volu	mes evacuated	(if other than two)_	Winnerson and an and a second	<u>na na secona s</u>
If well evacuated to dry	mess, number o	f gallons evacuated	Margan	
Name of Certified Anal	lytical Laborato	ry if Other Than En	iergy Labs	A
street as in	$\langle (\hat{\mathbf{x}}) \rangle$			
	and the second second	2011年1月1日年期1月	Service and the service of the servi	
Type of Sample	Sample Taken	Sample Volume		Preservative Added
a a service de la constance de	(circle)	thus as specific		(circle)
		below)		and the second but seen to the
in the second				
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	(Ŷ) N.	100 ml	Y Ø	H_2SO_4 (X) N
Heavy Metals	Y N	250 ml	Y N	HNO1 Y N
All Other Non- Radiologics	Y N	250 ml	YN	No Preservative Added
Gross Alpha	YN	1,000 ml	Y N	H ₃ SO ₄ Y N
Other (specify)	(Y) N	Sample volume	YN	YN
General Inorganic				
<u> </u>				If a preservative is used,
<u> </u>	•	v ⁱ t⊉ra≓ da 435		Specify Type and Quantity of Preservative:
				A CONTRACTOR OF
		1617-1614	N. S. S.	States (Stranger 1)
t di	i de ser a		1	
	1. The State	1221	P 정말 이 것, 안 날	

Comments Arrived en site at 1905. Tarner Holliday & Ryan Palmer present For the purge. Purge began at 0918. Purged O well this 5 Minutes. Purge ended at 0913. Left site at 0915.) urge Sample 1328 1+++ 1330 10.000 1325 1,1 ample: ANI

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E.z.	TACHMENT 1	
	IESA URANIUM MILL	
	SCHEET FOR GROUND WATER	
Description of Sampling Event: $3r^{\Lambda}$ Q	Sampler	
Location (well name) TWV- ()	Name and initials Tannor Holliday & Ryon Palmer	
2	· ·	
Date and Time for Purging <u>9.22-09</u>	and Sampling (if different)	
Well Purging Equip Used: X pump orbai	ler Well Pump (if other than Bennet) Grundfos	
Sampling Event Quarter ly witret (/ chloride		se ¹
pH Buffer 7.0 7.0	pH Buffer 4.0	
Specific Conductance 998 uMHOS/cm	Well Depth	P
Depth to Water Before Purging	Casing Volume (V) 4" Well: (.653h)	
Conductance (avg)	3" Well: <u>~/4</u> (.367h) pH of Water (avg)	· · · ·
Well Water Temp. (avg)	Redox Potential (Bh)Turbidity	1
Weather Cond. Clear, Sum But'l	Amb. Temp.(prior to sampling event) / 4. 2	
Weather Cond. <u>Clear, Sum</u> Ent'l		
Time: <u>08/8</u> Gal. Purged	Time: Gal, Purged	
Conductance		
рН	PH	
Temperature	Témperature	
Redox Potential (Bh)	Redox Potential (Eh)	
and the second		
Turbidity	Turbidity	3
Time:Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	pH	
	Real and the second	
Temperature	Temperature	in the stand
Redox Potential (Eh)	Redox Potential (Bh)	
N = RI		140 1
D. J. Blank	.*	-

Mill - Groundwater Discharge Permit Date: 11.17.06 Revision: 1 Groundwates Monitoring Quality Assurance Plan (QAP)

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Turbidity	Turbidity	

Volume of Water Purged WRADEREERANCE and fasmed

Pumping Rate Calculation

Flow Rate ((Q), in gpm.	Time to evacuate two casing volumes (2V)
\$/60 =	=	 $T = 2\dot{V}/\dot{Q} =$

A State Land

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs_____A

	1402.01	di mining popula		
<u>Type of Sanaple</u>	<u>Sample</u> Taken (circle)	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (circle)
		de ade provente de la compa	TP	NEOT ST. BT
VOCs	Y N	3x40 ml 100 ml	Y N	HCL: Y N H-SO4 (Y) N
Nutrients	<u>(Y) N</u> Y. N		Y (N) Y N	H ₂ SO ₄ (Y) N HNO ₃ Y N
Heavy Metals All Other Non- Radiologics	Y N Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify) General Inorganic	(Y) N	Sample volume	Y N	YN
		and and a second se	- A	If a preservative is used, Specify Type and
				Quantity of Preservative:
	st. at a			and all generations

Comments 10011 parameters & Palled D.T. Blonk 0816 frive GT

0820

Sample Jallen AT

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	ATTACHMENT 1	
WHUR	E MESA URANIUM MILL	
FIELD DATA W	DRKSHEET FOR GROUND WATER	
Description of Sampling Event: 31		
Location (well name) TWN - 1 R	Name and initials Tonner Holliday & Ryon	Palmo-
Date and Time for Purging _9-21-09		ag da le t
Well Purging Equip Used: <u>x</u> pump or _	bailer Well Pump (if other than Bennet) Grandfos	
Sampling Event Quarter ly withede/chlo	الدين العربي Prev. Well Sampled in Sampling Event	in a spart "
pH Buffer 7.0 7.0	pH Buffer 4.0 H.O.	· · ·
Specific Conductance 998 uMHOS	/cm .Well Depth	el File
Depth to Water Before Purging N/A	Casing Volume (V) 4" Well:(.653h)	
Conductance (avg)	3" Well: <u>4 (.367h)</u> pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Bb)Turbidity	17
Weather Cond Sunny H	at'l Amb. Temp (prior to sampling event) 2.5.	1.50n C.J
\mathcal{O} and		, 加速体验
Time: 0748 Gal Purged	Time:	
Conductance 58.4		19-11-15
Conductance 200 . 1	_ Conductance	
рн. 6.04	_ pH	i de la companya de la
Temperature 17,65	_ Temperature	
Redox Potential (Bh) 490	Redox Potential (Eh)	
Turbidity 6	Turbidies	· ·
Turbidity	Tutbidity	
Time: Gal. Purged	Time: Gal. Purged	
Conductance	_ Conductance	
pH	_ pH	÷
Temperature	Temperature	
Redox Potential (Eh)	Rédox Potential (Eh)	1 \dot{s}
5		
Kinsate	Prior TO TWINI -1 .	3-52/

16-14

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Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) $S/60 = = - G T = 2V/Q = - \sqrt{4}$

전 영국 관계로

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs_____N/A_____

	1.1.1.1.1	· · · · · · · · · · · · · · · · · · ·	5.00	
<u>Type of Sample</u>	Sample Taken (circle)	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (ctrcle)	Preservative Added (circle)
VOCs	YN	3x40 ml	Y'''N'	HCL Y N
Nutrients	(X) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	Y N	HNO ₃ Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H ₂ SO ₄ Y N
Other (specify) General Inorganic	(Y) N	Samplé volume	Y N	Y (N)
	5. and	itan series jere series series		If a preservative is used, Specify Type and Quantity of Preservative:
		1. N. 1. 1963		·
	1. A.			1993 - 198

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Comments Started purge at 0735. 1 set of parameters were taken. Rinsatz Schupple Taken at 0750. Left site at 0757

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WIRD	<u>ATTACHMENT 1</u> ITE MESA URANIUM MILL
	WORKSHEET FOR GROUND WATER
Description of Sampling Event: 35	Quarter Nitrate/chloride
Location (well name) TWN - R2	Name and initials Tonner Holliday & Ryan Palmer
Date and Time for Purging $9-21-6$	29 and Sampling (if different) 9-21-09
Well Purging Equip Used: 🗴 pump or	bailer Well Pump (if other than Bennet)Grundfos
Sampling Event Quarterly without /ch	londe Prev. Well Sampled in Sampling Event-tww-l
pH Buffer 7.0 7.0	pH Buffer 4.0 H.O.
Specific Conductance 998 uMHI	DS/cm Well Depth
Depth to Water Before Purging	Casing Volume (V) 4" Well: (.653h)
Conductance (avg)	3" Well: <u>~//4</u> (.367h) pH of Water (avg)
Woll Water Temp. (avg)	_ Redox Potential (Eb)Turbidity
Weather Cond	Ent'l Amb. Temp (prior to sampling event) 17.6
0	
Time: 0855.40 Gal. Purged	Gal, Purged
Conductance 12.8	Conductance
Culturiance	
pH 7.77	pn
Temperature 17-7.4	Témperature
Redox Potential (Bli) 396	Redox Potential (Eh)
REMOX PORTINIAN (EII)	
Turbidity	Tufbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
175	pH
pH	pix
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
D. I	
KINSat	e Prior to TWN2

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Turbidity	Turbidity		
Volume of Water Purged WHERPERPER	neresarch/ensured	165	
	5 - 3 - 3 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4	•	
Pumping Rate Calculation			

Time to evacuate two casing volumes (2V) $T = 2V/Q = \frac{\sqrt{7}}{A}$ Flow Rate (Q), in gpm. \$/60 = 1

If well evacuated to dryness, number of gallons evacuated ______

Name of Certified Analytical Laboratory if Other Than Energy Labs_____/A

- <u>)</u>	1447.01			and the second second
<u>Type of Sample</u>	<u>Sample</u> Taken (circle)	Sample Volume (indicate if other than as specified below)	Filtered (cticle)	Preservative Added (circle)
· · · · · · · · · · · · · · · · · · ·	والمروقية والمحاجب والمعادين	and sale provider		
VOCs	Y N	3x40 ml	Y 'N	HCL Y N
Nutrients	(Y) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 mf	YN ?,	HNO3 Y N
All Other Non- Radiologics	. <u>А. 10 М. 148</u>	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify) General Inorganic	Y N	Samplé volume	Y M	Y (N) If a preservative is used,
		1^{20} km $(-7^{\frac{1}{2}}\beta^{10}$		Specify Type and Quantity of Preservative:
		and the second		
	ant south t			and the species

Comments Arrived at 0830 Rinsats raan at 0831 taken Samples at 0855 Darameters 0857 site .0901

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WHUTTE M	ITACHMENT 1 IESA URANIUM MILL	
	(SHEET FOR GROUND WATER warter s) it cate / chioride	
Description of Octoberting Proper.	Sampler	
Location (well name) TWN - 3R	_ Name and initials Tonner Holliday & Ryon Palmer	
the second se	and Sampling (if different)	
Well Purging Equip Used: X_pump orbai	er Well Pump (if other than Bennet) Grundfos	
Sampling Event Quarterly vitrate/chloride	Prev. Well Sampled in Sampling Event-100-2	
pH Buffer 7.0 7.0	pH Buffer 4.0	
Specific Conductance 998 uMHOS/cm	Well Depth	
Depth to Water Before Purging	_ Casing Volume (V) 4" Well: <u>~/ 라</u> (.653h)	
Conductance (avg)	3" Well: <u>~/4</u> (.367h) pH of Waler (avg)	
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity	
Weather Cond. Swn	Amb. Temp.(prior to sampling event) 18.69:C	
Time: 0945 Gal. Purged	Time: Gal, Purged	
Conductance 10-1	Conduciance	
рн. 6.67	pn	
Temperature 18, 88	Temperature	
Redox Potential (Bh) 40 9	Redox Potential (Eh)	
TurbidityO	Turbidity	
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
płł	рН	
Temperature	Temperature	
Redox Potential (Eh)	Redox Potential (Bh)	
\cap		
Linsale Drive to T	WN.3	

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Volume of Water Purged WHERPERSPECters and Weasaned

Pumping Rate Calculation

A State and

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs_____/A

1		行行的推动管理运行。	0.04	
<u>Type of Sumple</u>	<u>Sample</u> Taken (circle)	Sample Volume (indicate if other think as specified below)	<u>Filtered</u> (clicle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y	HCL Y N
Nutrients	(¥) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	Y N ?	HNO3 Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Ý N	H ₂ SO ₄ Y N
Other (specify) General Inarganic	(Y) N	Samplé volume	YN	Y (N) If a preservative is used,
		tingert trojeså		Specify Type and Quantity of Preservative:
		i ni		

Comments 0427 Tanet Rinsate 1 500 nanament k. 30 20 0445 Rinsat at 0949 at 0947 Samola taken Ratt 62 Site at 0952

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	ATTACHIMENT 1	-274
	MIESA URANIUM MILL	
	RKSHEET FOR GROUND WATER	
Description of Sampling Event: 3rd (Quarter Nitrate/chloride	
Location (well name) TWN - 4R	Name and initials Tanner Holliday & Ryan Palmer	
Date and Time for Purging 9-21-09		
Well Purging Equip Used: <u>x</u> pump orb	ailer Well Pump (if other than Bennet) Grandfos	
Sampling Event Quarterly withest / chlorid	Prev. Well Sampled in Sampling Event	8
pH Buffer 7.0 7.0	pH Buffer 4.0	
Specific Conductance_998uMHOS/c	A. 1	
Depth to Water Before Purging Nn	Casing Volume (V) 4" Well: (.653h)	
Conductance (avg)	3" Well: <u>w4</u> (.367h) pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eb)Turbidity	0
Weather Cond. Sunnit: Brit	'I Amb. Temp.(prior to sampling event) 9.3.	C
$\mathbb{O}^{\mathbb{N}}$		
Time: 1042 Oal. Purged	Time:Gal, Purged	
Conductance 4:5	Conductance	15
рН. 7.82	pH	
Temperature 17.85	Temperature	0
Redox Potential (Bh) 383	Redox Potential (Eh)	
TurbidityO	Turbidity	• • •
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
рН	pH	
Tempesature	Temperature	
Redox Potential (Eh)	Redox Potential (Eh)	1
Rinsolo PRIOR TO	TWN-4	2429 (N

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Turbidity	Turbidity	
E GILOVORACE .	T DECEEDED.	

Volume of Water Purged WHERPHILTERSPIRE Jonation 165 (ral.

Pumping Rate Calculation

Flow Rate (Q), in gpm.	·	Time to evacuate two casing volumes (2V)
S/60 = =	_6	$T = 2V/Q = \frac{N/A}{N}$

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs_____/A____

. 1 2	$(1-\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{1}{2})$. I. inderized generation		
Type of Samile	<u>Sample</u> Takén <u>(circlé)</u> :	Sample Volume (indicate if other that as specified below)	<u>Eilitered</u> (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y	HCL Y N
Nutrients	(Y) N	100 ml	YN	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	Y N .	HNO3 Y N
All Other Non- Radiologics	Y N	250 ml	YN	No Preservative Added
Gross Alpha	Y N	1,000 ml	Ý N	H ₂ SO ₄ Y N
Other (specify) General Inarganic	(Y) N	Samplé volume	Y (N)	Y (N) If a preservative is used, Specify Type and
	القري (12			Quantity of Preservative:

Comments Tanner \$ 1010 ENNALE. Have il Completed a 011018 inte MUL 1044 ME TAller

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	<u>ITACHMENT 1</u> HESA URANNUM MULL
	ksheet for ground water
Description of Sampling Event: 31 Q	marter suitrate/chloride
Location (well name) TWN-5R	Name and initials_ Tonner Holliday & Ryon Palmer
Date and Time for Purging 9.21.09	_and Sampling (if different)
Well Purging Equip Used: 🗴 pump orbai	ler Well Pump (if other than Bennet) Grundfos
Sampling Event Quarter ly without / chloride	Prev. Well Sampled in Sampling Event-TWN-7
pH Buffer 7.07.0	pH Buffer 4.0
Specific Conductance_998uMHOS/cm	Well Depth no. Presente
Depth to Water Before Purging <u>NA</u>	Casing Volume (V) 4" Well:(.653h)
Conductance (avg)	3" Well: <u>~~4 (.</u> 367h) pH of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eb)Turbidity
Weather Cond Clean, Bundly Ent'l	Amb. Temp (prior to sampling event) 2/2. C
Time: 1400 Gal. Purged	Time:Gal, Purged
Conductance 4. 8	Conductance
pH 7.68	pH
Temperature 22.25	Témperature
Redox Potential (Bh) 219	Redox Potential (Eh)
$\rho_2 \wedge$	Turbidity
Turbidity	
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	рН
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

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Turbidity______ Turbidity______

Volume of Water Purged WARRANE Pressnesh feasured [65

Pumping Rate Calculation

Flow Rate (Q), in gpm. Time to evacuate two casing volumes (2V) S/60 = - C T = 2V/Q = - N/A

Number of casing volumes evacuated (if other than two) ______

If well evacuated to dryness, number of gallons evacuated MA

Name of Certified Analytical Laboratory if Other Than Energy Labs______/A_____

	19 A.	· · · · · · · · · · · · · · · · · · ·	501 A G	물건 방법을 즐기며 가격하는
<u>Type of Sample</u>	<u>Sahinple</u> <u>Takén</u> (circle):	Sample Volume (indicate if other than as specified below)	<u>Filtered</u> (clicle)	Preservative Added (circle)
VOCs	YN	3x40 ml	Y N 24	HCL Y N
Nutrients	(Y) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	Y N	HNO1 Y N
All Other Non- Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify) General Inorganic	(Y) N	Sample volume	Y N	YN
<u> </u>	1. e ^{-e}	ina partina Decomo partina		If a preservative is used, Specify Type and Quantity of Preservative:
				Security of L CONTANTING.
	12-24			l al d

1346 Comments Amin 07 STARTED any C with at 1347 Sample 1412 OmokiED aT cim

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CIE.	TACHIMIENT 1	
	IESA URANIUM MILL.	
Description of Sampling Event: 2	(SHEET FOR GROUND WATER	
There's allog to a considerating radius. 2	Sampler	
Location (well name) <u>TWN - 6 R</u>	Name and initials Tanner Holliday & Ryan Palmer	
	and Sampling (if different)	
Well Purging Equip Used: X jump orbail	ler Well Pump (if other than Bennet) Grandfos	
Sampling Event Quarterly without / chloride	Prev. Well Sampled in Sampling Event	
pH Buffer 7.07.0	pH Buffer 4.0 4.0	
Specific Conductance 998 uMHOS/cm	Well Depth	
Depth to Water Before Purging	Casing Volume (V) 4" Well:(.653h) 3" Well: <u>~/4</u> (.367h)	
Conductance (avg)	pH of Water (avg)	
Well Water Temp. (avg)	Redox Potential (Eh) Turbidity	I
Weather Cond. Chery Same Ent'l	Amb. Temp. (prior to sampling event) /4.7.	
Time: 0748 Gal. Purged	Time:Gal. Purged	4.4.4
Conductance 9.7	Conductance	
pH 5.43	pit	
Temperature <u>14.07</u>	Temperature	
Redox Potential (Bh) 496	Redox Potential (Eh)	·
Turbidity	Turbidity	•
Time: Gal. Purged	Time: Gal. Purged	
Conductance	Conductance	
pH	pH	
Temperature	Temperature	
Beton Potential (Eh)	Redox Potential (Bh)	
Kinsate prior to .	TWN-b	200

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Turbidity	Turbidity	
T GEORGACY	I the breaking	

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Volume of Water Purged WRSTLEBORERANDERED areable municid

Pumping Rate Calculation

Flow Rate (O), in gpm.	Time to evacuate two casing volumes (2V)
\$/60 =	·	$T = 2\dot{V}/Q =$

Number of casing volumes evacuated (if other than two)

If well evacuated to dryness, number of gallons evacuated

Name of Certified Analytical Laboratory if Other Than Energy Labs______A

20	1407 ···	A notestical property	27 A	
Type of Sample	<u>Sample</u> <u>Taken</u> <u>(circle)</u>	Sainple Volume (indicate if other than as specified below)	<u>Filtered</u> (circle)	Preservative Added (chrcle)
VOCs	Y N	3x40 ml	Y 'N	HCL Y N
Nutrients	(Y) N	100 ml	Y (N)	H ₂ SO ₄ (Y) N
Heavy Metals	Y N	250 ml	Y N	HNO, Y N
All Other Non- Rediologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	YN	H ₂ SO ₄ Y N
Other (specify) General Inorganic	(Y) N	Samplé volume	Y N	Y (N) If a preservative is used, Specify Type and Quantity of Preservative:

Purge <u>For the purge Purge began at 09124</u>. Tanace Halliday & Ryan Palmer present Purge <u>For the purge Purge began at 09126</u>. <u>Breget Arson Palmer present</u> <u>Purge ended at 0100050 Left site at 0952</u> Dample: <u>Finsale Soungle Collected</u> Holliday & Ryan Palmer present

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Groundwater Monitoring	1
Quality Assurance Plan (QAP)	Page 40 of 41
	ATTACHMENT 1
A MEN	ITE MESA URANIUM MILL
	WORKSHEET FOR GROUND WATER
Description of Sampling Event: 35	
	Sampler
Location (well name) TWN - 7 R	Neme and initials Tanner Halliday & Ryan Palmer
Date and Time for Purging	
Control and a sol a congress	CONTraine Agenthemile (in muchemile WCID
Well Purging Equip Used: X plump or	bailer Well Pump (if other than Bennet)_Grandfos
Sampling Event Quarterly witrate/ch	iloride_ Prev. Well Sampled in Sampling Event TWN - 4
0	and shifts the
pH Buffer 7.0 7.0	pH Buffer 4.0 4.0
Specific Conductance 998 uMHC	DS/cm Well Depth
Depth to Water Before Purging	Casing Volume (V) 4" Well: <u>~/A</u> (.653h)
Depui to water aboost a signing	$\underline{\qquad} (.353h)$
Conductance (dvg)	pH of Water (avg)
Well Water Temp. (avg)	PH of Water (avg) Redox Potential (Eb)Turbidity
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
Well Water Temp. (avg)	
Well Water Temp. (avg)	Redóx Potential (Eb) Turbidity Ext'l Amb. Temp.(prior to sampling event) 22.3°
Well Water Temp. (avg)	Redőx Potentiál (Eb) Turbidity Ext'l Amb. Temp (prior to sampling event) 22.3°c
Well Water Temp. (avg)	Redóx Potential (Eb) Turbidity Ext'l Amb. Temp.(prior to sampling event) 22.3°
Well Water Temp. (avg) Weather Cond. Sunny A. (12) ind y Time: 13.17Gal. Purged A.H Conductance 3.4 7.77	Redox Potential (Eb) Ext'l Amb. Temp.(prior to sampling event) 22.3° Tune: Gal. Purged
Well Water Temp. (avg) Weather Cond. Summy 4 (wind y Time: <u>1217</u> Gal. Purged AM Conductance <u>3. 4</u> pH7. 75	Redox Potential (Eb) Turbidity Bxt'l Amb. Temp.(prior to sampling event) 22 3 c Time: Gal. Purged Conductance pH
Well Water Temp. (avg) Weather Cond. Sunny A. (12) ind y Time: 13.17Gal. Purged A.H Conductance 3.4 7.77	Redox Potential (Eb) Ext'l Amb. Temp.(prior to sampling event) 22.3° Tune: Gal. Purged
Well Water Temp. (avg) Weather Cond. Surny 4 (wind y Time: <u>JJZ</u> Gal. Purged AM Conductance <u>3. 4</u> pH <u>7. 75</u> Temperature <u>22.31</u>	Redox Potential (Eh) Turbidity Ext'l Amb. Temp.(prior to sampling event) 22 2 C Time: Gal, Purged Conductance pH Temperature
Well Water Temp. (avg) Weather Cond. Surged A. (1) indep Time: 13.12. Gal. Purged A.M Conductance 3. 4 pH 7.75 Temperature 22.31 Redox Potential (Bh) 30.6	Redux Potential (Eb)
Well Water Temp. (avg) Weather Cond. Surged A. (1) indep Time: 13.12. Gal. Purged A.M Conductance 3. 4 pH 7.75 Temperature 22.31 Redox Potential (Bh) 30.6	Redox Potential (Eh) Turbidity Ext'l Amb. Temp.(prior to sampling event) 22 2 C Time: Gal, Purged Conductance pH Temperature
Well Water Temp. (avg) Weather Cond. Surnay 4 (12) ind y Time: <u>1217</u> Gal. Purged <u>AM</u> Conductance <u>3, 4</u> pH <u>7. 75</u> Temperature <u>22.31</u> Redox Potential (Bh) <u>306</u> Turbidity <u>0. ()</u>	Redox Potential (Eb) Turbidity Ext'l Amb. Temp.(prior to sampling event) 22.3°- Time: Gal. Purged Conductance pH Temperature Redox Potential (Eh)
Well Water Temp. (avg) Weather Cond. Survey A [12] Add Time: 1217 Gal. Purged Conductance 3.4 pH 7.75 Temperature 22.31 Redox Potential (Bb) 306 Turbidity 0.4 () Time: Gal. Purged	Redox Potential (Eh) Ext'l Amb. Temp.(prior to sampling event) D: D
Well Water Temp. (avg) Weather Cond. Surnay 4 (12) ind y Time: <u>1217</u> Gal. Purged <u>AM</u> Conductance <u>3, 4</u> pH <u>7. 75</u> Temperature <u>22.31</u> Redox Potential (Bh) <u>306</u> Turbidity <u>0. ()</u>	Redox Potential (Eb) Turbidity Ext'l Amb. Temp.(prior to sampling event) 22.3°- Time: Gal. Purged Conductance pH Temperature Redox Potential (Eh) Turbidity
Well Water Temp. (avg) Weather Cond. Survey A [12] Add Time: 1217 Gal. Purged Conductance 3.4 pH 7.75 Temperature 22.31 Redox Potential (Bb) 306 Turbidity 0.4 () Time: Gal. Purged	Redox Potential (Eh) Turbidity Ext'l Amb. Temp.(prior to sampling event) DD D' Turbs: Gal. Purged Temperature Redox Potential (Eh) Turbidity Time: Gal. Purged
Well Water Temp. (avg) Weather Cond. Sunny A. (Dindy) Time: 1212. Gal. Purged AM Conductance 3. 4 pH 7. 75 Temperature 22.31 Redox Potential (Bh) 30.6 Turbidity 0() Time: Gal. Purged Conductance ()	Redox Potential (Eb) Turbidity Ext'l Amb. Temp.(prior to sampling event) DD D'C Time: Gal. Purged pH
Well Water Temp. (avg) Weather Cond. Summed (With A (With A for A)) Time: 1212Gal. Purged A/P Conductance 34 pH 775 Temperature 22.31 Redox Potential (Bh) 30.6 Turbidity 0() Time: Gal. Purged Conductance () Time: Gal. Purged Temperature ()	Redox Potential (Eb) Turbidity Ext'l Amb. Temp.(prior to sampling event) D2.D*C Ture: Gal. Purged PH Temperature Redox Potential (Eh) Time: Gal. Purged Conductance pH Time: Gal. Purged Conductance pH Time: Gal. Purged
Well Water Temp. (avg) Weather Cond. Sunny 4. (13) Time: 3. 4 Conductance 3. 4 pH 7. 75 Temperature 22.31 Redox Potential (Bh) 30.6 Turbidity 0	Redox Potential (Eb) Ext'l Amb. Temp.(prior to sampling event) D Time: Gal. Purged PH Temperature Redox Potential (Eh) Turbidity Time: Gal. Purged Conductance pH

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Mill — Groundwater D. Groundwater Monitori Quality Assurance Plar	ng	Permit	Date: 11.1	7.05 Revisi	on: l		Page	11 of 41	2
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Turbidity			I	urbidity				·	
Volume of Water Pur	zed WR	R PHE	25 Concerta	i Sleist	Ri	165	,		
				s i Star	S			s taria	
Pumping Rate Calcula	tion								
		5			in and the second			i po C	19 A 19
Flow Rate (Q), in gpm			Ti	me to evac	uate two	casing vo	lumes (2V)		
\$/60 = =	6	1.1.1.	$\underline{\mathbf{T}}$	= 2V/Q = _		14		a"	20 00 0000 20 00 00 00 00
Number of casing volu	ines eva	cunted	(if other than	two)		(A an o			halley (h
		4.21				1.1923			
If well evacuated to dry	ness, nu	imber o	f gallons eva	cuated to	N	113	a strategica a	<u>a</u>	tan inti.
Name of Certified Anal	ytical L	aborato	ry if Other T	ian Energy	Labs	N/A	Y.	<u>di dia</u>	1. 1991 a.
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Type of Sample	Sai	nple	Sample V		Mitered		Preservati	ve Add	led
and the state of t		ken	(indicate)		<u>circle)</u>	5 ¹ *	(circle)	eren finske L	Station of the second
	<u>(ci</u>	<u>cle)</u> : .	dian as sp				4.000	enter er	Sec. Section
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Notrients	(¥)	Ň	100 ml	Y	ALC 23 10 103 104 104 104 104 104		H2SO4		N
Heavy Metals	V	Ň	250 ml	Y		ALC: NO.	HNO1	Ve.	
All Other Non- Radiologics	Y	N	250 ml	Y	Sector States		No Preserv	ative A	dded
Gross Alpha	Ý	N	1,000 ml	10 00 W	N	and a second	H ₂ SO ₄	Y	N
Other (specify)	(Y)	N	Sample vol			100 Car	Y (N)		
	\cup			翻任		Calife B			en e st et
General Inarganic_			arta Artan Arta Marina	na pari			If a preserve Specify Typ Quantity of	e and	
							Commission of		
			· · · · · ·	945 (13 8 - 174)	ile vet		na ana ana ang ang ang ang ang ang ang a	1.30	Starline de la
			1	A			1. 1 ^{. 1} . 1. 1.		

present on site at 1236 Ryan Comments Arrivad Palmer Tan Hollidas đ for sample, Rinsate began at 1 set of 12400 Rinso and sere taken at 1317 Samples usere deken Laft at 1320) parameters

site at 1324

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Mill – Groundwater Discharge Permit	Date: 2.25.07 Revision: 2
Gronadwater Monitoring Quality Assurance Plan (QAP)	Page 40 of 41
Contractory & Barry	
	<u>ITACHMENT 1</u> IESA URANIUM MILL
	ilsa ukanlon milli. Kshieernor ground water
Description of Sampling Event: 30 G	warter suitrate/chipride
Location (well name) TWN - 8R	Sampler Name and initials Tanner Hollidey & Ryon Palmer
Date and Time for Purging 9-21.09	and Sannpling (if different)
Well Parging Equip Used: X pump orba	for Well Pump (if other than Bonnet) Grundfos
Sampling Brene Quarter ly witrot / Chloride	Prev. Well Sampled in Sampling Event-no.u=5
pH Buffer 7.07.0	pHBmen40H_O
Specific Conductance <u>998</u> _uMHOS/cm	Wendenh
Depth to Water Before Purging_1.H	Casing Volume (V) 4" Well: (.653b)
Conductance (avg)	3" Well: <u>AZA (.367h)</u> DH OGWalen(avg)
Well Water Temp. (avg)	Redox Potential (Bb) Trurbidity
Weather Cond. dury burnly But'l	Amb Temp (prior to sampling event) 2/ (2
Time:Gdl, Purged	Time: Gat Purged
Conduciance Sa La	Conductance
7.91	b B
Temperature 21.92	Temperature
Redox Potential (Bb) 228	
ろう	Redox Perential (Bh)
Turbidity	Ţurbidity
Time:Gal. Purged	- Time: Gal. Purged
Conductance	Conductance
рн	рН
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
Rinsote price TO TW,	N-8

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Quality Assurance Plan	ng 1 (QAP)	• •		Page 41 of 41	
Turbidity	<u> </u>	Turbidi	by <u>1</u>		
	1 5100000000				
Volume of Water Pur	Bour Annaer Think			A State of the second s	
Pumping Rate Calcula	<u>tion</u>				
Flow Rate (Q), in gpm	~: 1	Tanas fra	evacuate two casi	that introlessing a faith	÷ -3 -1
S/60 = =		$\mathbf{T} = 2 V \mathbf{A}$		iel voimers (7 a)	
	and and and a	arthursely, berlines.	έα.		h
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lf well evacuated to dry	moss, nùmber o	f gallons evacuated		<u> Arthur an a</u>	rāt stragt s
Name of Certified Ana	lytical Laborato	rv if Other Than B	erev Labe	N/A	
					en la companya de la
Type of Samue	I Sample	Sample Volum	15. C20, 46. 1	Preservative Add	
eres and the second	Aalten	(indicate it offic	(cincle)	(circle)	
	(circle)	(then as specific below)			
locs			Y	HCL	
「「「「「「「「「」」」、 していっていったをまた。う	<u>(Y)</u> N	-3:40 ml	<u>Y</u> X		
Vutrients	Let a contraction	A DISCHARGE STORY OF LINE AND			
Vutrients Jeavy Metals	V. No	250 ml	Y N C	HNO: SA	
Nutrichts Scavy Metals M Other Non-					
Nutrichts Scavy Metala All Offick Non- tadiolopics From Alpha	Y 10 Y N <u>Y</u> N	250 mi 250 mi 1,000 mi	Y N Y N	HINO: No Preservative A HaSO: Y	ical *
Nutrichts Jeavy Metals NI Offici Non Cidiologics	Y N	250 mf 250 mil	Y N Y N	HNO3 Ý No Preservative A	ical -
Nutrichts Scavy Metala All Offick Non- tadiolopics From Alpha	Y 10 Y N <u>Y</u> N	250 mi 250 mi 1,000 mi	Y N Y N Y N	HaSO, Y Y No Preservative A	Real N
Nutrients Leavy Metals All Offick Non- cadiologics Moss Alpha Moss (specify)	Y 10 Y N <u>Y</u> N	230 ml 230 ml 1000 ml Semple volume	Y N Y N Y N	HINO: No Preservative A HaSO: Y N If a preservative is Specify Type and	Ilised;
Nutrients Leavy Metals All Offick Non- cadiologics Moss Alpha Moss (specify)	Y 10 Y N <u>Y</u> N	230 ml 230 ml 1,000 ml Sample volume	Y N Y N Y N Y N	HINO; Ý No Preservative A H2SO; Ý Y N H a preservative la	Iliseo;
Nutrients Leavy Metals All Offick Non- cadiologics Moss Alpha Moss (specify)	Y 10 Y N <u>Y</u> N	230 ml 230 ml 1000 ml Semple volume	Y N Y N Y M	HNO: Y No Preservative A HaSO: Y Y Y If a preservative is Specify Type and Quantity of Preservative	Iliseo;

Comments Arrived on site at 1443. Tapper Halliday & Ryan Palmer For the purge. Purge began at 1445. Parate and a Palmer Purge ended at 1508. Left site at 1511

Samples oure Taken AT 1510

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<u>Mill — Groundwater Discharge Permit</u> Groundwater Monitoring		Date: 2.25.07 Revision:	2 '	
Groundwater reconnering Quality Assurance Plan (QAP)	÷ *	Page 40 of 4	L . I	
day jurber	<u>ATTACHIMENT 1</u> TE MESA URANIUM MILL			
FIELD DATA W	ORKSHEET FOR GROUN) WATER		
Description of Sampling Event: <u>3rd</u>	_Quarter Nitrate/ch	locide		
Location (well name) TWN - 9R		anner Holliday & Ryan 1	almor	
Date and Time for Purging 9-22-09	and Sampling (if different	ALA		
() Wind the work of the		4 · · · · · · · · · · · · · · · · · · ·		
Well Purging Equip Used: X jump or _	_bailer Well Pump (if other t	han Bennet) Grundtos		
Sampling Event Quarterly without / chlo	nde Prev. Well Sampled in	SamplingBvent www.8	**************************************	
pH Buffer 7.07.0	pHBiffer4.0	HOME	and the	
	Veil Deptis		n a thuga an th	
Specific Conductance 918 uMHO	a an	ester i la		•••
Depth to Water Before Purging/A	Casing Volume (V) 4"	Well: <u>////</u> (.653h) Vell: <u>20/4</u> (.367h)		•
Conductance (avg)	nH of Water (avg)			•
Well Water Temp. (avg)	Redox Potential (Eh)		، موجع فبي	
WeatherContl. Sung. 4. Ceol	Tu ² l Amb. Temp. (priorio sam	ling eventi		
a a la construction de la construct A la construction de la construction				د. مربعهم
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Conductance B.H.	Conductance			
7.86	net in the second se			
14 04	- Cashing and the set of			
Temperature 14 9.8	Temperature	<u>.</u>		
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TurbidityO	_ Turbidity			
Time: Gal, Purged		Purged	• . · · ·	
Conductance	Conductance	Charles and the second	-	
Conquestients				
р <u>Н</u>	PH	<u> </u>		
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Redox Potential (Bh)			* -	5 · ·
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Volume of Water P	urged Vitisii.2007			<u>5</u>	et de la companya de
Pumping Rate Calci	มใสปม้ายเจ				•
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Mow Rate (Q), in gr	×10.	Time	io evacuate invo ca	asing volumes (2V)	•
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f well evacuated to a	- · ·		t antes		
f well evacuated to a Jame of Certified Au	ulytical Laboratoi	y if Other Than	Baciey Labs		
Jame of Certified A	ulytical Laboratoi		Baciey Labs	6.0/A	
	ulyticel Luborator	y if Other Than T <u>Sample Volu</u>	Bacigy Labs <u>: ***</u> be Filtbred	CO/A	<u>Sette Lociety y</u> a second y a
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Comments Arrived on site at 0714. Tarrier Halliday & Ryan Palmer present For the purge. Purge began at 0716 . Purged O even the 27 Minutes. Purge ended at 0743. Left site at 0746 arge Ample: <u>Sampled</u> at 0743 Rinsate 3 3.50 · ·

pH_

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Mill - Groundwater Discharge Permit Date: 2.25.07 Revision: 2 Groundwater Monitoring Quality Assurance Plan (QAP) Page 40 of Al ATTACHMENT 1 WHETE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER ZrA **Description of Sampling Bvent:** Quarter Nitrate / ching Sampler 5-1**6**3,93 Location (well name) TWN Name and initials Tanner Hall day Ry on Falme ન Date and Time for Purging 9-22-09 and Sampling (if different) Well Purging Equip Used: x pump or bailer Well Pump (if other than Bennet) Grandfos Sampling Event Quarter ly withrane / Chloride Prev. Well Sampled in Sampling Event 10.0 = 9 pHRuffer 4.0 pH Buffer 7.0 <u>7.0</u> 1816 all 1 Specific Conductance 998 uMHOS/cm Well Denth Show/A Show and Show of the Depth to Water Before Purging_ N/A (.653b) 3" Well: 7//4 (.367h) Conductance (avg)_ pH of Water (avg) Redox Polential (Eb) _____ Turbidity Well Water Temp. (avg). Weather Condz Ext'l Amb. Temp.(prior to sampling event) 12 Gal. Purged **Fines** Gal, Purged inductance Conductance Temperature Redox Potential (Bh) Redox Potential (Eh) Turbidity Turbidity_ Time:_ Gal. Purged Gal. Purged Time: Section 6 Conductance Conductance pН Temperature Temperature_ Redox Potential (Eh) Redox Potential (Bh)_

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<u>Mill — Ground weter Dischwere Pezmit</u> Groundwätter Monitoring	Date: 11.17.06 Rovision: 1	
Quality Assurance Plan (QAP)	Page 41 of 41	
		- 70
Turbidity	Turbidity	
Volume of Water Purged WHIRDERS		
Pumping Rate Calculation		•
L CHERINATOR, TOTAL CONSISTENCE		
Flow Rate (Q), in gpm.	Time to evacuate two casing volumes (2V)	
s/60 = =6	1 T ≥27/Q 5	
Number of casing volumes eviduated ((Other that two)	
II wer evacuated to arymen, multiple of	gallous evectated	
Name of Certified Analytical Laborator	y if Other Than Breegy Labe	
Type of Sample	Sample Volume Filtered Preservative Added	
Franken	(willcare an other (circle)	
(circle)	tion as specified Delow/	
	and the second	
VOIGs.	Sx4Cml Y N	
Nairieats (1) N Heavy Méfals	100mi Y (N H550, (Y N 250mi Y N H100, Y N	. au
All Other Non- Y MCM	250/mi V N NoPreservative Added	
Radiologics	an a	
Gross Alpha Y N Other (specify) (Y) N	Y N Hasol Y N Sample volume Y (N) Y (N)	
Other (specify) (Y) N		
General Inorganic	Construction and Construction of the Construct	
	If a preservative is used, Specify Type and	
······	Quantity of Preservative	

and the state

Commonts Arrived an site at 0825. Janner Holliday For the purge. Purge began at 0832. Purged at Purge ended at 0852. Left site at 0854 at 0825 jurge Palmer present Minutes 121.313 ample: 54 Rinsote Sample taken 0851 at

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Mill – Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)	Date: 2.25.07 Revision: 2 Page 40 of 41
	ATTACHMENT 1
	ITE MESA URANIUM MILL WORKSHEET FOR GROUND WATER
Description of Sampling Event: 30	Duarter Nitrate/chloride
Location (well näme) <u> </u>	Native and initials Tanner Halliday & Ryan Palmer
Date and Time for Purging <u>9.22.0</u>	A C
Sampling Event Quarterly without /ch	
pH Buffer 7.0 7.0	pir Burer 40
	DS/cm Well Depth
Depth to Water Before Punging 75.5	and the fight of the second
Conductance (avg)	1. 学校研究部院を設定物理が必要が必要が消費性調査が注重に対象が認定されていた。
Well Water Temp. (avg)	Ent'l Amb Temp (prior to sampling event) // Z ° C
	EXC FAMO - FCDD (prior to sampling even) - 777 C:-
	Time- Gal, Purged
Conductance	Conductance
pH	
Por se si se si se si	
Redox Potencial (Hin)	Redox Perential (Bh)
Turbidity	Tufbidity
Wine Gal Purced	Time: Gal. Purged
Conductance	Conductance
MI .	PH
Temperature	Temperature
redox Potential (Bh)	Redox Potential (Eh)

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Mill Grownstwatez Di	infayor Permit 10	zie: 11.17.05 Re	เช้ารักสะ ไ		
Groundwater Monitori Quality Assurance Plan	- ug	265. L L. L F. UG (1837)	JEDROJK, K	Page 41 of	41
Turbidáty	<u></u>	Turbidity			
Volume of Water Pan	ged WAREPART	Merers and Mai	aned		
Pumping Rate Calcula					
Flow Rate (Q), in gpm S/60 =		Time to c T = 2V/Q		asing volumes (2V)	_
Number of casing volu	mes evacuated (if of	her than two)	4	· · · · · · · · · · · · · · · · · · ·	
If well evacuated to dry	vness, number of gal	ons evacuation	• k		¥.
			··· ·	A contactor	÷
TUBELLO OF COLOREDOW & BARE		CULT TRANK LINE			:
<u>Type of Sample</u>	Sabhible Taken (chicle)	hinjile <u>.Volume</u> idicate il other uli as specifici low)	<u>Iffiltered</u> (circle)	<u>Preservative /</u> (circle)	Added Water (Attack)
	and the second states a state	dillastednig generation		· · · · · · · · · · · · · · · · · · ·	
VOCs Nutrients	(Y) N 10	40ml 0ml	Y N Y (N)	HEL H3SO4 (<u>X N</u> <u>Y) N</u>
Heavy Metals All Other Non- Radiologics	Y N 25	0 MI 0 ml	Y N Y N	H2SO4 (HINO3 NG PICEETVATIV	· •
Gross Alpha Other (specify)	Y N M	100 mil mple volume		H ₂ SO ₄ Y (N)	YN
General Inarganic			YN		t to be set
······		in the second		If a preservative Specify Type an Quantity of Pre-	ıd 🕴
		· • •			· · · .
	e galerie e				
L	<u></u>	. 1945		. <u> </u>	ا ر <u>محمد میں محمد میں</u> در ایر در ایر
Comments Arrived on GC For the purge.	Site at 1000 . Purge began at 1 NO14 . Left	Tannen Hollida	J well for	Palmer present 12 Minutes	· · ·
ple: Ania 1318 -	Sample 1321	104 132	3		13. f ^e
· Duplicate & The	w-6				

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Mill – Groundwater Discharge Permit	Date: 2.25.07 Revision: 2
Groundwater Monitoring Quality Assurance Plan (QAP)	Page 40 of 41
(A, b) = (A, b)	<u>ATTACHIMENT 1</u>
	: MESA URANIUM MILL RESHEET FOR GROUND WATER
Description of Sampling Event: 3 rd	Quaare a Nitrate & Albride 09
Location (well name) Picz	Name and initials Tanner Hillidey, Pyon Perhuer
Date and Time for Purging	and Sampling (if different) 9.22-09
Well Purging Equip Used:pump or	baller Well Rump (if other than Bonnet)
Sampling Event Nikate & chiloride	Prev. Well Sampled in Sampling Event
pH Buffer 7.0 7.0	pER Buffer 40
Specific Conductance <u>998</u> uMHOS/	5 4 4 1 C
Depth to Water Before Purging 63.02	Casing Volume (V) 4" Well: (653b)
Conductiluce (avg)	3" Woll:(.367h)
Well Water Temp. (avg)	Redox Potential (Eh)Turbidity
weather cond. <u>Clean Surrey</u> Br	c'l Amb. Temp (prior to campling event) 22.2
Time_111114 Gal Parged	Gal; Purged
pH 7.27	pH
Temperature 14.10	Temperature
Redox Potential (Eh) 572	Redox Potential (Eh)
Turbidity $_30.2$	Turbidity
Time: Gel. Purged	Time:Gal. Puiged
Conductance	Conductance
рН	рн
-	Temperature
Temperature	
Redox Potential (Eh)	Redox Potential (Eh)

Quality Assurance Plan	g (QAP)			Page 41 of 4	1
		가 다. 이번 전 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1			
Turbidity		Turbidity			
				······································	
Volume of Water Purg	ed When Field				_
			·2· A .	• • • •	
Pumping Rate Calculat	1000		1.18.1		
Flow Rate (Q), in gpm.				ng volumes (2V)	
3/60 = =		$\mathbf{T} = 2\mathbf{V}/\mathbf{Q}$			
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			· · · · · · · · · · · · · · · · · · ·		
Number of casing volu	nes evacuated (if other than two)		A state of the second s	
		······································			
f well evacuated to dry	ness, number of	gallons evacuated			e i eti,
Jame of Certified Anal	viical Laboratoi	v if Other Than Enc	ev Labs	Contraction of the second	
Went of Corneline Line					
					<u>.</u>
vpe of Sample	Sample	Sample Volume	Filtered	Preservative A	ilded
	Taken (circle)	(indicate if other than as specified	(circle)	(circle)	s de la de la delatera. En ser este este en la delatera en l En la delatera en la de
		E BREETE STOL DE RECERCICEE	- -		and the second sec
	SCH STORES	Helmen water of the		1.1.1.1.1.含味过褐黄。	
		below)			····
	not men	- <u>bélow)</u> 3x40 ml	YN	••• HCL	N
utrients	Y N	below) 3x40 ml 100 ml	Y N Y N	HCL Y	N N
lutrients lenvy Metals	Ý N CÔN V N	below) 3x40 ml 100 ml 250 ml	YN	HCL Y HSO4 Ó HNO3	N J N K N
utrients envy <u>Metals</u> 11 Other Non-	Y N	below) 3x40 ml 100 ml 250 ml 250 ml	Y N Y N	HCL H H2SO4 (1 HNO3 No Preservative	N 7 N C N Added
OCs jutrients jenvy Metals il Other Non- adiologics ross Alpha	Ý N CÔN V N	below) 3x40 ml 100 ml 250 ml	Y N Y N	HCL H H2SO4 (1 HNO3 No Preservative	N 7 N C N Added
utrients ienvy Metals II Olher Non- adiologics	Y N <u>C</u> N <u>Y</u> N Y N	below) 3x40 ml 100 ml 250 ml 250 ml	Y N Y (\$) X N ;	HCL 1 H ₂ SO ₄ (1 HNO ₃ No Preservative	N 7 N C N Added
utrients envy Metals Il Other Non- adiologics ross Alpha ther (specify)	Y N CD N Y N Y N	below) 3x40 ml 100 ml 250 ml 250 ml 3840 ml	Y N Y A) Y N Y N	HCL H H2SO4 (1 HNO3 1 No Preservative H2SO4 1	N 7 N C N Added
utrients envy Metals II Other Non- adiologics ross Alpin ther (specify) Apple Specify)	Y N CD N Y N Y N	below) 3x40 ml 100 ml 250 ml 3x40 ml 1,000 ml 3x40 ml 3	Y N Y A) Y N Y N	HCL Y H2SO4 (1) H2SO4 (1) H2SO4 (1) No Preservative H2SO4 (1) Y N	N N Added Y N
utrients envy Metals Il Other Non- adiologics ross Alpha ther (specify)	Y N CD N Y N Y N	below) 3x40 ml 100 ml 250 ml 3x40 ml 1,000 ml 3x40 ml 3	Y N Y A) Y N Y N	HCL. Y H ₂ SO ₄ HNO3 No Preservative H ₂ SO ₄ Y Y Y N	N N Added N
utrients envy Metals II Other Non- adiologics ross Alpin ther (specify) Apple Specify)	Y N CD N Y N Y N	below) 3x40 ml 100 ml 250 ml 3x40 ml 1,000 ml 3x40 ml 3	Y N Y A) Y N Y N	HCL. Y H ₂ SO ₄ (HNO ₃ No Preservative H ₂ SO ₄ Y Y N If a preservative Specify Type an	N N Added N is used,
utrients envy Metals II Other Non- adiologics ross Alpin ther (specify) Apple Specify)	Y N CD N Y N Y N	below)	Y N Y A) Y N Y N	HCL. Y H ₂ SO ₄ HNO3 No Preservative H ₂ SO ₄ Y Y Y N	N N Added N is used,
utrients envy Metals II Other Non- adiologics ross Alpha ther (specify)	Y N CD N Y N Y N	below)	Y N Y A) Y N Y N	HCL. Y H ₂ SO ₄ (HNO ₃ No Preservative H ₂ SO ₄ Y Y N If a preservative Specify Type an	N N Added N is used,
utrients envy Metals II Other Non- adiologics ross Alpha ther (specify) <u>Append Spergmun</u>	Y N CD N Y N Y N	below)	Y N Y A) Y N Y N	HCL Y H2SO4 (1 H2SO4 (1 H2SO4 (1 H2SO4 (1) No Preservative H2SO4 (1) Y N If a preservative Specify Type and Quantity of Press	N N Added N is used,
utrients envy Metals II Other Non- adiologics ross Alpha ther (specify)	Y N CD N Y N Y N	below)	Y N Y A) Y N Y N	HCL. Y H ₂ SO ₄ (HNO ₃ No Preservative H ₂ SO ₄ Y Y N If a preservative Specify Type an	N N Added N is used,

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Mill – Groundwater Discharge Permit Groundwater Monitoring	Date: 2.25.07 Revision: 2
Quality Assurance Plan (QAP)	Page 40 of 41
WHITE WHITE	
Description of Sampling Brent: 3	RKSHIERT FOR GROUND WATER Quaerer Nikak & Chloide 09 Sampler
Location (well name) <u><u>Pice</u> 2</u>	Name and initials Tanner Holliday, Lyon Palmer
Date and Time for Purging	and Sampling (if different) <u>9.22-09</u>
Well Purging Equip Used:pump or	bailer Well Rump (if other than Bennet)
Sampling Event Nikak & Chibride	Prev. Well Sampled in Sampling Event. Rzz. 1
pH Buffer 7.0 7.0	pH Buffer 40
Specific Conductance <u>778</u> uMHOS/	and the second se
Depth to Water Before Purging 15.2" Conductance (avg)	Casing Volume (V) 4° Well:(.653h) 3° Well:(.367h)
Well Water Temp. (avg)	Redox Potential (Eb) Turbidity
weather Cond. Clear, Sound Br	t'l Amb. Temp.(prior to sampling event) 22%
Time: 12.12.8 Gall Purged	Times Gal Purged
conductance 616.4	Conductance
рн. 8.02	
Temperature 16.61	Temperature
Redox Potential (Hh) 337	Redox Potential (Eli)
Turbidity 1407	Tuspidity
Time:Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH ₄
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Bb)

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Quanty 511-11-1	(QAP)			Page 41 of 41
			2	
Turbidity		Turbidity !		
MI-Barro of Willocor Day	and William V7:- F.S.	The second side Basicon		
A Creating of A strest like	zeu wnem rienu.	Parameters are Méasur		
Pumping Rate Calcula				·
The second second		The second s		(A TA)
Flow Rate (Q), in gpm $S/60 = =$	4	Time to evac T = 2V/Q =	unc two casing	VORUMES (ZV)
			•	
Number of casing volu	ines evacuated (if other than two)	· · · · ·	
If well evacuated to dry	mess, number of	f gallon's evacuated		
			· ·	
Name of Certified Ana			/ Labs	and the part of the second
		Rizekt, Sheke	<u></u>	
Type of Sample	<u>Sahinple</u> Takèn	Sample Volume (indicate if other)	Filtered	Preservative Added (circle)
•	(circle)	time as apecified	CRECACE	
	AN AND SOLAR	below)	<u>a an an an an</u>	and the second second second
VOCs	Y N	3x40 ml	R N	HCL
Nutrients	Ø N	100 ml	r (N)	H ₂ SO ₄ (Y) N
Heavy Metals All Other Non-	<u> Y N</u>		<u>r</u> n 7 N	HNO3 Y N No Preservative Added
Radiologics	YN	250 ml	τ. ΤΟ 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10	 Second service Street Street and the second s Second second s Second second se
	YN	1.000 ml	<u> </u>	H2SO4 Y N
Gross Alpha		L Samnle volume	(N)	Y (N)
Other (specify)	(Y) N	A		
				•
Other (specify)				If a preservative is used,
Other (specify) Lawren Inorganic				Specify Type and
Other (specify) Lawren Inorganic		p <u>arti i secondo de secondo</u> r en con Statemento de secondo d Statemento de secondo d	n o n an	
Other (specify) Lawren Inorganic				Specify Type and
Other (specify) Lawren Inorganic		p <u>arti i secondo de secondo</u> r en con Statemento de secondo d Statemento de secondo d	.	Specify Type and
Other (specify) Lawren Inorganic				Specify Type and Quantity of Preservative:
Other (specify) Lawren Inorganic		1997 - 2002 - 2003 - 2003 - 2003 - 2003 1997 - 2003 - 2003 - 2003 1997 - 2003 - 2003 - 2003 - 2003 1997 - 2003 - 2003 - 2003 1997 - 2003 - 2003 - 2003 - 2003 - 2003 1997 - 2003 - 2003 - 2003 - 2003 - 2003 1997 - 2003 - 2003 - 2003 - 2003 - 2003 1997 - 2003 - 2003 - 2003 - 2003 - 2003 1997 - 2003 - 2003 - 2003 - 2003 - 2003 1997 - 2003 - 2003 - 2003 - 2003 - 2003 - 2003 - 2003 1997 - 2003 - 20		Specify Type and

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Mill – Groundwater Discharge Permit Groundwater Monitoring	Date: 2.25.07 Revision: 2
Quality Assurance Plan (QAP)	Page 40 of 41
Description of Sampling Event: 3 rd	DRKSHIEET FOR GROUND WATER Quare a Nikak & Chloride 09 Sampler
Location (well name) <u>1123</u>	Name and initials Tanner the lidey layour Valuer
Date and Time for Purging	and Sampling (if different) <u>9.22.09</u>
Well Purging Equip Used:pump or X	bailer Well Pump (if other than Bennet)
Sampling Brent Nikak & Chloride	Prev, Well Sampled in Sampling Event Prez 2
pH Buffer 7.0 7.0	pH Buffer 4.0
Specific Conductance <u>998</u> uMHOS	/cm Well Depth
Depth to Water Before Purging_36.5	
1. Stall de Michael Stall	3" Well: (.367h)
Conductance (avg)	phr of Water (avg)
Well Water Temp. (avg)	Redox Potential (Eh)
Weather Cond. Clean Sammer B	at'l Amb. Temp (prior (o sampling event) ZZC
Time: 120.5. Gal: Purged	Cimes Gal; Purged
Conductance 2042	Conductance
pH 12.3	H
1 5 611	 A subject the state of the stat
	_ Temperature
Redox Potential (Bh) 232	_ Redox Potential (Eh)
Turbidity	Typidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
	pH
Temperature	Temperature
	Rédox Poténtial (Eb)
Reflox Potential (Eh)	Ready Potennai (Mi)

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<u>Mill</u> — Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)	Date: 11.17.06 Revision: 1 Page 41 of 41
Tuchidity	Turbidity
Volume of Water Purged When Field Pr	arameters are Measured
Pumping Rate Calculation	an a
Flow Rate (Q), in gpm. S/60 = =	Time to evacuate two casing volumes (2V) T = 2V/Q =
Number of casing volumes evacuated (if	othër than two)
If well evacuated to dryness, number of g	allons evacuated
Name of Certified Analytical Laboratory	if Other Than Energy Labs

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"曹操"的"公司"安静的"副城市", e . Sample Volume Type of Sample Sainple Filtered Preservative Added (indicate if other (circle) (circle) Taken think as specified (circle): 11.5 below) 1. 5 419 4 - minter in 3x40 ml VOCs YN Y N HCL Y N Ð N) Nutrients N 100 ml Y H_2SO_4 Ø N 250 ml HNO3 Y N No Preservative Added Heavy Metals YN Y N Other 250 ml Ý All Non-YN N Radiologics 幼ら **Gross** Alpha Y N YN 1,000 ml Y N H₂SO₄ TŪ Ŵ Other (specify) Ŷ Ν Sample volume N Y Arned Indianic If a preservative is used, Chlorick V. Specify Type and Quantity of Preservative:

Comments Horing at 11.53 Tanue to mat Sandling EVENT. Die Ser of Parametris talen, Samples, Irtt sile at 1209 AT 1205 offected

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<u>Mill Groundwater Discharge Permit</u> Groundwater Monitoring	Date: 2.25.07 Revision: 2
Quality Assurance Plan (QAP)	Page 40 of 41
	ATTACHIMENT 1
	TE MESA URANIUM MILL
Description of Sampling Event: 3	PORKSHEET FOR GROUND WATER
Location (well name) <u>JULPU</u>	Name and initials Tanner Hulfday, Pyoe Pulmer
Date and Time for Purging	2_and Sampling (if different) 9.22.09
Well Purging Equip Used: Zpump or	_bailer Well Pump (if other than Bennet) faciste fin pump
Sampling Brent Nikak & Chleriek	Prev. Well Sampled in Sampling Rvent. A.B.
pH Buffer 7.0 7.0	pH Buffen 4.0
n in a state of the state of th	xs/cm Well Depth
Depth to Water Before Purging 114	Casing Volume (V) 4 ^w Welk:(.653h)
C. LEWERSCHLEICHER ST. LEWERSCHLEICHER	3" Well:(.367h)
Conductance (avg)	ptrof.water (avg)
Well Water Temp. (avg)	Redox Potential (Eb)
weather.cond. <u>Clear, Surg</u>	Ene'l Amb. Temp. (prior to sampling event) 22.31 C
	Times Ghl, Purged
rime: <u>105 2</u> Gal Purged	
Conductance <u>////////////////////////////////////</u>	Conductance
pH 1.7	A Det and the second seco
Temperature 15-32	Temperature
Redox Potential (Bh)_377	Redox Potential (Eh)
Turbidity	Tuxoidity
Time: Gal. Purged	Time:Gal. Purged
Conductance	Conductance
PH	pH
Temperature	Templerature
Redox Potential (Eh)	Renor Potential (Eb)

Groundwater Monitoris Quality Assurance Plan	~					Page 41	of 41
				<u>v</u>			
Turbidity			Turbidity				_~··
		-	·	· · · · ·			
Volume of Water Puij	zed When	n Field					
Pumping Rate Calcula	้	-		· • • • • • •		•	
Uniperio Assos Carolons		M.					
10w Rate (Q), in gpm	-		Time to ev	acuate two cas	ing vol	umes (2V)	
//60 =			Time to evT = 2V/Q				<mark>a sa</mark> na sa
Number of casing volu	Mes evaci						
Anternation of Antonia Anter	arctifis of y Live	mine (an erenders testers over the			_	
f well evacuated to dry	/ness, nun	nber of	f gallons evacuated	<u>ba</u>		N.S.	مرد را ا میر
S		ا	1 A	19 			
Jame of Certified Anal	lytical Lai	boratoi	ry if Other Than Ener	gy Labs	<u></u>		
			ry if Other Than Bre			·····	<u>aa</u> to ta kan Na kaada sa
	Sain	nple	Sámple Volume	Filtered	, , 	Preservativ	e Added
	Sam Tal	nple sen	Sample Volume	Filtered (Circle)	, , 	Preservativ	
	Sain	nple Sen clè): ;	Sample Volume	Filtered (Circle)	, , 	Preservativ (ch(d)	<u>e Added</u>
yne of Sample	Sain Ital Chin	n <u>plæ</u> Sen clie)	Sámple Volume	Filtered (Circle)		Preservatiy (cincle)	e Added
vine of Sample	Sain Tal (City S	n <u>nlæ</u> Sen cle)	Simple Volume (indicate if other, (finit is specified below)	<u>Filtered</u> (Citcle)		Preservatily (cincle) HCL	<u>e Added</u> Y
<u>vae of Sample</u> OCs	Sain Ital Chin	nnlæ sen cle)	Simple Volume (indicate if other (frain as specified below) 3740 ml 100 ml	Filtered (circle) Y N		Preservatily (cincle) HCL H2SO4	<u>e Added</u> Y <u>N</u>
vne of Sample OCs utrients cavy Métals	Sain Tal (City S	nike Sen Cie) N N	Simple Volume (indicate if other, (han as specified (below) 3/40 ml 100 ml 250 ml	Filtered (circle) Y N Y N N		Preservatily (circle) HCL HSO4 HNO5	e Added Y N (V N V N V N
vne of Sample OCs unients cavy Métals Il Other Non-	Sain Tal (City S	nnlæ sen cle)	Simple Volume (Indicate If other (Hail as specified below) 37,40 ml 100 ml 250 ml	Filtered (circle) Y N		Preservativ (cincle) HCL H2SO4 HNO3 No Preservat	e Added Y N Ø N Y N Y N
<u>vne of Samiple</u> OCs unients eavy Metals II Other Non-	Sain Tal (City S	ninke Sen Cla) N N N	Simple Volume (Indicate if other (Indicate if other	Filtered (circle) Y N Y N N		Preservativ (cincle) HCL H2SO4 HNO3 No Preservat	e Added Y N (V N V N
<u>yme of Samiple</u> OCs unients eavy Metals II Other Non- adiologics ross Alpha	Saim Iai (chiv (V) V Y Y	nnlo Sen Cla) N N N N	Simple Volume (Indicate If other (Indicate If other below) 37,40 ml 100 ml 250 ml 250 ml	Y N Y N Y N Y N Y N		Preservativ (cincle) HCL H2SO4 HNO3 No Preservat	e Added Y N Ø N Y N Y N
yme of Samiple OCs utrients eavy Métals II Othèr Non- adiologics ross Alpha ther (specify)	Sain Iai (cirv))))))))))))))))))))))))))))))))))))	nhlo Sen Clo N N N N	Simple Volume (indicate/if other (finit as specified below) 3/40 ml 250 ml 250 ml	Filtered (circle) Y Y Y Y N N N Y N N N N		Preservatily (cincle) HCL H ₂ SO ₄ HNO; No Preservat	e Added Y N Ø N Y N Y N
Vine of Sample OCS unients eavy Metals II Other Non- adiologics ross Alpha ther (specify) Memory Thorganic	Sain Iai (cirv))))))))))))))))))))))))))))))))))))	nhlo Sen Clo N N N N	Simple Volume (indicate if other, than as specified below) 3/30 ml 200 ml 250 ml 1,000 ml 5 ample volume	Filiterreal (Citcle) Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N		Preservativ (cincle) HCL H ₂ SO ₄ HNO; No Preservat H ₂ SO ₄ Y	e Added Y N Y N Y N ive Added Y N
yme of Samiple OCs utrients eavy Métals II Othèr Non- adiologics ross Alpha ther (specify)	Sain Iai (cirv))))))))))))))))))))))))))))))))))))	nhlo Sen Clo N N N N	Simple Volume (indicate/if other (finit as specified below) 3/40 ml 250 ml 250 ml	Filiterreal (Citcle) Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N		Preservativ (cincle) HCL H2SO4 HNO3 No Preservat H2SO4 Y Y	e <u>Added</u> Y N Y N Y N ive Added Y N
Vine of Sample OCS unients eavy Metals II Other Non- adiologics ross Alpha ther (specify) Memory Thorganic	Sain Iai (cirv))))))))))))))))))))))))))))))))))))	nhlo Sen Clo N N N N	Simple Volume (indicate/if other, than as specified below) 3/30 ml 200 ml 250 ml 250 ml 1,000 ml Sample volume	Filterred Circle Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N		Preservativ (cincle) HCL H2SO4 HNO3 No Preservat Y Y	e <u>Added</u> Y N X N Ivo Added Y N ive is used, and
Vine of Sample OCS unients eavy Metals II Other Non- adiologics ross Alpha ther (specify) Memory Thorganic	Sain Iai (cirv))))))))))))))))))))))))))))))))))))	nhlo Sen Clo N N N N	Simple Volume (Indicate If other (Mail as specified below) 33:40 ml 100 ml 250 ml 250 ml 3:00 ml Sample volume	Filtered (circle) Y Y Y Y N Y N Y N Y N Y N Y N		Preservativ (cincle) HCL H2SO4 HNO3 No Preservat Y Y	e <u>Added</u> <u>Y</u> N <u>V</u> N <u>ive</u> is used, and reservative:
Type of Sample TOCs Tunients teavy Metals II Other Non- adiologics ross Alpha ther (specify)	Sain Iai (cirv))))))))))))))))))))))))))))))))))))	nhlo Sen Clo N N N N	Simple Volume (indicate if other (indicate if other dian as specified belier) 3:40 ml 100 ml 250 ml 1;000 ml Sample volume	Filtered (circle) Y Y Y Y N Y N Y N Y N Y N Y N		Preservativ (cincle) HCL H2SO4 HNO3 No Preservat Y Y	e <u>Added</u> Y N X N Ivo Added Y N ive is used, and

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Comments Arrive at 1044 Tanner & lyon free Die Ser of favametris talen; Samples Collected Jeft stil at 1059. Keint For Sampling SurenT.

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2711 N.W. A.G.A.

October/November Sampling Event

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Mill – Gaoundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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	<u>FACHMENT 1</u> ESA URANINIM MULI.
FIELD DATA WORK	Sheet for ground water
· · · · · · · · · · · · · · · · · · ·	etter Nitrade de chloeide
Location (well name) TWN-1	Name and initials Ryan Palmer P.
Date and Time for Purging <u>10.28.09</u> s	
Well Purging Equip Used: Zpump orbailt	sr Well Pump (if other than Bennet) <u>Annual Fors</u>
Sampling Event <u>Altak</u>	Prov. Well Sampled in Sampling Event
pH Buiffer 7.0 7.0	pH Baiter 40 4.0
Specific Conductance <u>998</u> uMHOS/cm	Well Depth 1/12.5
Depth to Water Before Purging 46.99	Casing Volume (V) 4" Well: <u>(5.5/(.653h)</u> 42. 77803 3" Well: <u>(.367h)</u>
Conductance (avg)	pH of Water (avg)
Well Water Temp. (avg)	Redok Polential (Eb)
Weather Cond. Drowing But'l	Amb. Temp (preor to sampling event)
Time: Gal. Purged	TimeGal. Purged
Conductance 711 6	Conductance
pH7.07	Hq
Temperature 9. 42	Temperature
Redox Potential (Bh) 462	Redox Potential (Eh)
Turbidity 2.0	Turbidity
Thue: Gal. Purged	Time: Gal. Purged
Conductionce	Conductance
pH	PH
Tomperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)
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Turbidity	· · · · · · · · · · · · · · · · · · ·	Turbidity	· · · · · · · · · · · · · · · · · · ·	•	
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Mill – Groundwater Discharge Pennit Groundwater Monitoring Quality Assurance Plan (QAP) Date: 2.25.07 Revision: 2

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Page 40 of 41 ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEETFOR GROUND WATER Chlubide Description of Sampling Event: INVATE 3 Samplen Samplen Name and initials Tanal N Palmell Location (well name) 2-07 Date and Time for Purging and Sampling (if different) Well Putging Equip Used: Lipump or _____bailer Well Rump (if other than Bennet) AUNA Sampling Event Sampling Rvent pH Büffer 7.0 Specific Conductance WHIOS 8267 Depth to Water Before Purging Casing Volume (V) 4" Well: 76 8 (.653h) OFFICE WATE Conductance (ave) Redox Potential (Rb) 70 Turbidity 3. Well Water Temp. (avg) Amb. Temp. (prior to) sampling event) Weather Cond Nile Dan Gal. Porged Gal Purged Hine: ើកធំអី юH Sec. 19. 19 15.7 Temperature Temperature Redox Potential (Eh) Redoy Potential (Eh Turbidity Vicibidity Gal. Purged Gal. Purged Time: // 3. Time: 112 700 270 Conductance Conductance pH. Ç, pH_ 15,38 Temperature_ 5 Тетрегания 381 Redox Potential (Eb) Redox Potential (Eh) 28.2 7.8 Indo

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Mill - Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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ATTACHMENT 1 WHITE MĖSA URANIUM MHLL FIELD DATA WORKSHEET FOR GROUND WATER Description of Sampling Event: NYWATE Huride Sampler Nathe and initials an Valmed Location (well name) Date and Time for Purging and Sampling (if different) Xpump or __bailer Well Bump (if other than Bennet), Well Purging Equip Used: anna Sampling Event ell Sampled in Sampling Event. pH Buffer 7.0 uMHOS/cm Denth Specific Conductance Depth to Water Before Purging.31. Casing Volume (V) 4" Well; ¥573 .653hd Conductance (ave) Well Water Temp. (avg) Redox Polencial (Eh) / 2 Turbidity Weather Cond Clean WANN Ext'l Amb. Temp (prior to sampling even Phile: 101 Yme://// Gal Purged Conductanc Conducta + 2 st offers Temperature Temperature Redox Potential (Eh) Redox Potential (El Turbidity_ Vabidity. Time: 1116 Gal. Purged Time: Gal. Purgeol 8 0 Conductance Conductance Ζ., nH Temperature Temnerature Redox Potential (Eh) Redox Potential (Eh) ill 3. Tueb

Quality Assurance Plan (QAP) Page 41 of 41 Turbidity Turbidity Volume of Water Purged When Ficht Parameters are Whenshred S.3 Pumping Rate Calculation
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Mill - Groundwater Discharge Pennit Date: 2.25.07 Revision: 2 Groundwater Monitoring 141 ' *||* 801 \$16 9977 Quality Assurance Plan (QAP) Page 40 of 41 ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER Description of Sampling Event: Sampler Name and initials Location (well name) Date and Time for Purging 10:28:09 and Sampling (if different) Well Purging Equip Used: Zpurp or __bailer Well Pump (if other than Bennet), Viewald Sampling Event_ Prev. Well Sampled in Sampling Byent Thiw 4k pH Buffen 4.0 pH Buffer 7.0_ Well Denth ul/IHOS/cm Specific Conductance Depth to Water Before Purging 36.0 Casing Volume (V) 4" Well: 89 (.653h) 58 3" Well (.367h) pH of Water (avg) Conductance (avg) Redox Potential (Bh) Turbidity Well Water Tomp. (avg) Weather Cond. Will lie Ent'l Amb. Temp. (prior to sampling event) Time: 1036 Gal. Purged Times Gal Purged sin kinan Conductance 7 Conductance юH Temperature Temperature Redox Potential (Eh) Redox Potential (Eh) Turbidity. Turbidity_ Time: Gal. Purged Time: Gal. Purged Conductance Conductance pĦ, pHTemperature Temperature ··· Redox Petchilal/(Bit) Redox Potential (Eh) V = N3419

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Groundwater Mozitorio Quality Assurance Plan	-			. ,	Page 41 of	-41
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Groundweter Monitoring Quality Assurance Plan (QAP)	Page 40 of 41
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Mill - Groundwater Discharge Permit Grauedwater Monitoring Quality Asserance Plan (QAP)

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ATTACHMENT 1 WHITTE MESA URANIUM MILL FIELD DATA WORKSHEET, FOR GROUND WATER Description of Sampling Event: NETRATE 3 CHIVERAG N Valmer Location (well name) 7 Date and Time for Purging and Sampling (if different) Well Purging Equip Used: X pump or __ hailer Well Pump (if other than Bennet), Sampling Event Well Sampled in Sampling Event pH Buffer 4.0 pH Bilffer 7.0 Specific Conductance_ uMHOS/cm Casing Volume (V) 4" Well: <u>54.67</u> (.653h) 35. (.367h) (.367h) (.367h) Depth to Water Before Putging 75.33 Conductance (avg) Redox Potential (Eb) Turbidity Well Water Temp. (avg) WeatherCond. / Ma Ent'l Amb. Temp.(prior to sampling event). 1.7 SUMU Time: 145.2 Gal. Purged Fine: 1458 Condiolance 200 Conduc рН Temperature Temperature Redox Potential (Eh) Redoy Potential (Eh Turbidity. Verbidity Gal. Purged Time: 145 5 Time: 1500 Gal. Purged 48 36, Conductance Conductance 4,6 Temperature Temperatura Redox Potential (Eh) Redox Potential (Eh) urb net

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Date and Time for Purging 11-10-07	and Sampling (if different)	
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Mill – Choundwater Discharge Permit Groundwater Monitoring	Date: 11.17.06 Revision: 1	· · ·
Quality Assurance Plan (QAP)		Page 41 of 41
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Mill – Groundwater Discharge Pennit Groundwater Monikoring Quality Assurance Plan (QAP)

Date: 2,25.07 Revision: 2

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ATTACHMENT 1 WHITE MESA URANIUM MILL WORKSHEET FOR GROUND WATER FIELD DATA Description of Sampling Event:____ NIWAKE CHIOLIAG Sampler is Palmed Location (well marie) Native and initials 100 11.3.09 and Sampling (if different) TAN . Date and Time for Purging Well Purging Equip Used: Knump or _____bailer Well Pump (if other than Bennet) Sampling Event Prev. Well Sampled in Sampling Event 7 pH Biffer 7.0 Well Dame 1455 Specific Conductance uN/IHOS/cm Depth to Water Before Purging 162-39 Casing Volume (V) 4" Well: <u>83.//</u> 7083 (.653h) 5 2 (.367h) Conductance (avg) Redox Potential (Eb) Turbidity Well Water Temp. (avg)_ Luchest21 Amb. Temp (prior to sampling event) / 7 WeathenCond Gal. Purged 05 Conduction Commictance Temperature Temperature .. 921 8 Redoy Potential (En Redox Potential (Eh) Wabidity Turbidity Gal. Purged Thue: Gal. Purged Time: 296 50 Conductance Conductance pH 7.4 Temperature Tempergiane Redox Potential (Eh) Redox Potential (Èh) 1.05 Inab

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Location (well manne) TWN 9	Name and initials	1 Holliday & Kyani Valmel
Description of Sampling Event: <u>N942</u>		AL.
	MESA URANIUM MILL RKSHEDLHOR GROUND W	VATER
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Quality Assurance Plan (QAP)	44	Page 40 of 41
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Mill – Groundwater Discharge Permit Groundwater Monitoring	Date: 2.25.07 Revision: 2
(menterværer montaning Quality Assurance Plan (QAP)	Page 40 of 41
	ATTACHMENT 1
	e mesa uranium mill Drksheedkor ground water
	ate 3 Chloride
Location (well manie) TWW-10	Name and initials Tanks Holliday & byon Palmed
	Land Charles and the second
Date and Time for Purging 11.10.0	(and Sampling (if different)
Well Purging Equip Used: Xpump or	Baller Well Pump (if other than Bennet) Jund Fos
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pH Buffer 7.0 <u>+ - U</u>	pH.pomer.4.0
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	31 Welk (367h)
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н Чо!	4.07
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Mill - Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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Date: 2.25.07 Revision: 2

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Page 40 of 41 ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEELFOR GROUND WATER Description of Sampling Event: CHURAE <u>NY YNANE</u> lyan Palmed Name and initials Juniol Location (well manie) and Sampling (if different) Date and Time for Purging Xpump or ____bailer Well Pump (if other than Bennet) Well Purging Equip Deed: Prev. Well Sampled in Sampling Event TWW-1112 Sampling Event_ pH Buffer 4.0 pH Buffer 7.0 Specific Conductance uMHOS/cm Casing Volume (V) 4" Well: 71.47 (653h) 46.01691 Depth to Water Before Purging 71.53 3" Well: DH: Of Wales (avg) Conductance (avg) Redox Polencial (Eb). Turbidity Woll Water Temp. (avg) MACHERTI Amb. Temp (prior to sampling event) Weather Cond Proc. 0848 Gal Purged rimo: 0840 Gal. Purged Conduciance 2742 2771 Conditierance Temperature ... 77 Temperature Redoy Potential (Eh) Redox Potential (Eh) **Wabidity** Turbidity_ Gal. Purged Ťime: <u>/8</u> Time: [184 Gal. Purged Conductance Conductance 3 ۶Hq Temperature Tempergund Reliox Potential (Eh) Redox Potential (Eh) 2.2 Tuels Inet

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Mill – Groundwater Discharge Permit Groundwater Monitoring Onality Assurance Plan (QAP) Date: 2.25.07 Revision: 2

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Page 40 of 41 ATTACHMENT 1 white mėsa urąnium mill WORKSHEELOR GROUND WATER FIELD DATA Description of Sampling Event: CHIOLAG NYWAKE ian Palmed Name and initials Taulel Location (well name) .3.07 and Sampling (if different) Date and Time for Purging Komp or ____bailer Well Pump (if other than Bennet) Well Purging Equip Used: าณณ Sampling Event Prev. Well Sampled in Sampling Event pH Buffer 4.0 pH Buffer 7.0 Specific Conductance MHOS 76877 Casing Volume (V) 4" Well: 70.07 (.653h) Depth to Water Before Purging S del of Water (ave) Conductance (avg)_ Redox Polencial (Ea) Turbidity Well Water Temp. (avg) weather Conds. Amb. Temp (prior to sampling event) rume: /// 7 Gill Purged ine: 10 Gal. Purged Conductance 2520 Conductan юЩ -5 Temperature Temperature Redox Potential (Bh) Redox Potential (Eh Turbidity **D**utbiolity Time: 102 Gal. Purged Time:_ 10 Gal. Purged 45 432 Conductance Conductance pН pH_ Temperature Temperature Redox Potential (Eb) Redox Potential (Bh) 9.7 nel 2,22

Mill – Groundweter Di Groundwater Monitori		Date: 11.17.05 Ret	vision: l		
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	and the second designment of the second design				
Turbiclity		Turbidity	Martin Bernard	e	
			$a_1 + a_1 < a_2$	· · · · · · · · · · · · · · · · · · ·	
Volume of Water Purp	• •			i 	
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VOCs	Y'SN .	3x40ml	V. N	HEL	
Nutrients	N N	100 ml		HSO N]
Heavy Metals	Y N	250 mi	Y N	YINO, Y N	
All Other Non- Radiologics	YN	250 ml	Y N	No Preservative Added	1
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<u>Mill – Groundwater Discherge Permit</u> Groundwater Monitoring	Date: 2,25.07 Revision: 2
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WINITE	
Location (well hame) TWN 13	Name and initials Tayles Holliday & byans Palmed
Date and Time for Purging <u>1-4-09</u>	and Sampling (if different)
Well Purging Equip Used: Xpump orb	aller Well Bump (if other than Bennet) Land Fos
Sampling Event Nitrate	Prevention Sampled in Sampling Door TANA 13 R
pH Buffer 7.0 7.0	ptterreran 40
specific Conductance <u>998</u> uMHOS/c	m 7 Well Deputy
Time: 1258 Call Purged 12 Commentance: 1-380 pHi -7.46 Temperature: 15.14 Redox Poicaulit (Bhy: 288 Turbidity: 76.1 Fine: 1305 Gal. Purged 54	Temperature 14.68 Redox Potential (Eh) 370 Dirbidity 13.9 Time: 1309 G. (. Purged 78
20nductaines 1328 M 772	Conductance 1352 PHT 7.68
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Groundwater Monitori Ownity Assurance Plan				Page 41 of 41	
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ATTACHMENT 1 WHITE MESA WRANIUM MILL FIELD DATA WORKSHEED FOR GROUND WATER 3 Chloride Description of Sampling Event: Netrate Name and initials [amed Location (well hame) TWN and Sampling (if different) Date and Time for Purging 11-4-04 see lee Well Purging Equip Used: Krump or _____bailer _____Vell Polmp (if other than Bennet) saina Sampling Event Well Sampled in Sampling from DOM 14 R al and the transport pH Buller 7.0 Mandefine and B5 States and a state of the Specific Conductance MAHOS Casing Volume (V) 4 Well: 46.78 (.653h) Depth to Water Before Putping Welle Conductance (ave) Well Water Temp. (avg). H. 7 Renox Polential (10h) SST. Turbidity 59 nto. remp (prior to sampling event) 19 °C :: imes 1992 AHIA Gal Purged Gal Pursed ninductance 34 3.7 80 Conduc • 律中國行 南 法國往 481 Temperaturs Temperature Redox Potential (Eh) Redon Potential (El) Ч **Liftbidity** Turbidity. Time: 1425 The: 142 Gal. Purged 54 Gal. Purged 1238 Conductance Conductance 7.61 рĦ ρĤ 14.62 l'emperature_ Temperature 364 368 Rédox Potential (Éh) Redox Potential (Eh) 98:0 1032 arb urh

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Mill – Groundwater Discharge Pennit Groundwater Monitoring	Date: 2.25.07 Revision: 2
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	<u>ATTACHMENT 1</u> E MÉSA URANIUM MILL
	DRKSHEDLFOR GROUND WATER
Description of Sampling Event: <u>////</u>	ate & Chlulide
Location (well name) TWN 15	Sampler Name and initial's <u>Tapper Holfiday & Kyan</u> Palmer
Date and Time for Purging <u>11-10-09</u>	and Sampling (if different)
Well Parging Equip Used: Xpump or	Baller Well Pump (if other than Bennet) Lanund Fos
Sampling Event Nitrate	Prev. Well Sampled in Sampling Rvent, TLVA 15 R
pH Buffer 7.0 7.0	ptHppmcr4.04_0
Specific Conductance <u>1918</u> uMHOS	Con Well Deputy 155 research and a second seco
Depth to Water Before Purging 92.6	Casing Volume (V) 4" Well: 40.72 (653h)
Conductance (avg)	
Well Water Temp. (avg)	Redox Polentiav(Eh) Turbidity
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a and a second	
Time: 0831 Gill Puged 6	Fileg: CKSE
Conductance 2/63	
	Conductance
pm 7.43	p
Temperature 12.96	Temperature 13.67
Redox Polential (Bii) 444	Redox Potential (Eh) 458
an in the second se	
Turbidity <u>)1.5</u>	Zandelativy 217.2
Time: 0836 Gal. Purged 36	Time: 0851 Gal. Purged 66
Conductance 2342	Conditiciance 2346 2407
рн681	6.82 6.71
Temperature 14.06	Tomperature 14.01 14.03
Redox Potential (Bh)_45	Redox Potential (Bb) 445 437
Turb. 30.5	Turb 565 34.2

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Mill — Groundwater D. Groundwater Monitori		Date: 11.17.06 Re	vision: l		x
Quality Assurance Plan				Page 41 of 41	-
			en la cardadana 11 A Artana		
Turbidity	Gale - A	Turbida	A. Marina	Ware the course of the	
Volume of Water Pug	ged Wien/Riste	Paratieters and here	med 78		
Pumping Rate Calcula	<u>Lion</u>		i Jarry	() () () () () () () () () ()	÷ .
Flow Rate (Q), in gpm S/60 = =	- parties	Tims to c	vacuate two cessing $\frac{1}{3}$	iolumes (2V)	
Number of casing volu	ines evacuated (f oiller than (1/0)		er	1. A
If well evacuated to dry	mess, number of	gallons evacuated	and the second and second		Constance in the
Name of Certified Anal		y if Other Than Ene	gy Labe	and Andrews	
i i statu se		<u>e 'u Petro nave</u>		WALLANS	<u> </u>
Type of Sample	Samole Taken (Circle)	Sample Volume (indicate it office than as speatfied	Evitered (circle)	Ereservative Addel	
		(holow)			
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All Other Nou, Radiologies	YNN	250 ml	Y N	No Preservative Add	
Gross Alpha Other (specify)	N N	1400 ml Sample volume	V N	HISO4 Y T	
chliette					
				If a preservative is us Specify Type and	5141
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Comments Boy inning Depth ros Then \$ 81 Purach Well 18-

et well R purged tri 10846. 11 star DUMP: fump placement Well back up of 10 Minutes Trmau 410100 and Minutes Samples Taken CAT Ō. Mary Throughout purge ater was 2

Total Depth

Mill - Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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Turbidity

pH

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Date: 2.25.07 Revision: 2

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ATTACHMENT 1 WHIITE MĖSA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER NY trate 3 Description of Sampling Event: Chloride Sampler Nathe and initials ins Palmed Location (well name) and Sampling (if different) Date and Time for Purging 11-4-09 Well Purging Equip Used: Lounp or _____baller Well Europ (if other than Bonnet), anuna f Samphing Event Prev. Well Sampled in Sampling Event pH Buffer 7.0 Specific Conductance uMHOS/cm Well Denth 3400 49.36 Depth to Water Before Purging Casing Volume (V) 4" Well: 33.06 (.653h) 1.23 13 ② Conductance (avg) edőz Polentlal (Eh) Turbidity Well Water Temp. (avg) Ent'l Amb. Temp (prior to sampling event) Weathen Cond. So ANA & Cla Ð. runes.o.go.comme.Gal.Purgeditari ime: ost Gal, Purged 2 912 Conductance 1999 Conducta 7.06 400 Temperature Temperature 478 Redox Potential (Bh) Redox Fotential (Eh) りん Putbidity 24 Time: 0813 Time: 0810 Gal. Purged_ 51 Gal. Purged 1869 884 Conductance Conductance 7.09 .03 pH1 14.36 142 Temperature Temperature 472. 475 Rédox Potential (Éh) Redox Potential (Eb) 125 49 w

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l'urbidity		Turbidity	La contraction of the second	· · · · · · · · · · · · · · · · · · ·
lolume of Water Purg	ad When Biold I	Demonsphere pro NAS		
	· · · · ·	S WINNESS CI & SEC IVICU		
<u>umping Rate Calcula</u>	ala a			
low Rale (Q), in gpm.			vacuate two casing t	(770) and 1970
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ANG OIL SMILLING AND AND A	Taken	(malicate al ollior	(Chicle)	Preservative Added (chiele)
*	(circle)	thun as specified		
	and the second	bclow)		·····································
JCs.	Y	3x40 ml	V. MN	
irients avy Metals	V N V N	100 ml 250 hol	Y W N N	HASO4 N MNO4 N
Other Non-	YN	250ml	M N	No Preservative Added
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oss Alpha her (specify)	X N	1,000 ml Samplé volume	Y N Y N	H ₂ SO ₂ Y N Y /D
tor (specify)	(Y) N	Smining Anomic	- CY	
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	2 M 1			If a preservative is used, Specify Type and
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Comments Arrive AT 0800 Tanak H. B Man M. Mesent Feel Ment. Purge began at 0804 . Purged well for 11 Minutes Purge ended at 0815 . Samples Taken at 0815 . Left site at 0820 Water slowly closed Throughout purge Left site at 0820 - (p) (a (x)

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Mill – Groundwater Discharge Permit Groundwater Monikoring Quality Assurance Plan (QAP) Date: 2.25.07 Revision: 2

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ATTACEMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER NPIVATE Description of Sampling Event: CHIOLIAE Sampler Sec. Diffe in Palmer Location (well manne) TW Name and initials_ Date and Time for Purging 11-41-09 and Sampling (if different) Well Purging Equip Used: "Lipunip or __bailer Well Pump (if other than Bennet) anund Fos Prev. Well Sampled in Sampling Event TULN 17 R Sampling Event_ pH Buffer 7.0, pH Buffer 4.0. Denn 110 Specific Conductance uMHOS/cm Casing Volume (V) 4" Well: 48.58 (.653h) Depth to Water Before Purging vel: <u>/////</u>(.367h) of Water (avg) 77 49 conducting (ave) 10.8 13.98 Renox Polential (Eb) 433 Turbidity 63 Well Water Temp. (avg) Bit'l Amb. Temp (prorao sampling event) 14 Weather Cond. Cl-co CERCLIPIO Gal Purcetory 用品的年代 Conductance 925 3 Conductan 733 iX pЩ 13,65 14 24 Temperature Temperature Redox Potential (Bh) 445 44 Redoy Potential (Eh) 57 **Visibidity** Turbidity_ Gal. Purged Time: 0918 Time: 0925 Gal. Purged 60 1499 99(1 Conductance Conductance 7.94 σH pĦ. 3.98 0 Temperature Temperature 428 417 Redox Potential (Hh) Redox Potential (Bh) Turb 236 058 wh

<u>Mill – Groundwater Di</u> Groundwater Monitorit	g	Date: 11.17.05 Rev	vision: l		
Quality Assurance Plan	(QAP)			Page 41 of 41	
	_				
Turbidity		Turbidity			
	5 575 5	a	and ar		
Volume of Water Purg	•				
Pumping Rate Calcula	tion			•	
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How Rate (Q), in gpm	1	Time to en	ecuate two casing v	olumes (2V)	
\$/60 = =	- P	1=240			
Number of casing volu	nes evacuated (i	f other than two)		and a straight france of the straight of the st	•
If well evacuated to dry	mann minufatio`		, 	·	
-	-		•		
Name of Certified Anal	ytical Laborator	y if Other Than Bae	cgy Labs	a three particular and a second	
				- 「「「「「「」」」」	
Type of Sauhille	Sample	Sample Volume	Iffiltored	Preservative Added (circle)	7
	Taken	(indicate if other	(circle)	(circle)	80 <u>1 -</u>
6 10 gen - 10 mar	<u>Circlé)</u> ; ;;	than as specified below)			4
	and a second		n Alexandra Alexandra Alexandra	1	
VOCs.	Y N AD N	3740 ml 100 ml	YN		ž.
Nutrients Heavy Motals	V N	250 mi	V N	H ₂ SO ₄ (2) N MNO ₃ V N	•
All Other Non-	Y N	250 ml	M N	No Preservative Added	
Radiologics Gross Alpha	T. MT-	1,000 m1	Y N	H.SO. Y N	
Other (specify)	Y N AD N	Sample volume	Y N	Y /D	8 - 8 - 19 - 19 - 19 - 19 - 19 - 19 - 19
		Minding Providence			
Chillide				If a preservative is used,	
•	-		- 7.	Specify Type and	·."
				Quantity of Preservative:	1
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	al and]

 $\{\hat{g}_{i}\}_{i\in I}$ Commentes AWING 090 st 0908 - Purged Well Samples Taking it 0424. Lot be inar c Purge ended at 0934. Samples Taken it O424 Water Was Lirte & Marky, never cleared Pump when pulled had I clay on Bottom Purge site at ÷,

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<u>A'ITACHIMENT' 1</u> WHETE MESA URANIUM MILL WORKSHIEPLFOR GROUND WATER FIELD DATA NYWATE 3 Description of Sampling Event: CHIOLIAG Sampler Sampler Name and initials est Palmed Location (well name) Date and Time for Purging and Sampling (if different) Well Pump (if other than Bennet) Well Purging Equip Used: Xpunip or ______bailer Sampling Event Prevs Well Sampled in Sampling Event nHBüter40 pH Buffer 7.0_ MHOS/cm + Well Denth and H Sussaint and Specific Conductance Depth to Water Before Purging 58.6 Casing Volume (V) 4" Well: 56.4 (.653h) Conductance (ave) 2084 pH 66 Water (avg) v 696. Redox Potential (Rh) 25 Turbidity 41 19 Well Water Temp. (avg)_ wentercom Chrae Mik Bat'l Amb. Temp (prior to sampling event) CET M Time: 1517 Gal Burged Fine: 1892 Gal. Purged Condefinee 2074 ING Conducta 696 рĦ Щα Temperature Temperature 430 Redox Potential (Eh) Redox Potential (Eh) 79 X Turbidity Varbidity_ Time: 1530 Time: 1526 90 Gal. Purged Gal. Purged 6. 2117 Conductance 116 Conductance 96 6.98 σH рĦ 44 Temperature Temperature 422 414 Redox Potential (Eli) Redox Potential (Bh) 82 Ц 40 urb

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Mill - Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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ATTACHIMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER Description of Sampling Event: NEWATE 3 Chloride an Valmed Location (well name) Th Date and Time for Purging 11: 2.09 and Sampling (if different) Well Punging Equip Used: Zoump or _____bailer Well Fump (if other than Bennet) www-19R Sampling Event Prev. Well Sampled in Sampling Event . 1/H pH Büffer 7.0 Dennesses IID uMHOS/cm Specific Conductance_ Casing Volume (V) 4" Well: <u>54.8</u> Well: <u>54.8</u> 55.19 Depth to Water Before Purging (.653h) 35 Conductance (avg) of Water (avg) Well Water Temp. (avg) Redox Polential (Eb) Weigher Cond. Alear Amb. Temp (prior to sampling event) Gal Burged Nine Lass The Conducti 1.5 二方面 Temperature Temperature Redon Potential (Eh Redox Potential (Eh) **Vurbidity** Time: 13 4 Gal. Purged Gal. Purged 57 Conductance Conductante σH :86 Temperature Temperature 403 Redox Potential (Eb) Redox Potential (Bb

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ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER Unalted Description of Sampling Event: Nitrak & 44 Sampler Location (well name) Name and initials nel Date and Time for Purging and Sampling (if different) 1 15 1 141 pump or Abailer Well Pump (if other than Bennet) Well Purging Equip Used: i frak Sampling Event Prev. Well Sampled in Sampling Event pH Buffer 7.0 nH Buffer 4.0 Specific Conductance Well Depth uMHOS/cm Sin 2 Casing Volume (V) 4" Well: Depth to Water Before Putging (.653h) 3" Well: (.367h). pH of Water (avg) Conductance (avg) Redox Potential (Eh) Turbidity Well Water Temp. (avg All Money Ent I Amb. Temp (prior to sampling event) Weather Cond C IN. POSS of STORM Time: 193/1. Gal. Purged l'ine; Gal. Purged 7236 Conductance Conductan 1.300 юH Temperature Temperature . Redox Potential (Eh)_ Redox Potential (Eh) Turbidity Turbidity_ Gal. Purged Gal. Purged Time: Time: Conductance Conductance pH. Temperature Temperaturé Rodox Potential (Bb) Redox Potential (Eh)

Groundwater Monitori Quality Asserance Plan	(MAP)			Page 41 of 41	
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<u>[ype of Samiple</u>	Taken	Sample Volume	Filtered		led OSTAN
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	ORKSHEET FOR GROU		
	Sampler	D DI	Λ
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Quality Assurance Plan	(QAP)			Page 41 of	4 <u>1</u>
Turbidity		Turbidit	y		
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3/00 = <u> </u>					- · ·
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If well evacuated to dry	man number o		¢4		
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	<u>(clicle)</u>	thun as specified		(circle)	e presidente de la companya de la co La companya de la comp
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ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND W ATER 44 Description of Sampling Event: Nihak, b UngerEd Location (well mame) _nica Date and Time for Purging and Sampling (if different) Well Purging Equip Used: ____pump or ___baller Well Rump (if other than Bennet) Rate Sampling Event Prey: Well Sampled in Sampling Byent 7.0 pH Buffer 7.0 pH Buffer 4.0 Specific Conductance ______ uMHOS/cm VVelliDepth Depth to Water Before Purging 37. 43 Casing Volume (V) 4" Well: (.653h) 3" Well: (367h). pH of Water (avg) Conditcunce (ave) Well Water Temp. (avg) Redox Potential (Eb) Turbidity Ext'l Amb. Temp (prior to sampling event) Weather Cond. STORM Clouds OUT of S.W. Time: // 2.8 Gall Pargeo -Time® Gal Purged 2264 Conductance____ Conductan 3 14.4417 рH Temperature Temperature Redox Potential (Eh) Redox Potential (Eh) Turbidity Turbidity. Gal. Purged Gal. Purged Thus: Time: Conductance Conductance pĦ bН Temperature Temperature Rodox Potential (Eb) Redox Potential (Eh)

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Comments: Arrived on Site Nesent. One Ser of Para 1030 - lets Site at 11) new Vina es Convie Vie Minus Samples Darameters Tallen 1135.

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ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER Description of Sampling Event: 44 Nitak Waarth Sampler NWU Sampler . Name and initials_ Almel Location (well name) Date and Time for Purging and Sampling (if different) Well Purging Equip Used: Zpump or __bailer Well Pump (if other than Bennet) EristoLic i Yiall Sampling Event Prev. Well Sampled in Sampling Event_1.4. pH Buffer 4.0 pH Buffer 7.0_ 498 Specific Conductance uMHOS/cm Well Depth AP inter the second Casing Volume (V) 4" Well: Depth to Water Before Purging (.653b) pET of Water (avg) (.367h) Conductance (avg) Well Water Temp. (avg) Redox Potential (Eh) 🕤 Turbidity wenthen Cond. Claudy Ent'l Amb. Temp.(prior to sampling event) 10.00 Gal. Purged //A **Time** and Time: Gal. Parged 754.3 Conductance : Conductanc 1/52855 юH Temperature Temperature Redox Potential (Eh)_ Redox Potential (Eh) Turnidity Turbidity Thue: Time: Gal, Purged Gal. Purged Conductance Conductance pЩ pН Temperature Temperature Redox Potential (Éh) Redox Potential (Eh)

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VOCs Nutrients	Ø N	<u>3x40/ml</u> 100 ml	Y N	HCL Y N HSO4 CV N	
Heavy Metals	Y Ø	250 ml	V N	HNO	
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Mill — Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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Date: 2.25.07 Revision: 2

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	iesa uranium mill Ksheef for ground water
Description of Sampling Event: <u>Newste</u>	3 Chloride
Location (well manne) TVV O	Name and initials Tapped Holliday & Lyon Palmer
Date and Time for Purging <u>11-4-09</u>	and Sampling (if different) <u>MA</u>
Well Purging Equip Used: Xpump orbail	er Well Rump (if other than Bennet) Land Fes
Sampling Event <u>Nitrate</u>	Prev. Well Sampled in Sampling Event TWW 17 R
pH Buffer 7.0 7.0	pH Buffer 4.0
specific Conductance_998_uMHOS/cm	Well Depth 110
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Conductance (avg)[08]	3" Well:(.367h) pH: of Water (avg)7_ H9
Well Water Temp. (avg) 13.98	Redox Potential (Eh) 433 Turbidity 631
Weither Cond. Clear 4 Sunny Bril	Amb. Temp (prior to sampling event) 14.5°C
Time: Gal. Purged	Gal: Purged
Conductance	Conductings
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If well evacuated to dry	mess, number of	f gallons evacuated		
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ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND W 41 Description of Sampling Event: Quartest NiHasts Sampler ._____ Name and initials____ Location (well manne) Th/N-Wei Date and Time for Purging and Sampling (if different) $g \sim 10^{11}$ Well Purging Equip Used: Zoump or ______ bailer Well Pump (if other than Bennet) Statt Sampling Event_ Prev. Well Sampled in Sempling Event. pH Buffer 7.0. pH Buffer 4.0 998 Specific Conductance_ uMHOS/cm Depilitante Depth to Water Before Purging Casing Volume (V) 4" Well: (.653h) an 3" Well: (.367h) pH of Water (avg) Conductance (ave) Well Water Temp. (avg) Redox Potential (Els) Turbidity Ent'l Amb. Temp (prior to campling event) Weather Cond Status 2377 Time / X/Zand Gal. Purged rime: Purgeo Conductance Conductanc Temperature . Temperature Redox Potential (Eh) Redox Potential (Eh) Turbidity. Turbidity Gal. Purged Thne: Gal. Purged Time: Conductance Conductance pH_{_} pН Temperaturé Temperature. Rotox Potential (Eh) Redox Potential (Eh) TWN-

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		and a second second second		1 t (017)	
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\$/60 = =		T=2WQ			
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If well evacuated to dry	ness, number of	gallons evacuated			·
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Page 40 of 41 <u>ATTACEMENT 1</u> WHITE MIESA URANIUM MILL FIELD DATA WORKSHEET, FOR GROUND WATER NETVORE 3 CHORIDE Description of Sampling Event:___ w.Samplen Name and initials Tayles Holliday & byan Palmell Location (well name) <u>TWN</u> Date and Time for Purging and Sampling (if different) Well Purging Equip Used: Xpump or __baller Well Pump (if other than Bannet) IANA Sampling Event Prev. Well Sampled in Sampling Event oner 4 0 2 pH Buffer 7.0 Depuis and a state of the second ul/HOS/cm Specific Conductance_ Casing Volume (V) 4" Well: Depth to Water Before Purging (.653h) Well: Conductance (avg) of Water (avg).4 Redox Polennial (Eb) Woll Water Temp. (avg) 14410 Bat I Amb. Temp (prior to sampling event) Weather Cond. rime: //// Burgeol Sal Poreed Conductance Conducta pН y . . P. . 1 Temperature Temperature Redox Potential (Eh) Redoy Potential (Eh) Turbidity_ Webjaity_ Gal. Purged Time: Time Gal. Purged Conductance Conductance DH рH, Temperature Tempergiuñ Redox Potential (Eh) Redox Potential (Eh) : پنجم Insate B4 TTAIN - 2

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Turbidity		Tunibindit		
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ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET, FOR GROUND WATER Description of Sampling Event: NITVATE 3 CHIOLIAC Sampler Painpier Name and initials <u>Juniel</u> Location (well manne) TWW-Date and Time for Purging 11.2.09 and Sampling (if different) Well Purging Equip Used: Zpump or __bailer Well Fump (if other than Bennet) AAAAA Sampling Event Prev. Well Sampled in Sampling Event pH Büffer 7.0 Deputikations Specific Conductance_ uMHOS/cm Casing Volume (V) 4" Well: Depth to Water Before Purging (.653h) 3' Well. (.367h) Conductance (avg) Redox Potential (Bh)____Turbidity Well Water Temp. (avg). Veather Condiz Amb. Temp:(priot/to.sumpling.event) ime: 04520 Gal Porgeo Conducti Conductance sh selara Temperature Temperature ... Redox Potential (Eh) Redoy Potential (Eh) **Eurbidity** Turbidity Gal. Purged Thue: Gal. Purged Time: Conductance Conductance nH pH_ Temperature_ Temperature Rédox Potential (Éb) Redox Potential (Bh) insate 154 TAVN-3

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Nutrients	10 N	100 ml	Y 60	H/SO4 D N
Heavy Metals	Y N	250 mi	Y N	HNO, Y N
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Mill - Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

pH Buffer 7.0

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Redox Potential (Eh)

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ATTACHMENT 1 WHITE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATE Description of Sampling Event: HULLATE Sampler Location (well make) Name and initials and Sampling (if different) Date and Time for Purging Well Pump (if other than Bennet) Well Purging Equip Used: Xphimp or ______baller Sampling Event N. Swath Prev. Well Sampled in Sampling Event 19 7.0 1.0 pH Buffer 4.0 Specific Conductance_998 uMHOS/cm Well Depth 16 Kab Depth to Water Before Purging. Casing Volume (V) 4" Well: f.653h) 3º Well: (.367h) pH of Water (avg) Conductance (avg)_ Redox Polential (Els) Turbidity Well Water Temp. (avg) Weather Cond Saltw lines But'l Amb. Temp (prior to sampling event) Gal. Purged Line: Gal. Purged Conductance 的翻訳 Temperature Redox Potential (Bh) Redox Potential (Eh) Turbidity. Gal. Purged Gal. Purged Time: Conductance

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Lugbidity			Turbidity	· · · · · · · · · · · · · · · · · · ·		,		
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		envinent t	standil Berning and an and an and					
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If a preservative is used, Specify Type and Quantity of Preservative:

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	ATTACEMENT 1
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	Quality Assurance Plan (QAP)	Page 41 of	41	
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	olume of Water Purged When Field Parameters are Meanured	t the state	· ·	
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FIELD DATA WORK	esa uranium mill Sheef.nor ground water
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	and Sampling (if different)
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Mill - Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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ATTACHMENT 1 WHITE MESA URANIUM MULL FIELD DATA WORKSHEEL FOR GROUND WATER NYIVATE 3 Description of Sampling Event: Chlorae Sampler yans Palmed Location (well name) Name and initials Jumel Date and Time for Purging and Sampling (if different) Well Purging Equip Used: Xpump or _____bailer Well Fump (if other than Bennet) Sampling Event Prev. Well Sampled in Sompling Event pH Büffer 7.0 II Depth South MA Specific Conductance 1. Skill uWHOS/cm Casing Volume (V) 4" Well:______3" Well:______3" Well:_______3" Well:_______ Depth to Water Before Purging (.653h) (.367h) Conductance (ave) Redox Folential (Eb) _____ Turbidity Well Water Temp. (avg) Weather Cond Ext'l And: Temp (prior to sampling event) Purged Prines, al Purged Conducta i Temperature Temperature Redox Potential (Bh Redox Potential (Eh) **Verbidity** Gal. Purged Gal. Purged Time: Conductance Conductance σĦ Temperature Temperature Rédox Potential (Bh) **Redox** Potential (Eb)

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Mill – Groundwater Discharge Pennit Groundwater Monitoring		Date: 2.25.07 Revision: 2	` I
Quality Assurance Plan (QAP)		Page 40 of 41	•
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	<u>ATTACHMENT 1</u>
Quality Assurance Plan (QAP)	Page 40 of 41
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<u>Mill – Groundwater Discharge Permit</u> Date: 11.17.05 Revision: 1 Groundwaler Monitoring **Quality Assurance Flan (QAP)** Page 41 of 41 Turbidity op bardin w Volume of Water Purged When Field Parameters are Measured * 10 Pamping Rate Calculation 彩 名書 清洁之后 Flow Rate (Q), in gpm. Time to evecuate two casing volumes (2V) t > 2S/60 = T=2V/0=223 Number of casing volumes evacuated (if while, man (wo)) It well evacuated to dryness, number of gallous evacuated Name of Centified Analytical Laboratory if Other Than Hnergy Labo We Mary WWW. WINDOW ())副》 Type of Sa Sample Sample Volume Filtered Preservativ Taken (indirentententite (circle) (cifele) (circle) diminane)sprecifica Babya 成的新闻 H_iSO/ Nutrients Ň 100 ml (N 1819 ieuv Wefell Omil HNO; c YEN Outer Nou 0mi No Preseductive Added Radiologics Gross Alpha 000 ml H-SO/ W 11.2 Other (specify) Ň Sample volume D Uallesde If a preservative is used, 965 F Specify Type and Quantity of Preservative: ie i Sin 4

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Mill – Groundwater Diechasge Permit Groundwater Monitoring Quality Assurance Plan (QAP) Date: 2.25.07 Revision: 2

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ATTACHMENT 1 WHITTE MESA URANIUM MILL FIELD DATA WORKSHEET FOR GROUND WATER Description of Sampling Event: NIWAKE Antiac Volmed Location (well name) Th annel Date and Time for Purging and Sampling (if different) IJ. 3 Well Pump (if other than Bennet) Well Parging Equip Used: Louis or ______baller Anna Sampling Event Prev. Well Sampled in Sampling Event. 7 Lus pH Büffer 7.0 Specific Conductance_ ul/IHOS/cm Denth Casing Volume (V) 4" Well: Depth to Water Before Purging, (.653h) 3" Well: (367節) Hof Water (avg) 4 Conductance (avg) Redox Potential (Eh) Turbidity Well Water Temp. (avg) Vool Ext'l Amb. Temp.(prior to sampling event) Weinher Cond (and the second s al, Purged nductance 15 Conductat pН . . . 9.45 Temperature Temperature Redox Potential (Hb) Redox Potential (Eh Wabidity Turbidity Gal. Purged Tine: Time: Gal. Purged Conductance Conductance pH . pĦ Temperature Temperature Redox Potential (Bb) Rédox Potential (Éli)

Quality Assumance Plan	(QAP)			Page 41 of 41
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Mill – Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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Page 40 of 41 ATTACHMENT 1 WHITTE MESA URANIUM MILL FIELD DATA WORKSHEET, FOR GROUND WATER Description of Sampling Event: NPhane 3 CHIOR de Sampler is Valmed Location (well manne) _____ Name and initials / ///// Date and Time for Purging 11-3-04 and Sampling (if different) Well Purging Equip Used: 'Xpump or __bailer Well Pump (if other than Bennet) gand Sampling Event ell Sampled in Sampling Event TWN 11 pH Buffer 7.0 Specific Conductance_ uWHOS/cm Casing Volume (V) 4" Well._ 3" Well.______3" Well.______3" Depth to Water Before Purging (653h) Conductance (avg)_ 6H of Water (ave) a Well Water Temp. (avg). Redox Polential (Eh) Turbidity Weather Cond. Cleaced Kldcm Ent FAmb. Temp (proprostampling event) 14 San GalsPurged Fines inne. Gal: Purged Conductance Conduct \mathbf{pH} او معر او Temperature Temperature Redox Potential (Eh) Redox Potential (Eh Turbidity. **Mabidity** Gal. Purged Gal. Purged This: Time: Conductance Conductance ÷. σН pH_ Temperature_ Temperature Rédox Potential (Éli) Redox Potential (Eh) Kinsot

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Mill — Groundwater Discharge Permit Groundwater Monitoring	Date: 2.25.07 Revision: 2
Quality Assurance Plan (QAP)	Page 40 of 41
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Quality Assurance.		71		Page 41 of 4	11
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Quality Assurance Plan (QAP)	Page 40 of 41
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Mill – Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP)

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Quality Assurance Plan (QAP)	Page 40 of 41	
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Quality Assurance Plan	(QAP)	~		Page 41 of 41
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Mill – Groundwater Discharge Permit Groundwater Monitoring Quality Assurance Plan (QAP) Date: 2.25.07 Revision: 2

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ATTACHMENT 1 WHITTE MESA URANIUM MILL FIELD DATA <u>(Sheetleor Ground Water</u> Description of Sampling Event: NYWATE CHORAC Sampler s Valael Location (well name) T Nathé alid mitials Date and Time for Purging 11-4-09 and Sampling (if different) Well Purging Equip Used: Xpump or ____bailer Well Pump (if other than Bennet) grund 4 Sampling Event Prev. Well Sampled in Sampling Event TWA 16 pH Büffer 7.0 Specific Conductance_ uMHOS/can Well Depth and Casing Volume (V) 4" Well: Depth to Water Before Purging (.653h) 3" Well: Conductance (avg) 1 of Water (ave) Well Water Temp. (avg) Redox Potential (Eh) Turbidity Ent'l Amb. Temp (prorto sumpling event) WeathenCond Clark rime: 0156 L Burged Jar, Purged Conductan Conductance E Man pН Temperature . Temperature Redox Potential (Eh) Redox Potential (Eh) Turbidity Wabidity Gal. Purged Time. Gal. Purged Time: Conductance Conductance pH_ DH Temperature Temperature Rédox Potential (Eli) Redox Potential (Eb) Kinsate

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Quality Assurance Plan	-		Pege 41 of 41
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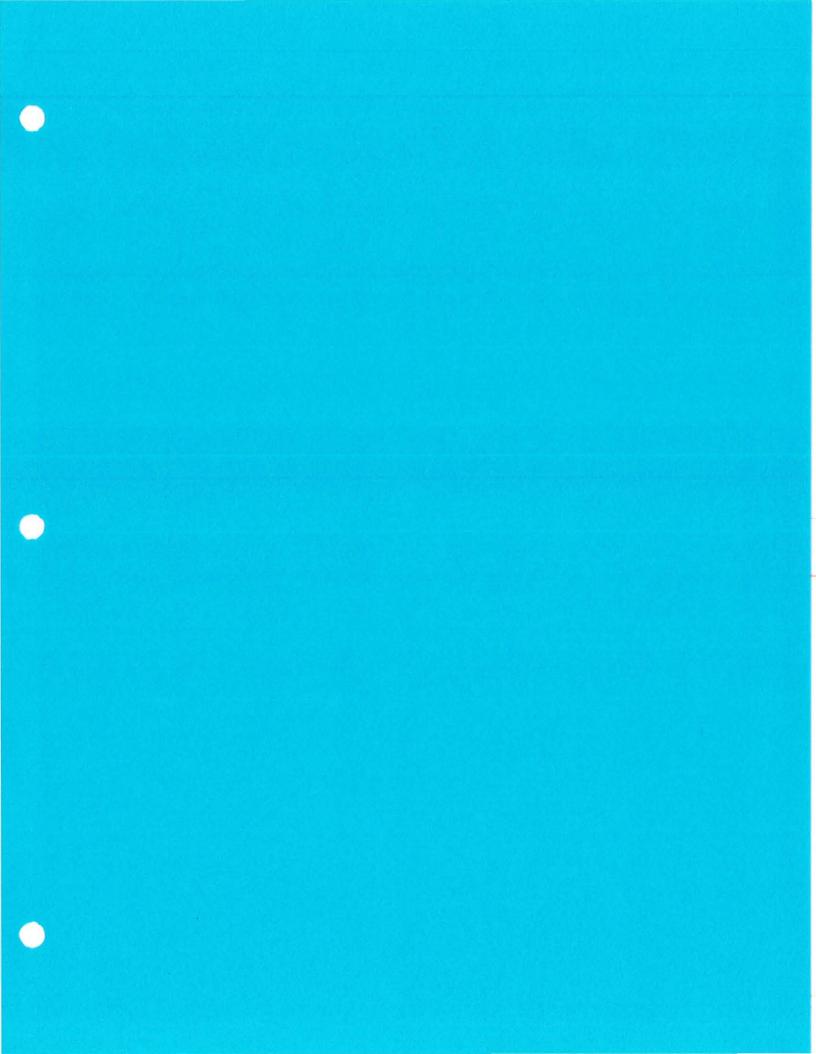
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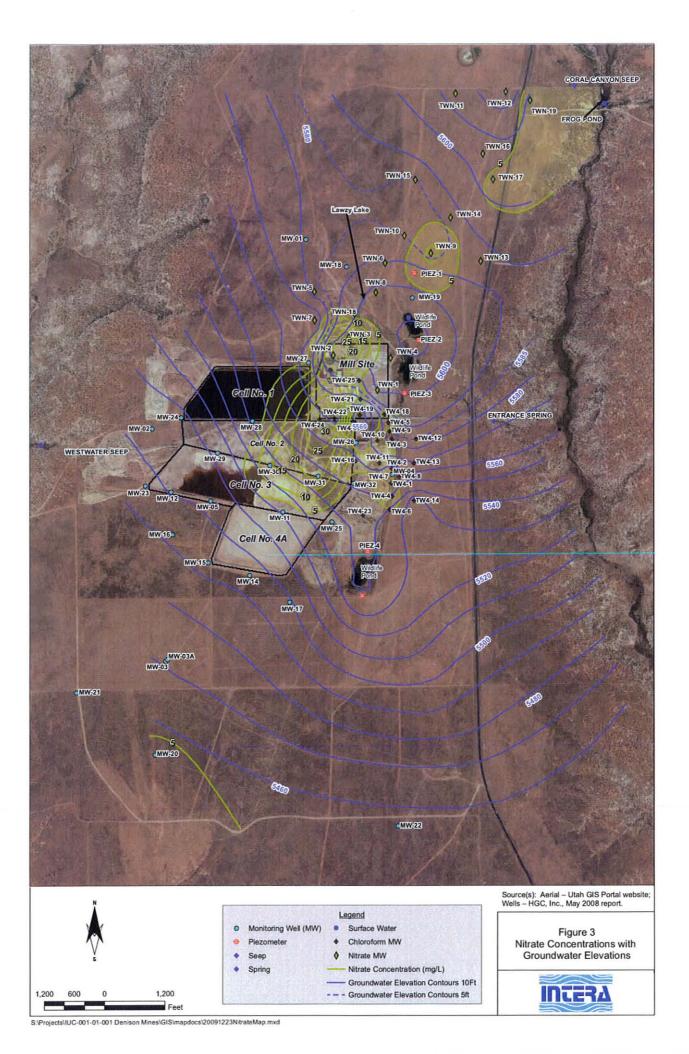
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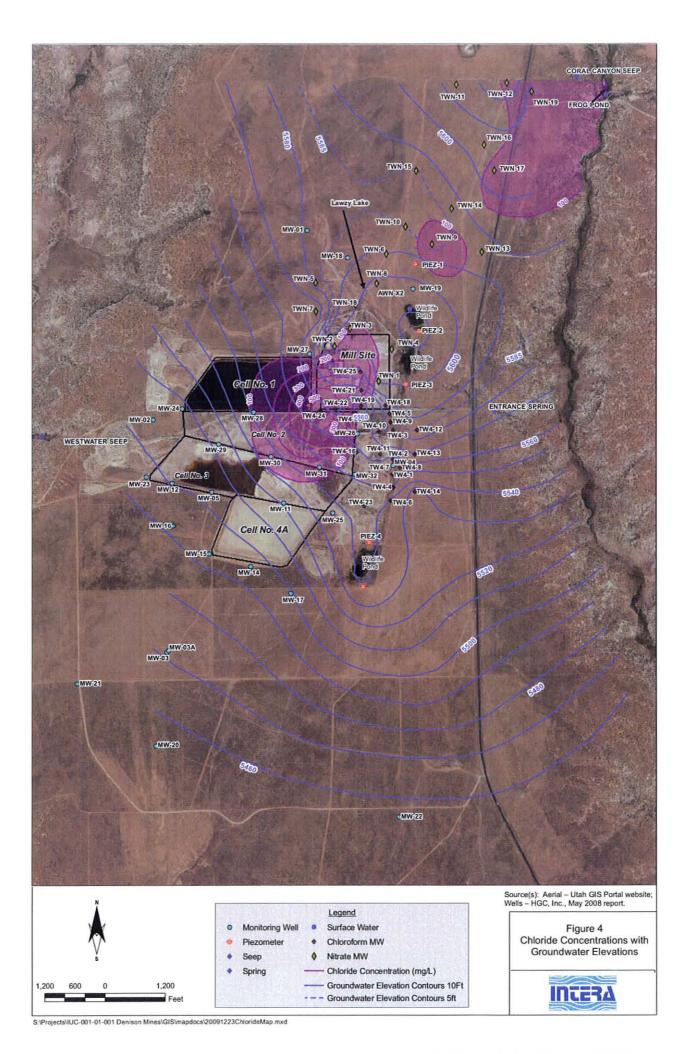
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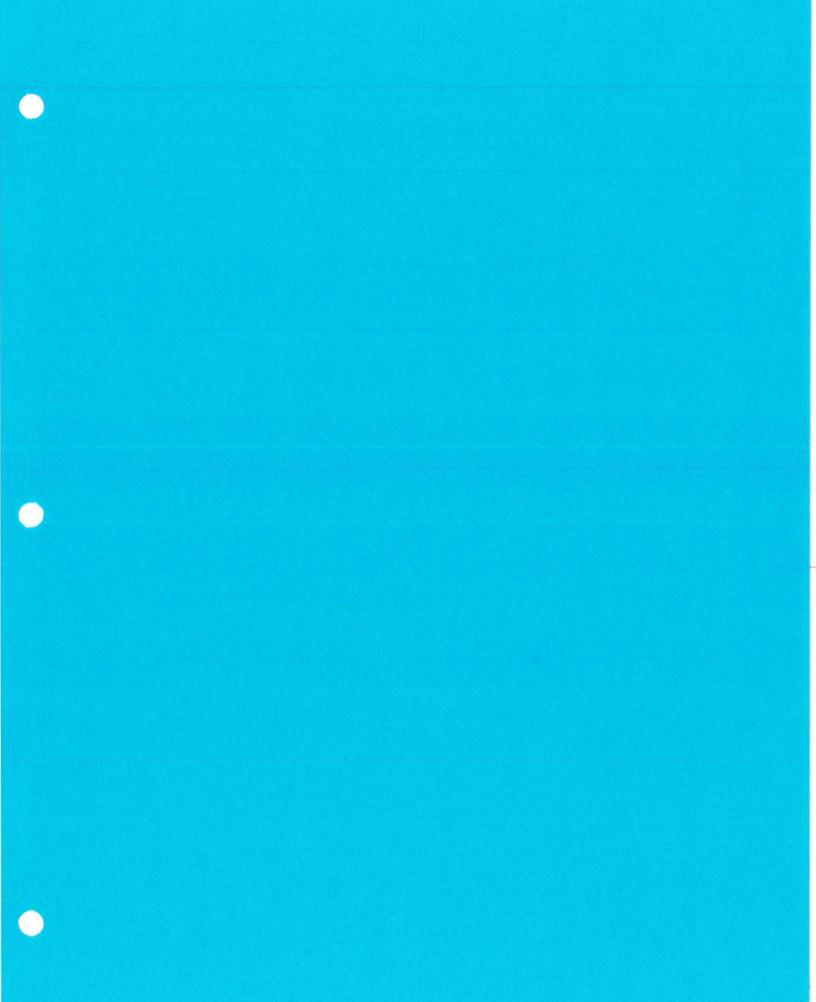
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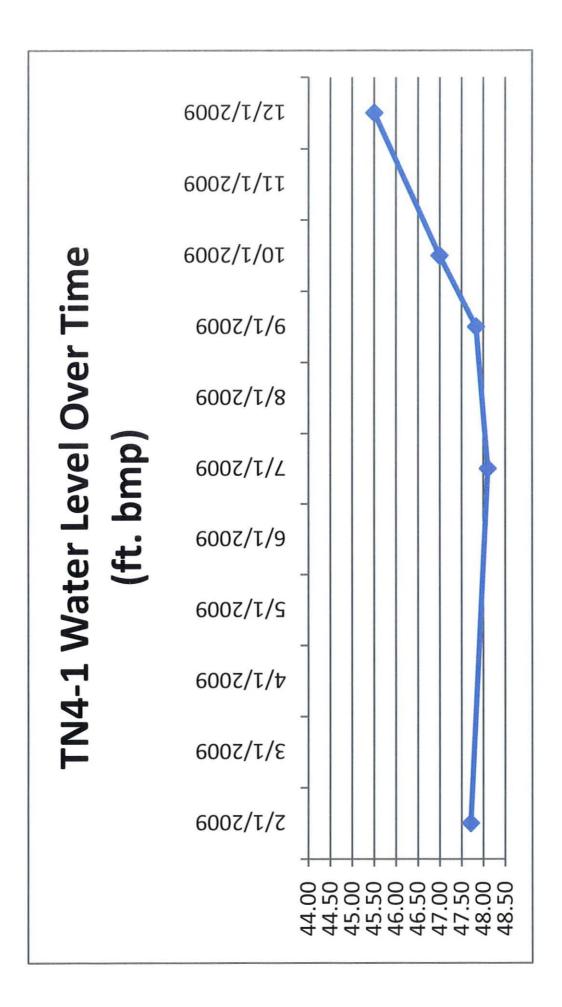
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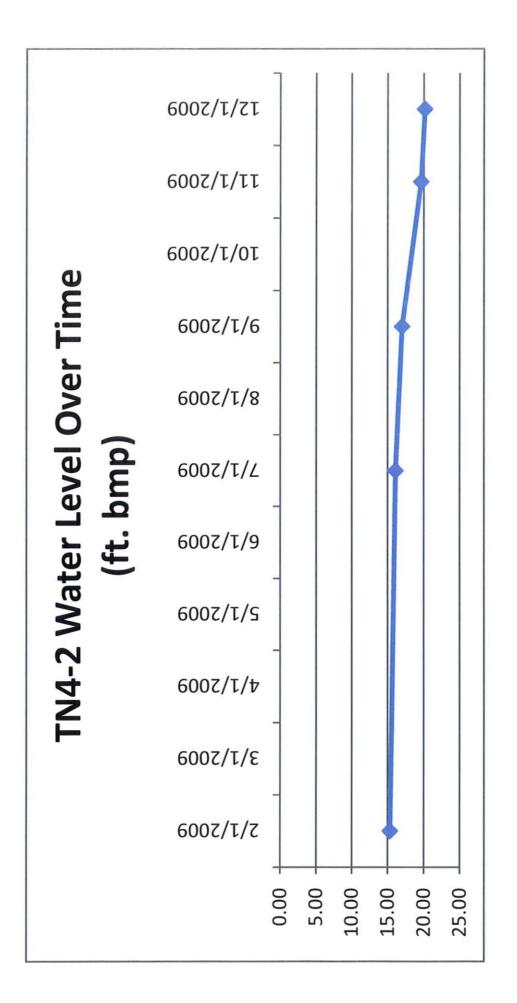


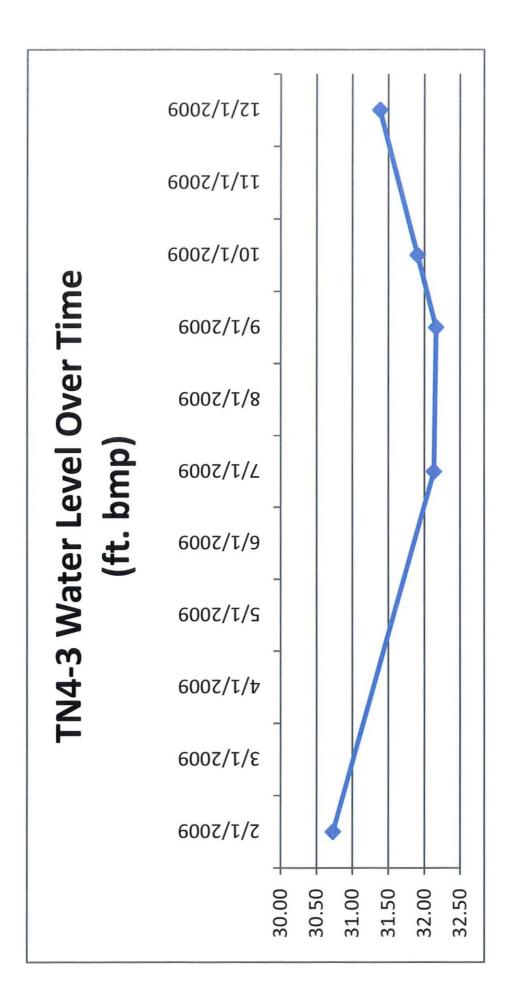


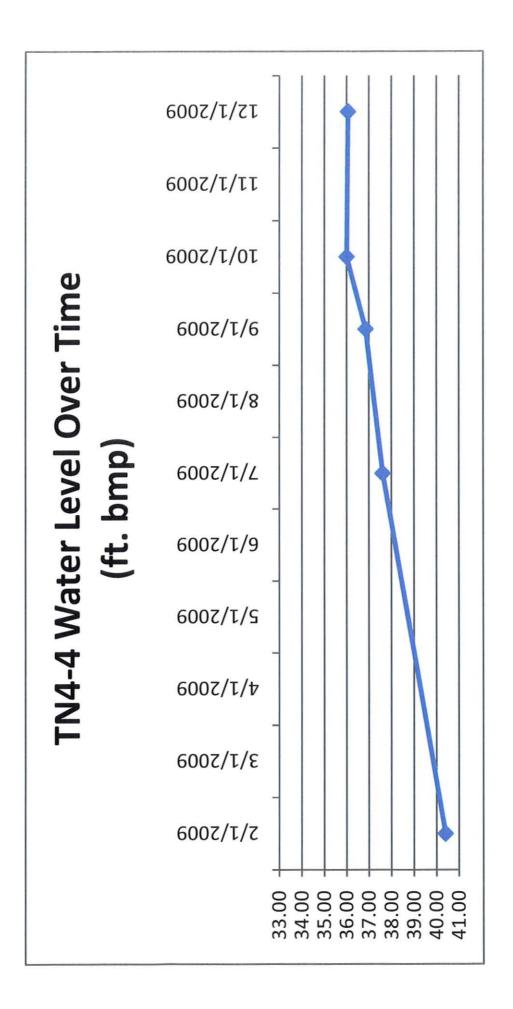


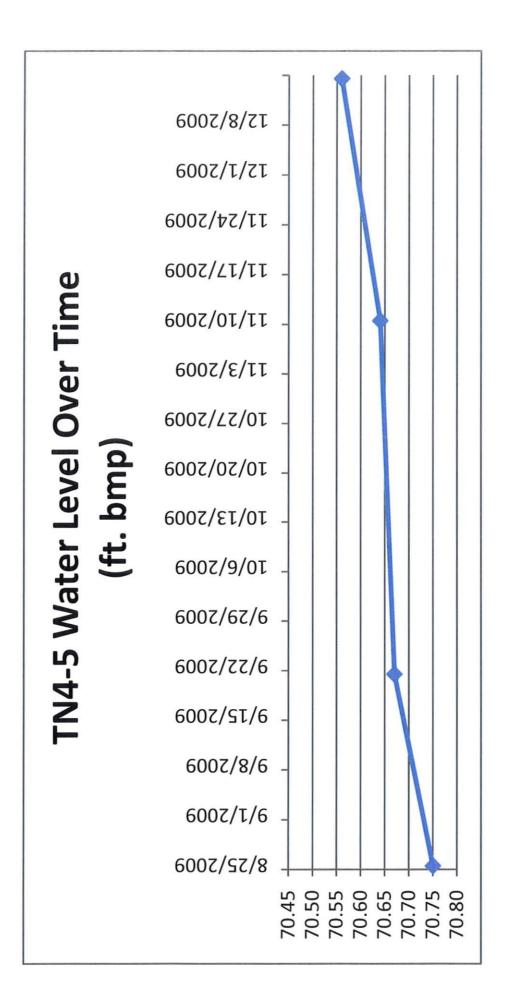
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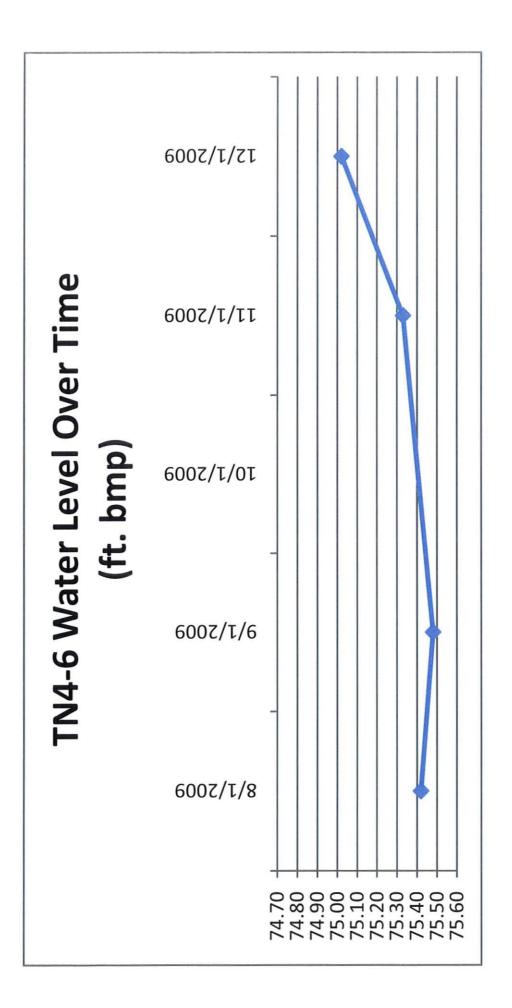


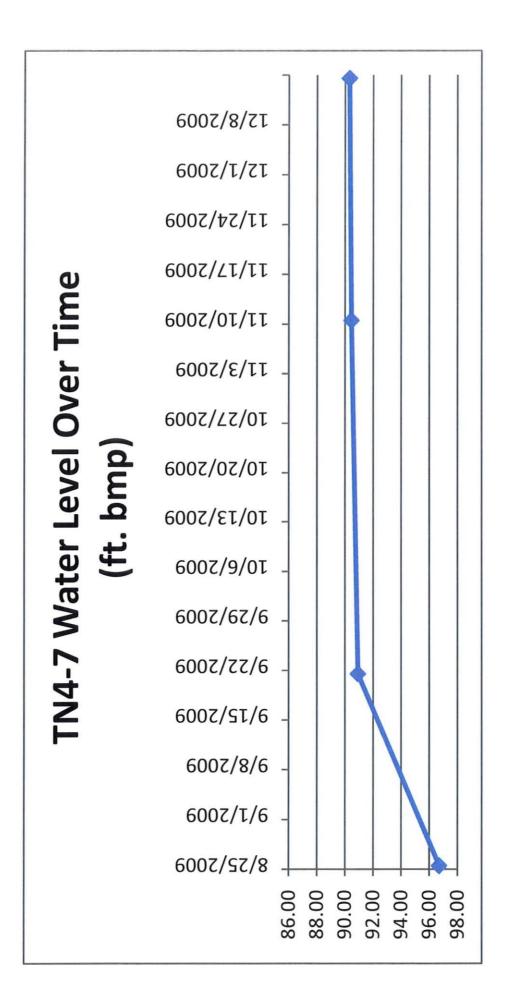


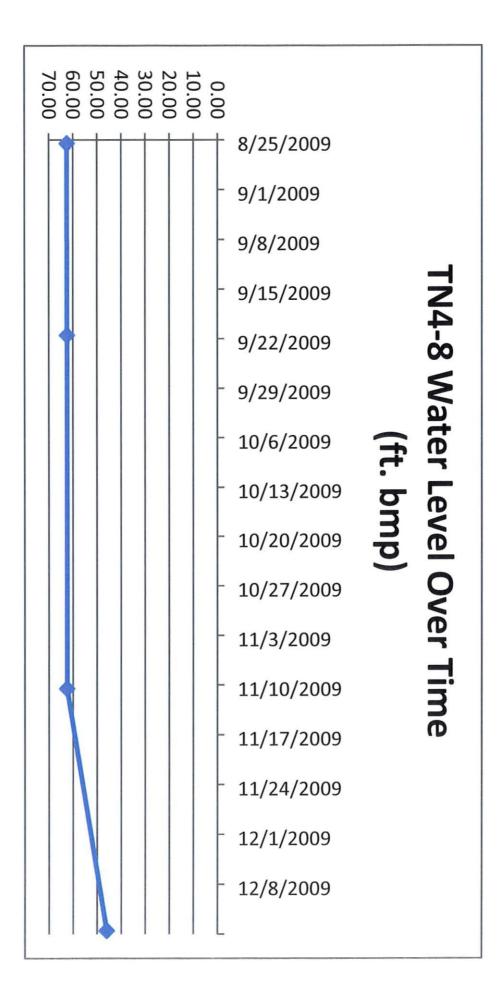


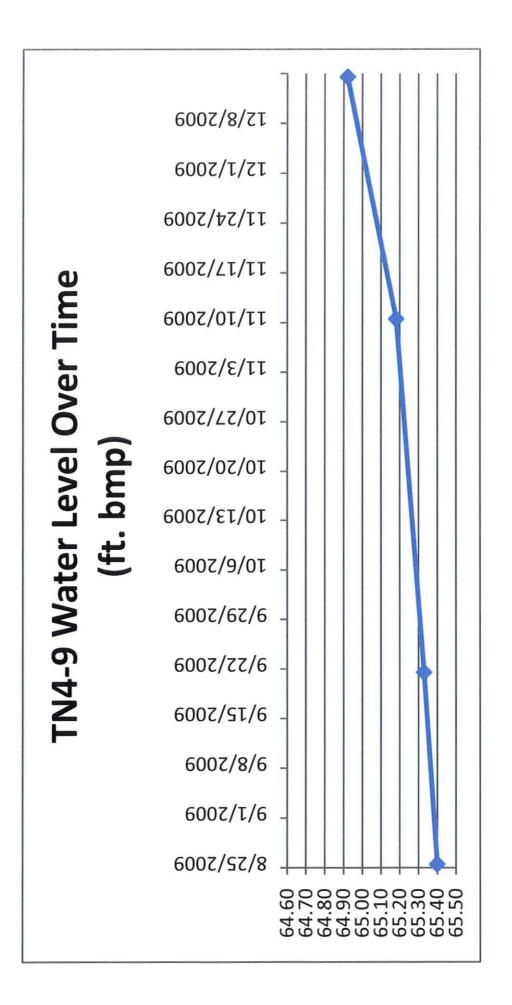


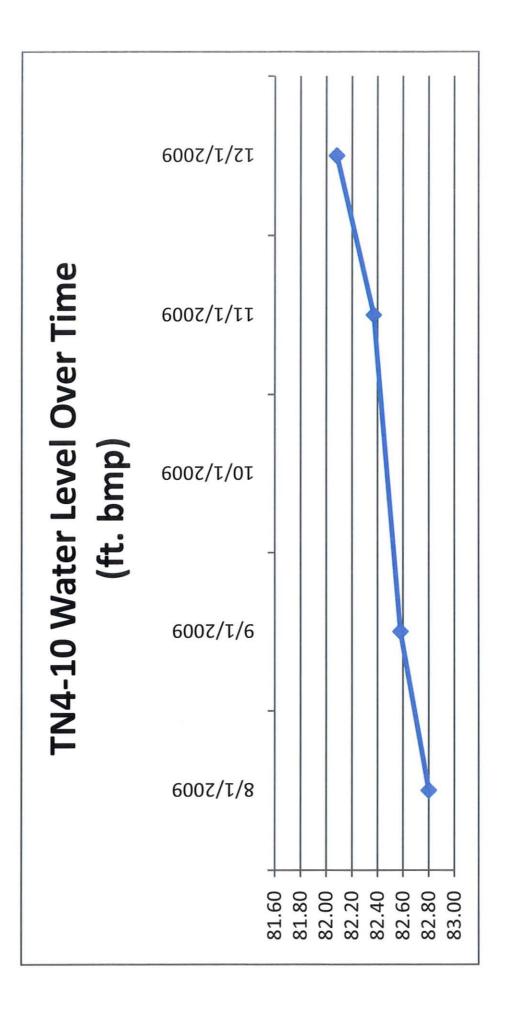


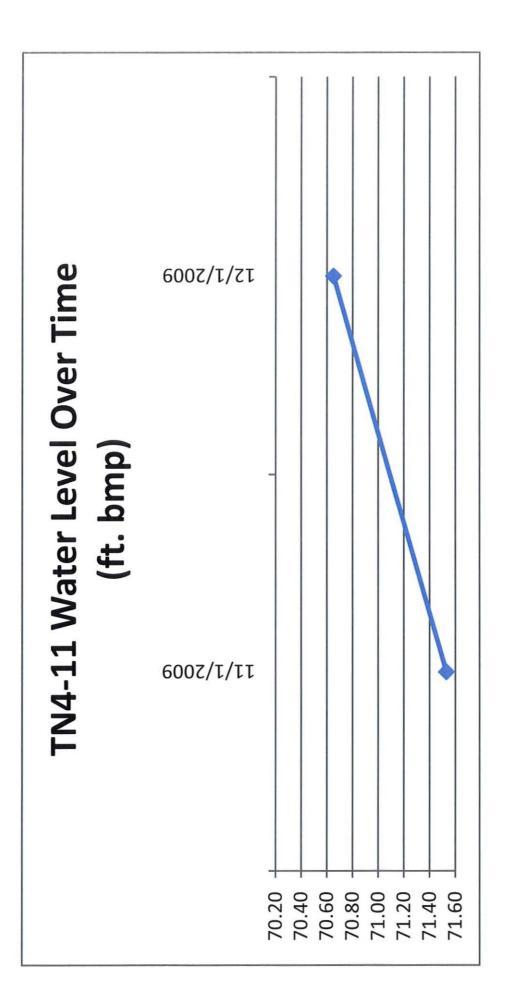


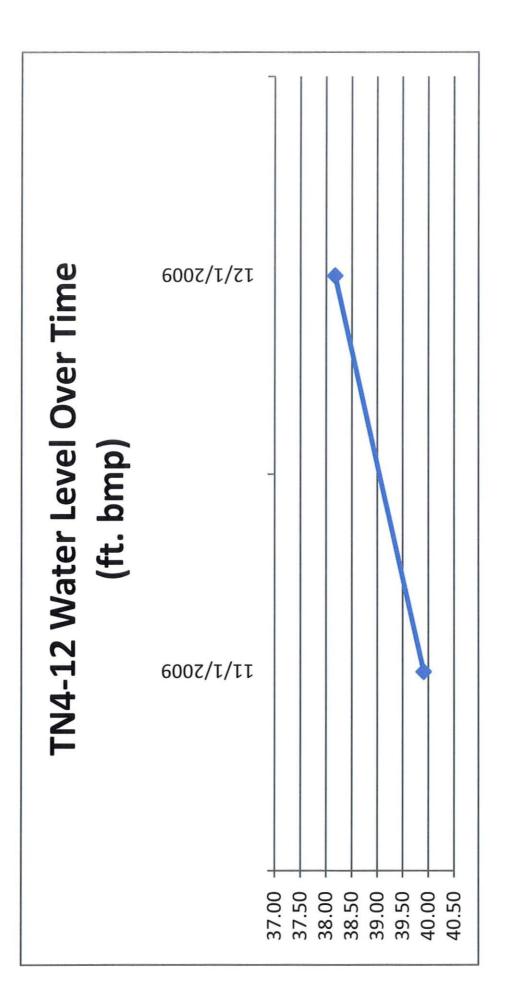


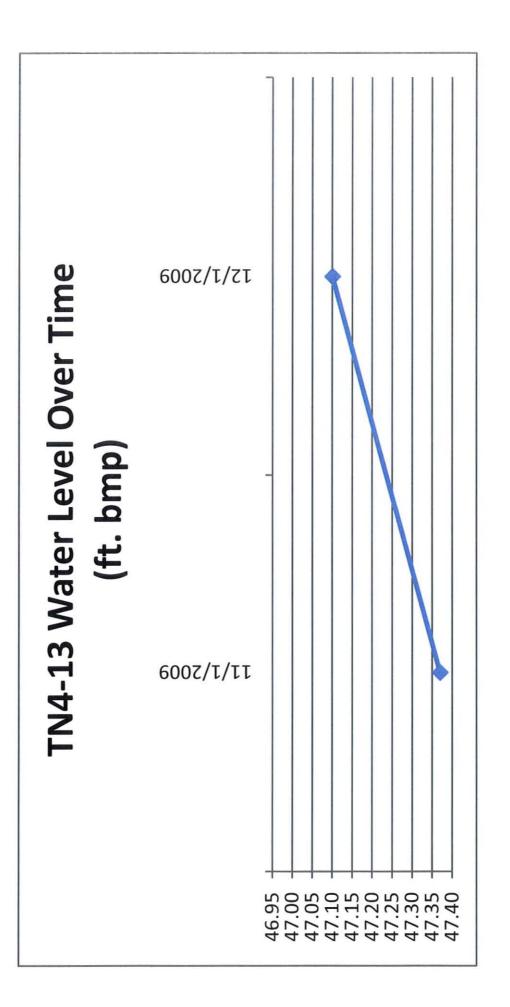


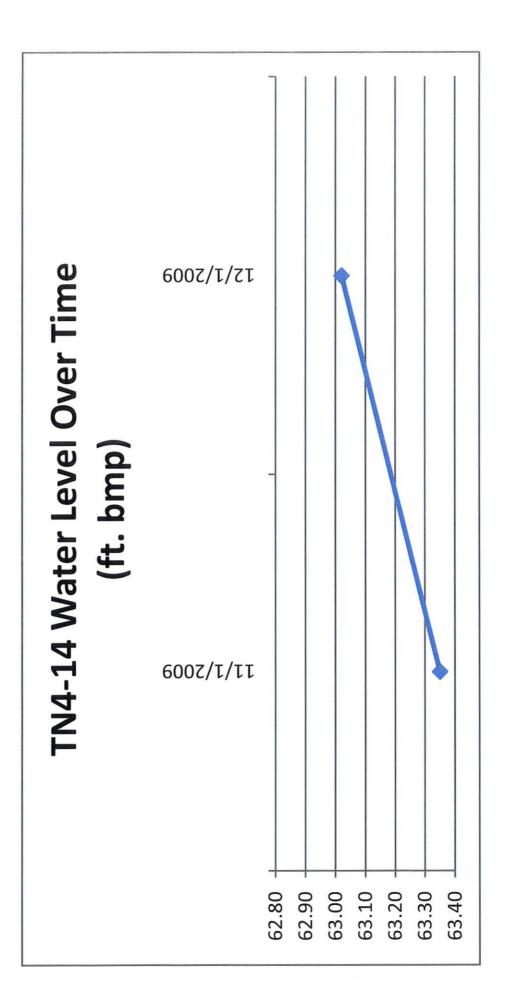


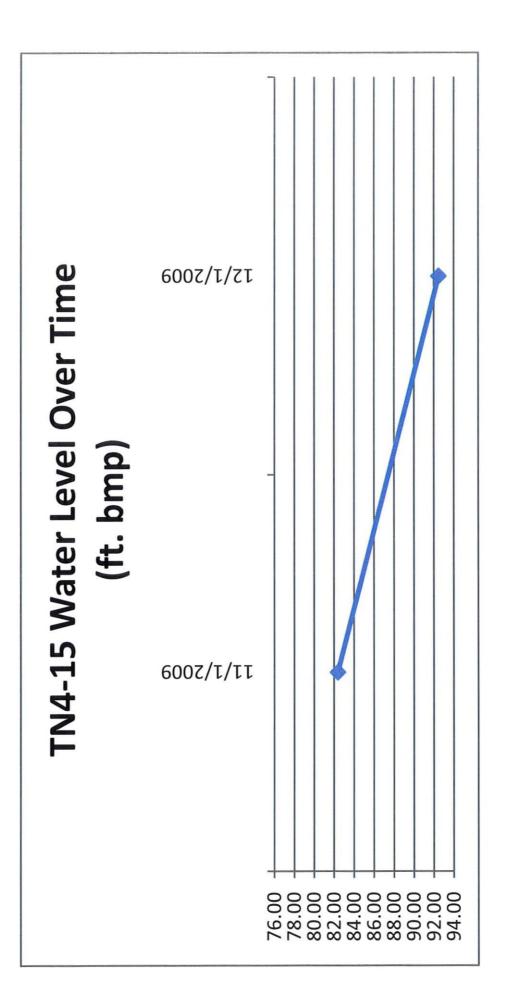


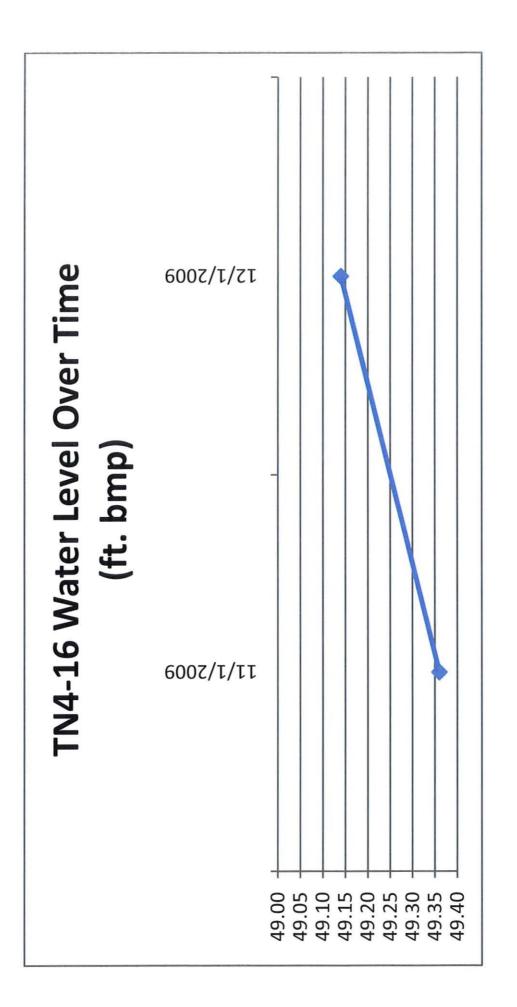


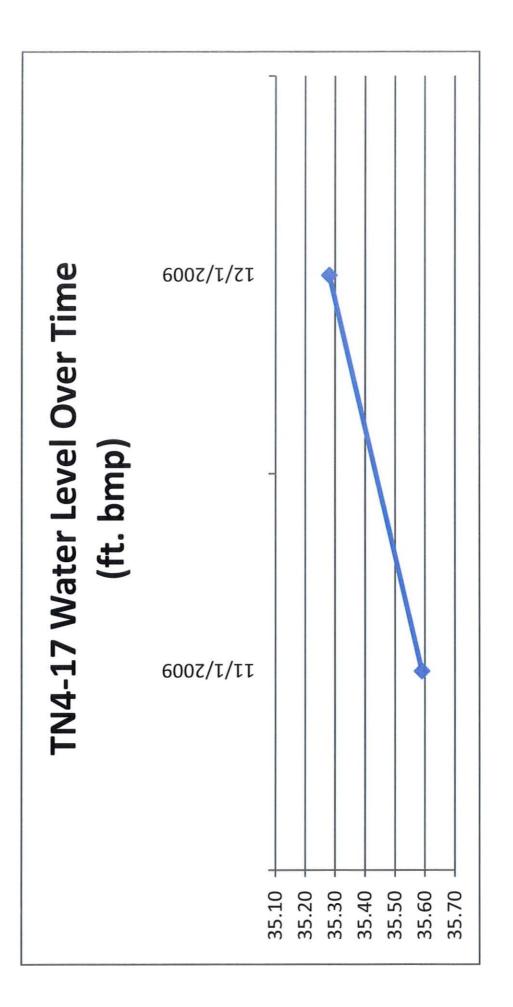


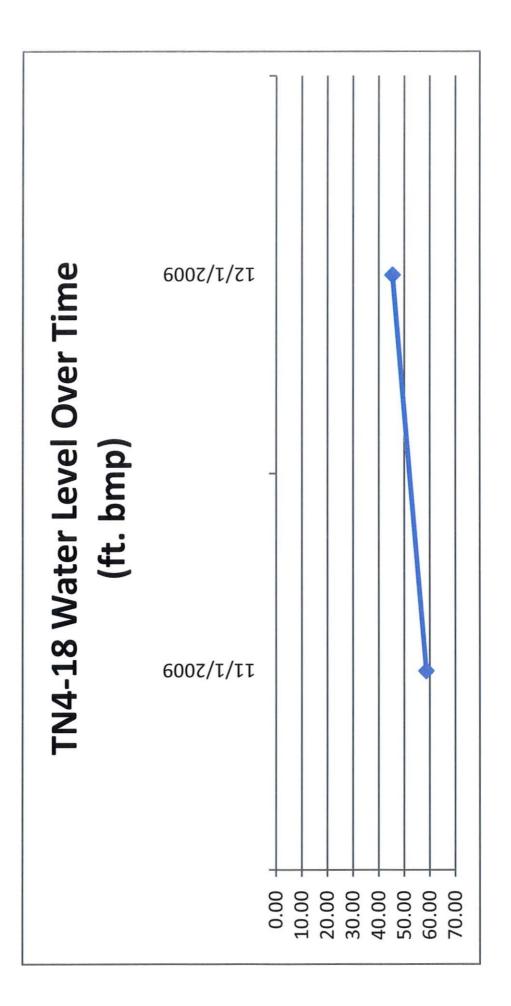


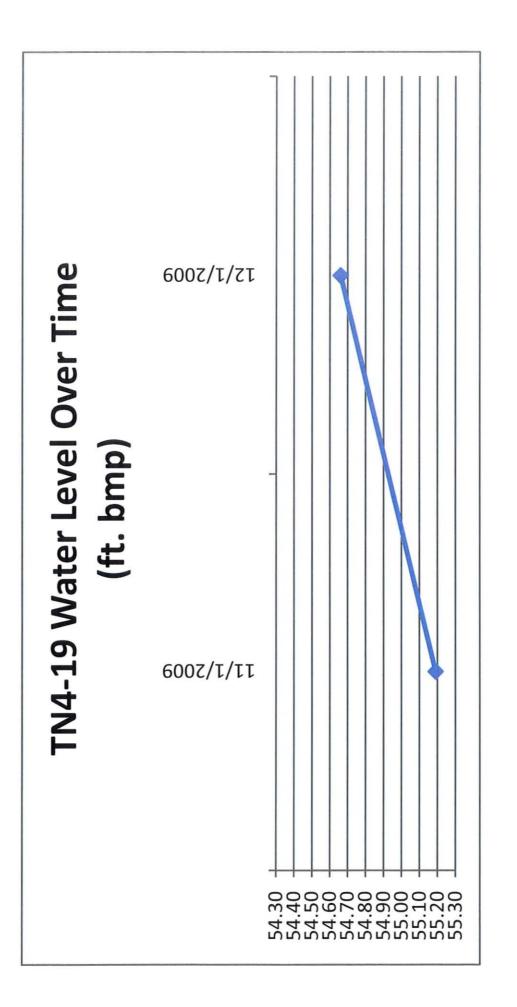


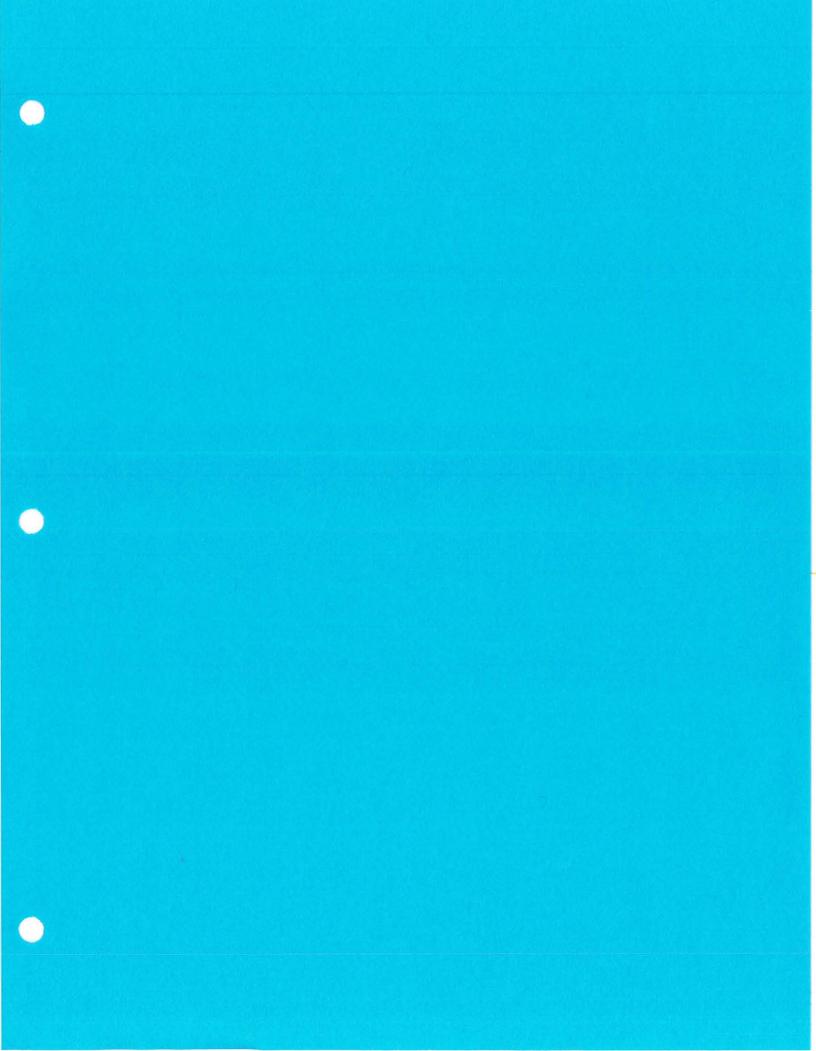












Tab E

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,646.96	5,648.09	1.13				112.5
5,577.74				2/6/2009	47.71	46.58	
5,577.35				7/21/2009	48.10	46.97	
5,577.62				9/21/2009	47.83	46.70	
5,578.46				10/28/2009	46.99	45.86	
5,579.95				12/14/2009	45.50	44.37	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,625.75	5,626.69	0.94				95
5,610.13				2/6/2009	15.32	14.38	
5,609.39				7/21/2009	16.06	15.12	
5,608.49				9/21/2009	16.96	16.02	
5,605.84				11/2/2009	19.61	18.67	
5,605.33				12/14/2009	20.12	19.18	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,633.64	5,634.50	0.86				110
5,594.72				2/6/2009	30.73	29.87	
5,593.32				7/21/2009	32.13	31.27	
5,593.29				9/21/2009	32.16	31.30	
5,593.55				10/28/2009	31.90	31.04	
5,594.07				12/14/2009	31.38	30.52	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,641.04	5,641.87	0.83				136
5,585.05				2/6/2009	40.40	39.57	
5,587.84				7/21/2009	37.61	36.78	
5,588.60				9/21/2009	36.85	36.02	
5,589.45				10/28/2009	36.00	35.17	
5,589.39				12/14/2009	36.06	35.23	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,653.70	5,655.18	1.48				155
5,554.70				8/25/2009	70.75	69.27	
5,554.78				9/21/2009	70.67	69.19	
5,554.81				11/10/2009	70.64	69.16	
5,554.89				12/14/2009	70.56	69.08	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,663.03	5,664.94	1.91				135
5,550.03				8/25/2009	75.42	73.51	
5,549.97				9/22/2009	75.48	73.57	
5,550.12				11/3/2009	75.33	73.42	
5,550.43				12/14/2009	75.02	73.11	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,647.39	5,649.26	1.87				120
5,528.75				8/25/2009	96.70	94.83	
5,534.53				9/21/2009	90.92	89.05	
5,535.01				11/10/2009	90.44	88.57	
5,535.15				12/14/2009	90.30	88.43	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,649.35	5,651.48	2.13				160
5,562.98				8/25/2009	62.47	60.34	
5,563.07				9/21/2009	62.38	60.25	
5,563.06				11/3/2009	62.39	60.26	
5,577.35				12/14/2009	48.10	45.97	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,645.68	5,647.45	1.77				102.5
5,560.05				8/25/2009	65.40	63.63	
5,560.12				9/22/2009	65.33	63.56	
5,560.27				11/10/2009	65.18	63.41	
5,560.53				12/14/2009	64.92	63.15	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,664.63	5,666.98	2.35				107.5
5,542.65				8/25/2009	82.80	80.45	
5,542.87				9/22/2009	82.58	80.23	
5,543.08				11/10/2009	82.37	80.02	
5,543.37				12/14/2009	82.08	79.73	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,683.16	5,684.53	1.37				147.5
5,553.92				11/3/2009	71.53	70.16	
5,554.80				12/14/2009	70.65	69.28	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,667.03	5,668.24	1.21				115
5,585.54				11/3/2009	39.91	38.70	
5,586.07				12/14/2009	39.38	38.17	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,633.04	5,634.32	1.28				120
5,578.08				11/3/2009	47.37	46.09	
5,578.35				12/14/2009	47.10	45.82	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,647.80	5,649.53	1.73				135
5,562.10				11/4/2009	63.35	61.62	
5,562.43				12/14/2009	63.02	61.29	

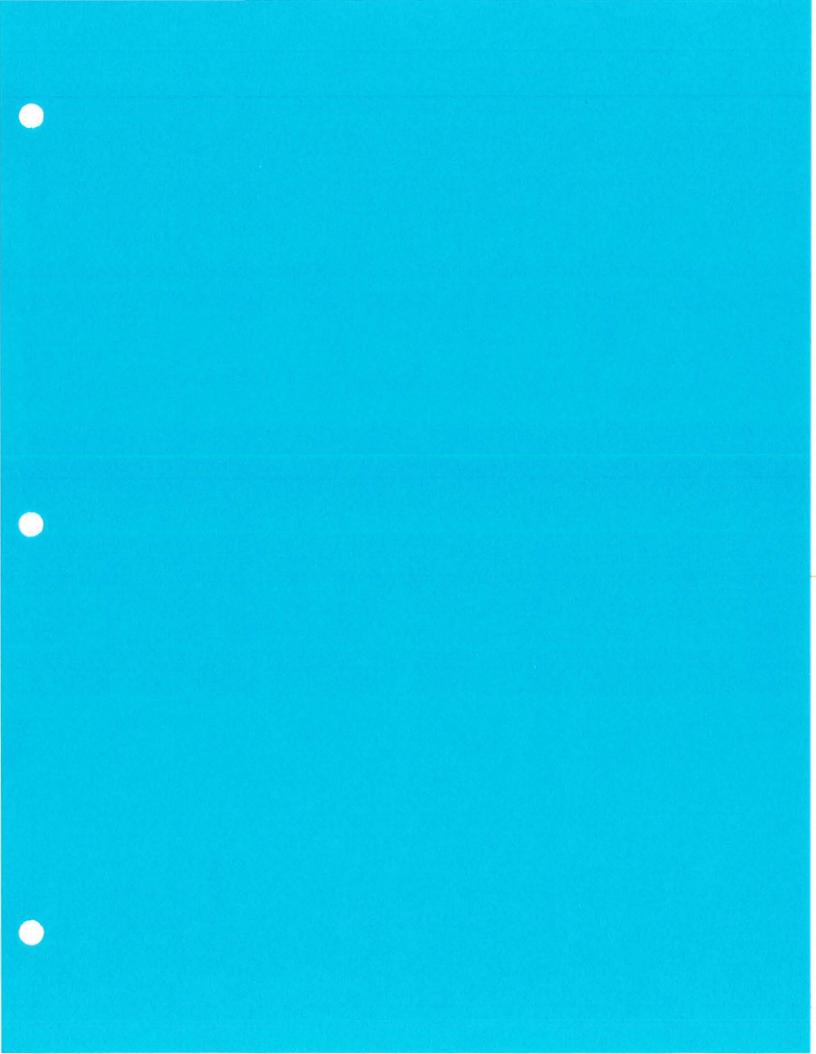
Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,675.01	5,676.49	1.48				155
5,543.08				11/10/2009	82.37	80.89	
5,532.99				12/14/2009	92.46	90.98	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,651.07	5,652.70	1.63				100
5,576.09				11/4/2009	49.36	47.73	
5,576.31				12/14/2009	49.14	47.51	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,639.73	5,641.55	1.82				100
5,589.86				11/4/2009	35.59	33.77	
5,590.17				12/14/2009	35.28	33.46	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,643.95	5,645.45	1.50				100
5,566.85				11/2/2009	58.60	57.10	
5,580.14				12/14/2009	45.31	43.81	

Water Elevation (WL)	Land Surface (LSD)	Measuring Point Elevation (MP)	Length Of Riser (L)	Date Of Monitoring	Total or Measured Depth to Water (blw.MP)	Total Depth to Water (blw.LSD)	Total Depth Of Well
	5,659.59	5,661.36	1.77				110
5,570.26				11/2/2009	55.19	53.42	
5,570.79				12/14/2009	54.66	52.89	



Tab F

February Sampling Event



ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

ANALYTICAL SUMMARY REPORT

February 11, 2009

Denison Mines (USA) Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09020370

Project Name: Initial Nitrate

Energy Laboratories, Inc. received the following 7 samples for Denison Mines (USA) Corp on 2/10/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09020370-001	TWN-1	02/06/09 12:25	02/10/09	Aqueous	Nitrogen, Nitrate + Nitrite
C09020370-002	TWN-2	02/06/09 13:20	02/10/09	Aqueous	Same As Above
C09020370-003	TWN-3	02/06/09 12:37	02/10/09	Aqueous	Same As Above
C09020370-004	TWN-4	02/06/09 10:20	02/10/09	Aqueous	Same As Above
C09020370-005	TWN-60	02/06/09 08:45	02/10/09	Aqueous	Same As Above
C09020370-006	TWN-63	02/06/09 08:30	02/10/09	Aqueous	Same As Above
C09020370-007	Temp Blank		02/10/09	Aqueous	Temperature

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Styphanie Wildup



LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines (US Initial Nitrate	A) Corp					Report I	Date: 02/11/09
Lab ID: Cilent Sample ID: Matrix:	C09020370-001 TWN-1 Aqueous							Date: 02/06/09 12:25 ved: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	rite as N	0.7	mg/L		0.1		E353.2	02/11/09 10:59 / jal
Lab ID: Client Sample ID: Matrix:	C09020370-002 TWN-2 Aqueous					(ved: 02/06/09 13:20
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	25.4	mg/L	D	0.2		E353.2	02/11/09 11:09 / jal
Lab ID: Client Sample ID: Matrix:	C09020370-003 TWN-3 Aqueous					C		ate: 02/06/09 12:37 ved: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	23.6	mg/L	D	0.2		E353.2	02/11/09 11:12 / jal
Lab ID: Client Sample ID: Matrix:	C09020370-004 TWN-4 Aqueous					c		ate: 02/06/09 10:20 /ed: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Anaiysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitri	ite as N	1.0	mg/L		0.1	- 3	E353.2	02/11/09 11:14 / jal

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.

D - RL increased due to sample matrix interference.

le matrix interference.



LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines (USA) Initial Nitrate	Corp					Report I	Date: 02/11/09
Lab ID: Client Sample ID: Matrix:	C09020370-005 TWN-60 Aqueous					(Date: 02/06/09 08:45 ved: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	02/11/09 11:17 / jal
Lab ID: Client Sample ID: Matrix:	C09020370-006 TWN-63 Aqueous			1111-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1		(ved: 02/06/09 08:30
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitri	ite as N	ND	mg/L		0.1		E353.2	02/11/09 11:19 / jai
Lab ID: Client Sample ID: Matrix:	C09020370-007 Temp Blank Aqueous				e , (k	C		ate: Not Provided ved: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPE	RTIES	2	°C				E170.1	02/10/09 09:25 / sdw



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QA/QC Summary Report

Client: Denison Mines (USA) Corp

Project: Initial Nitrate

Report Date: 02/11/09 Work Order: C09020370

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLImit	Qual
Method: E353.2								Batch:	R11458
Sample ID: MBLK-1	Method Blank				Run: TECH	INICON_090211	A	02/11	/09 10:0
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Con	trol Sample			Run: TECH	INICON_090211	A	02/11	/09 10:0
Nitrogen, Nitrate+Nitrite as N	2.25	mg/L	0.10	90	90	110			
Sample ID: C09020370-001AMS	Sample Matrix 8	Spike			Run: TECH	INICON_090211	A	02/11	/09 11:0
Nitrogen, Nitrate+Nitrite as N	2.83	mg/L	0.10	108	90	110			
Sample ID: C09020370-001AMSD	Sample Matrix S	Spike Duplicate			Run: TECH	INICON_090211	A	02/11	/09 11:0
Nitrogen, Nitrate+Nitrite as N	2.91	mg/L	0.10	112	90	110	2.8	10	S

Qualifiers:

RL - Analyte reporting limit.

S - Spike recovery outside of advisory limits.

ND - Not detected at the reporting limit.

ENERGY Chain of C	ustody ar	d Analytic	al Request	Reco	ord		Page	e of
Company Name:		me, PWS, Permit, Et		<u>. </u>	Samp	ole Origin	EPA/Sta	ate Compliance:
Denison Mines	Twit	ial Nitrag	FE		State	UT	Yes 🗌	No 🗌 💷
Report Mail Address: P.O. Base 809	Contact Na Ryan	me: Pho	Email	and the second s	Sampler: (Please Print)			
Blanding UT 84511 Invoice Address: SAME	Invoice Co	ntact & Phone:	782221		Purch	hase Order:	Quote/E	ee H. & Ryan
Special Report/Formats – ELI must be notified prior to sample submittal for the following: DW A2LA GSA EDD/EDT(Electronic POTW/WWTP Format: State: LEVEL IV Other: NELAC	Containers AWSVBO Soils/Soilds loassay <u>O</u> ther	AMALYSI amalysi	SREQUESTE	SEE ATTACHED ON Normal Turnaround (TAT)	R U S H	Contact ELI prior RUSH sample su for charges and scheduling – See Instruction Page Comments:	ubmittal	Shipped by: <u>M_A_A</u> Cooler (D(s): <u>Cooler (D(s):</u> <u>Cooler (D(s):</u> <u>Cooler (D(s):</u> <u>Yes</u> No Custody Seal (Y) N Bottles/ Coolers B (C) Intact (Y) N
	me MATRIX	X						Signature N Match
TWW-1 2.6.09 12	50 1-W				\angle			2
2 TWN-2 2.6.09 13.	20 1-W				/			MIL
3TWN-3 2.6.09 12	87 1-W							© Rnn
	20 1-W				/			
	451-W							
	30 1-W				1			出 ()
7					-			ATTO
Temp Blank								R O
9								\$ M9000370
10								
Custody Relinquished by (pril): Date/Time: 103		hature	Received by (print):		Date/Time	1	Signatu	ire:
Reinquished by (print): Date/Time!	Sign	natūre:	Received by (print):	1	Date/Time	£)	Signatu	ire:
Signed Sample Disposal: Return to Client:	Lab Dispo	osal:	Received by Laboratory		Date/Time	9:25	Signatu	DP:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc Workorder Receipt Checklist

Denison Mines (USA) Corp



Login completed by: Edith McPike

Reviewed by:

Reviewed Date:

Date and Time Received: 2/10/2009 9:25 AM

Received by: pb

Carrier name: Next Day Air

Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present	
Custody seals intact on shipping container/cooler?	Yes 🗸	No 🗌	Not Present	
Custody seals intact on sample bottles?	Yes 📋	No 🗌	Not Present 🗹	
Chain of custody present?	Yes 🗹	No 🗌		
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌		
Chain of custody agrees with sample labels?	Yes 🗸	No 🗌		
Samples in proper container/bottle?	Yes 🗹	No 🗌		
Sample containers Intact?	Yes 🗹	No 🗌		
Sufficient sample volume for indicated test?	Yes 🗹	No 🗌		
All samples received within holding time?	Yes 🗹	No 📋		
Container/Temp Blank temperature:	2°C On Ice			
Water - VOA vials have zero headspace?	Yes 🗌	No 🗌	No VOA vials submitted	\square
Water - pH acceptable upon receipt?	Yes 🗹	No 🗌	Not Applicable	

Contact and Corrective Action Comments:

None



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CLIENT: Denison Mines (USA) Corp

Project: Initial Nitrate

Sample Delivery Group: C09020370

Date: 11-Feb-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS USING EPA 505

Data for Atrazine and Simazine are reported from EPA 525.2, not from EPA 505. Data reported by ELI using EPA method 505 reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS: USEPA: WY00002; FL-DOH NELAC: E87641; California: 02118CA Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER: The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER,WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT

ANALYTICAL SUMMARY REPORT

February 12, 2009

Denison Mines (USA) Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09020365

Project Name: Chloride Exploration

Energy Laboratories, Inc. received the following 7 samples for Denison Mines (USA) Corp on 2/10/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09020365-001	TWN-1	02/06/09 12:50	02/10/09	Aqueous	E300.0 Anions
C09020365-002	TWN-2	02/06/09 13:20	02/10/09	Aqueous	Same As Above
C09020365-003	TWN-3	02/06/09 12:37	02/10/09	Aqueous	Same As Above
C09020365-004	TWN-4	02/06/09 10:20	02/10/09	Aqueous	Same As Above
C09020365-005	TWN-60	02/06/09 08:45	02/10/09	Aqueous	Same As Above
C09020365-006	TWN-63	02/06/09 08:30	02/10/09	Aqueous	Same As Above
C09020365-007	Temp Blank		02/10/09	Aqueous	Temperature

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By: St. phanie Waldigo



International uranium 12:28:23 p.m. 12-22-2009 25/37

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 307.25 • 15 • Fax 307.234.1639 • casper@energylab.com

LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines (USA Chloride Exploration) Corp					Report Dat	e: 02/12/09
Lab ID: Client Sample ID: Matrix:	C09020365-001 TWN-1 Aqueous					(Collection Dat DateReceive	e: 02/06/09 12:50 d: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		19	mg/L		1		E300.0	02/1 1/ 09 20:05 / jl
Lab ID: Client Sample ID: Matrix:	C09020365-002 TWN-2 Aqueous					(Collection Dat DateReceive	e: 02/06/09 13:20 d: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		29	mg/L	-	1		E300.0	02/11/09 20:52 / lji
Lab ID: Client Sample ID: Matrix:	C09020365-003 TWN-3 Aqueous			1200		(Collection Dat DateReceive	e: 02/06/09 12:37 d: 02/10/09
Analyses		Result	Units	Qualifiers	RL.	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		96	mg/L		1		E300.0	02/11/09 21:07 / lji
Lab ID: Client Sample ID: Matrix:	C09020365-004 TWN-4 Aqueous					(Collection Dat DateReceive	e: 02/06/09 10:20 d: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		13	mg/L		1		E300.0	02/11/09 21:22 / Iji

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.



 International uranium
 12:28:34 p.m.
 12:22:2009

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 www.energylab.com

LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines (USA) Chloride Exploration	Corp					Report Dat	e: 02/12/09
Lab ID: Client Sample ID: Matrix:	C09020365-005 TWN-60 Aqueous						Collection Dat DateReceive	e: 02/06/09 08:45 d: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		ND	mg/L		1		E300.0	02/11/09 21:38 / ljl
Lab ID: Client Sample ID:						(Collection Dat DateReceive	e: 02/06/09 08:30 d: 02/10/09
Matrix:	Aqueous					MCL/		4
Analyses		Result	Units	Qualifiers	RL	QCL	Method	Analysis Date / By
MAJOR IONS Chloride		ND	mg/L		1		E300.0	02/11/09 21:53 / j
Lab ID: Client Sample ID: Matrix:	C09020365-007 Temp Blank Aqueous			unaria. Alt		(Collection Dat DateReceive	e: Not Provided d: 02/10/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPE Temperature	RTIES	3.0	°C				E170.1	02/10/09 09:25 / pb

26/37

LABORATORIES

International uranium 12:28:44 p.m. 12-22-2009 **ENERGY LABORATORIES, INC.** • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 307.25 • 575 • Fax 307.234.1639 • casper@energylab.com www.energylab.com 27 /37

QA/QC Summary Report

Client: Denison Mines (USA) Corp

Project: Chloride Exploration

Report Date: 02/12/09 Work Order: C09020365

Analyte		Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	E300.0							_	Batch:	R114625
Sample ID:	LCS	Laboratory Co	ntrol Sample			Run: IC1-C	090211A		02/11	/09 14:42
Chloride		9.61	mg/L	1.0	96	90	110			
Sample ID:	MBLK	Method Blank				Run: IC1-C	_090211A		02/11	/09 14:57
Chloride		ND	mg/L	0.02			Construction and the second			
Sample ID:	C09020365-001AMS	Sample Matrix	Spike			Run: IC1-C	_090211A		02/11	/09 20:21
Chloride		70.2	mg/L	1.0	104	90	110			
Sample ID:	C09020365-001AMSD	Sample Matrix	Spike Duplicate			Run: IC1-C	_090211A		02/11	/09 20:36
Chloride		71.0	mg/L	1.0	105	90	110	1.1	20	

ND - Not detected at the reporting limit.

ENERGY Chain of Cust	ody and Analytical Request Rec PLEASE PRINT- Provide as much information as possible.	Page of
Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin EPA/State Compliance:
Denison Mines	chlopide Exploration	State: //T Yes No .
Report Mail Address: P.O. BOX 809 Blanding UT 8451/	Contagt Name: Phone/Fax;	Email: Sampler: (Please Print) -
P.O. ISAK 807	Kyan Palmer 678-2221	
Blanding UT 8451/	Invoice Contact & Phone:	Purchase Order: Quote/Bottle Order:
Same	Davio Turk 678 2221	
Special Report/Formats – ELI must be notified prior to sample submittal for the following: DW A2LA GSA EDD/EDT(Electronic Data) POTW/WWTP Format:	Number of Containers Sample Type: A Water Solis/Solids Air Water Solis/Solids Vegetation Bioassay Other Celerchen SEE ATTACHED	Purchase Order: Immune H. Mart Purchase Order: Quote/Bottle Order: Quote/Bottle Order: Quote/Bottle Order: R Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page Shipped by: M – A – A Cooler ID(s): V Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page Shipped by: M – A – A Cooler ID(s): S Cooler S S° C On Ice: (es) No Custody Seal (Y) N Bottles/ Coolers H Bottles/ Coolers B C
SAMPLE IDENTIFICATION Collection Collection (Name, Location, Interval, etc.)		Intact YN Signature YN Match
TWN-1 2-6.09 1250	1-W /	2
2 TWN-2 / B20	1-W /	
3 TWN-3 / 1237	1-W /	
*TWW-4 1020	1-w /	1/
*TWN-60 0845	1-w /	
"TWN-63 2.6.09 0830	1-12/	1
7		
* Temp Blank		609020365
9		
10		
Custody Reliquished by (print): Date/Time: 1030	Stenature: Received by (print):	Date/Time: Signature:
Record Religquished by (print): Date/Time:	Signature: Received by (print):	Date/Time: Signature:
Signed Sample Disposal: Return to Client:	Lab Disposal: Received by Laboratory:	Date/Time: A-10-07 9:25

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

12-22-2009

Energy Laboratories Inc Workorder Receipt Checklist

Denison Mines (USA) Corp

Login completed by: Kimberly Humiston Reviewed by: Reviewed Date: C09020365

Date and Time Received: 2/10/2009 9:25 AM Received by: pb

Carrier name: Next Day Air

Shipping container/cooler in good condition?	Yes 🗹	No 🔲	Not Present
Custody seals intact on shipping container/cooler?	Yes 🗹	No 🗌	Not Present
Custody seals intact on sample bottles?	Yes 🗌	No 🗌	Not Present
Chain of custody present?	Yes 🗹	No 🗌	
Chain of custody signed when relinquished and received?	Yes 🗹	No 📋	
Chain of custody agrees with sample labels?	Yes 🗹	No 🗌	
Samples in proper container/bottle?	Yes 🗹	No 🗌	
Sample containers intact?	Yes 🗸	No 🗌	
Sufficient sample volume for indicated test?	Yes 🗹	No 🗌	
All samples received within holding time?	Yes 🗹	No 🗌	
Container/Temp Blank temperature:	3°C On Ice		
Water - VOA vials have zero headspace?	Yes 🗌	No 📋	No VOA vials submitted
Water - pH acceptable upon receipt?	Yes 🗹	No 📋	Not Applicable

Contact and Corrective Action Comments:

None

30/37



CLIENT:

Project:

Denison Mines (USA) Corp Chloride Exploration

Sample Delivery Group: C09020365

Date: 12-Feb-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS USING EPA 505

Data for Atrazine and Simazine are reported from EPA 525.2, not from EPA 505. Data reported by ELI using EPA method 505 reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY

eli-h - Energy Laboratories, Inc. - Helena, MT

eli-r - Energy Laboratories, Inc. - Rapid City, SD

eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS: USEPA: WY00002; FL-DOH NELAC: E87641; California: 02118CA Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER: The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER, WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT



ANALYTICAL SUMMARY REPORT

February 25, 2009

Denison Mines (USA) Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09020752

Project Name: Nitrate

Energy Laboratories, Inc. received the following 3 samples for Denison Mines (USA) Corp on 2/20/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09020752-00	01 Piez 1	02/19/09 08:48	02/20/09	Aqueous	Nitrogen, Nitrate + Nitrite
C09020752-00	2 Piez 2	02/19/09 08:20	02/20/09	Aqueous	Same As Above
C09020752-00	3 Piez 3	02/19/09 07:35	02/20/09	Aqueous	Same As Above

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Stephanie Weldup



LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines (US) Nitrate	A) Corp					Report [Date: 02/25/09
Lab ID: Client Sample ID: Matrix:	C09020752-001 Piez 1 Aqueous					(Date: 02/19/09 08:48 ved: 02/20/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	6.8	mg/L	D	0.2		E353.2	02/25/09 13:58 / jal
Lab ID: Client Sample ID: Matrix:	C09020752-002 Piez 2 Aqueous					(Pate: 02/19/09 08:20 ved: 02/20/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	0.5	mg/L		0.1		E353.2	02/25/09 14:01 / jal
Lab ID: Client Sample ID: Matrix:	C09020752-003 Piez 3 Aqueous					C		ved: 02/19/09 07:35
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitri	te as N	0.7	mg/L		0.1		E353.2	02/25/09 14:11 / jal

Report RL - Analyte reporting limit. Definitions:

QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Denison Mines (USA) Corp

Project: Nitrate

Report Date: 02/25/09 Work Order: C09020752

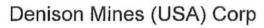
the second se			-	_					
Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2								Batch	R11517
Sample ID: MBLK-1	Method Blank				Run: TECH	INICON_090228	5A	02/2	5/09 13:0
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Cor	ntrol Sample			Run: TECH	INICON_090225	5A	02/2	5/09 13:0
Nitrogen, Nitrate+Nitrite as N	2.42	mg/L	0.10	94	90	110			
Sample ID: C09020752-002AMS	Sample Matrix	Spike			Run: TECH	INICON_090225	5A	02/28	5/09 14:0
Nitrogen, Nitrate+Nitrite as N	2.32	mg/L	0.10	90	90	110			
Sample ID: C09020752-002AMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_090225	δA	02/25	5/09 14:0
Nitrogen, Nitrate+Nitrite as N	2.35	mg/L	0.10	92	90	110	1.3	10	

ND - Not detected at the reporting limit.

ompany Name:			PLEASE PRIN Project Nan				n as put	same.		Samp	ole Origin	EPA/S	tate Compliance:
Denison Mi	res		Nitrate	-						State	: hT	Yes [] No 🗌
eport Mail Address: D. O. Br	× 809		Contact Na	ne:	P	hone/Fax:				Emai	l:	Sampl	er: (Please Print)
Denison Mix eport Mail Address: p. o. Ba Blanding	UT 84511		Ryan	PAIn	NER	6782	125					Rya.	- PAIMER
voice Address:			Invoice Cor	tact & F	Phone:					Purcl	hase Order:	Quote	Bottle Order:
Same					Bane								1
pecial Report/Formats – EL ior to sample submittal for		fied	ntainers W S V B O Is/Solids ssay <u>O</u> ther		NALYS	ns reg	DUES		d (TAT)	R U	Contact ELI prio RUSH sample s for charges and scheduling – Se Instruction Page	ubmittal e	Shipped by: <u> <u> <u> </u> <u> </u></u></u>
GSA POTW/WWTP State: Other:	A2LA EDD/EDT(Elec Format: LEVEL IV NELAC	tronic Data)	Number of Containers Sample Type: A W S V B O Air Water Soils/Solids Vegetation <u>B</u> ioassay <u>O</u> ther	! lat				SEE ATTACHED	Normal Turnaround (TAT)	S H	Comments:		Receipt Temp On Ige Yes No Custody Seal (Y Bottles/ Coolers B Intact (Y
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	N									Signature Y
Piez 1	2.19.09	0848	1-W	X									
Piezz	2.19.69	0820	1-W	X									OWITA
Piez 3	2.19.09	0735	1-12	X									Nnn
									_				n2i
						+ $+$ $-$			-				A YO
						+							Q
													RAT
													10 10 10
													57
													7090201
ustody Retinquished by (print):	Date/Time		Sign	ature	/	Receiv	ed by (print	t):		Date/Time	8:	Signa	iture:
Record Relinguished by (print):	NER 2.19.0 Date/Time	27	Sign	ature:		Receiv	ed by (print	t):		Date/Time	e:	Signa	iture:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc Workorder Receipt Checklist



.



Login completed by: Edith McPike		Date and Time	Received: 2/20/2009 9:3	80 AM
Reviewed by:		Re	ceived by: pb	
Reviewed Date:		Carr	rier name: Next Day Air	
Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present	
Custody seals intact on shipping container/cooler?	Yes 🗹	No 🛄	Not Present	
Custody seals intact on sample bottles?	Yes 🗌	No 🗌	Not Present 🗹	
Chain of custody present?	Yes 🗹	No 🗌		
Chain of custody signed when relinquished and received?	Yes 🗹	No 📋		
Chain of custody agrees with sample labels?	Yes 🗹	No 🗌		
Samples in proper container/bottle?	Yes 🗹	No 🔲		
Sample containers intact?	Yes 🗸	No 🗌		
Sufficient sample volume for indicated test?	Yes 🗸	No 🗌		
All samples received within holding time?	Yes 🗹	No 🗌		
Container/Temp Blank temperature:	3°C On Ice			
Nater - VOA vials have zero headspace?	Yes 🗌	No 🗌	No VOA vials submitted 🗹	1
Nater - pH acceptable upon receipt?	Yes 🗹	No 📋	Not Applicable	

Contact and Corrective Action Comments:

None



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CLIENT: Denison Mines (USA) Corp

Project: Nitrate

Sample Delivery Group: C09020752

Date: 25-Feb-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS USING EPA 505

Data for Atrazine and Simazine are reported from EPA 525.2, not from EPA 505. Data reported by ELI using EPA method 505 reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS: USEPA: WY00002; FL-DOH NELAC: E87641; California: 02118CA Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER:

The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER,WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT

July Sampling Event



ANALYTICAL SUMMARY REPORT

July 30, 2009

Denison Mines (USA) Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09070693

Project Name: Nitrate

Energy Laboratories, Inc. received the following 8 samples for Denison Mines (USA) Corp on 7/17/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09070693-001	MW-18	07/14/09 08:12	07/17/09	Aqueous	Nitrogen, Nitrate + Nitrite
C09070693-002	MW-19	07/14/09 10:26	07/17/09	Aqueous	Same As Above
C09070693-003	Piez-1	07/14/09 09:25	07/17/09	Aqueous	Same As Above
C09070693-004	Piez-2	07/14/09 09:45	07/17/09	Aqueous	Same As Above
C09070693-005	Piez-3	07/14/09 10:10	07/17/09	Aqueous	Same As Above
C09070693-006	Piez-4	07/14/09 08:07	07/17/09	Aqueous	Same As Above
C09070693-007	Piez-5	07/14/09 08:52	07/17/09	Aqueous	Same As Above
C09070693-008	Temp Blank	07/14/09 10:10	07/17/09	Aqueous	Temperature

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

D. Waldup Stephanie D. Waldrop

Reporting Supervisor



LABORATORY ANALYTICAL REPORT

Client:	Denison Mines (USA	A) Corp		11/14-1 (III -				
Site Name:	Nitrate	, ,					Report D	ate: 07/30/09
Lab ID:	C09070693-001					(Collection D	ate: 07/14/09 08:12
Client Sample ID:	MW-18						DateRecei	ved: 07/17/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Nitrogen, Nitrate+Nitr	rite as N	ND	mg/L		0.1		E353.2	07/22/09 13:28 / jal
Lab ID:	C09070693-002					(Collection D	pate: 07/14/09 10:26
Client Sample ID:	MW-19						DateRecei	ved: 07/17/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Nitrogen, Nitrate+Nitr	ite as N	2.2	mg/L		0.1		E353.2	07/22/09 13:31 / jal
Lab ID:	C09070693-003				********	(Collection D	ate: 07/14/09 09:25
Client Sample ID:	Piez-1						DateRecei	ved: 07/17/09
Matrix:	Aqueous					8 - 1 - 840		
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Nitrogen, Nitrate+Nitr	ite as N	6.8	mg/L		0.2		E353.2	07/22/09 13:33 / jal
Lab ID:	C09070693-004						Collection D	ate: 07/14/09 09:45
Client Sample ID:	Piez-2						DateRecei	ved: 07/17/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL		Method	Analysis Date / By
MAJOR IONS		(March)			2020			
Nitrogen, Nitrate+Nitr	ite as N	0.5	mg/L		0.1		E353.2	07/22/09 13:36 / jal

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines (USA) Nitrate	Corp					Report D	Date: 07/30/09
Lab ID: Client Sample ID: Matrix:	C09070693-005 Piez-3 Aqueous					C		Pate: 07/14/09 10:10 ved: 07/17/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Nitrogen, Nitrate+Nitr	ite as N	0.8	mg/L		0.1		E353.2	07/22/09 13:46 / jal
Lab ID: Client Sample ID: Matrix:	C09070693-006 Piez-4 Aqueous					C		ved: 07/14/09 08:07
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Nitrogen, Nitrate+Nitr	ite as N	1.8	mg/L		0.1		E353.2	07/22/09 13:48 / jal
Lab ID:	C09070693-007					(Collection D	ate: 07/14/09 08:52
Client Sample ID: Matrix:	Piez-5 Aqueous						DateRecei	ved: 07/17/09
Analyses	•	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitri	ite as N	0.7	mg/L		0.1		E353.2	07/22/09 13:51 / jai
Lab ID: Client Sample ID: Matrix:	C09070693-008 Temp Blank Aqueous					(Pate: 07/14/09 10:10 ved: 07/17/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPE	RTIES							
Temperature		2.0	°C				E170.1	07/17/09 09:15 / sec

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Denison Mines (USA) Corp

Project: Nitrate

Report Date: 07/30/09 Work Order: C09070693

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2						10		Batch:	R12125
Sample ID: MBLK-1	Method Blank				Run: TECH	HNICON_09072	2A	07/22	/09 12:43
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Cor	ntrol Sample			Run: TECH	INICON_09072	2A	07/22	/09 12:46
Nitrogen, Nitrate+Nitrite as N	2.47	mg/L	0.10	99	90	110			
Sample ID: C09070693-004AMS	Sample Matrix	Spike			Run: TECH	INICON_09072	2A	07/22	/09 13:38
Nitrogen, Nitrate+Nitrite as N	2.39	mg/L	0.10	96	90	110			
Sample ID: C09070693-004AMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_09072	2A	07/22	/09 13:41
Nitrogen, Nitrate+Nitrite as N	2.47	mg/L	0.10	100	90	110	3.3	10	

ENERGY LABORATORIES	Chain of	Cust				Requ mation as p	iest R	leco	ord		Pag	ge of
Company Name:			Project Nar	ne, PWS, Pe	ermit, Etc.				Samp	ole Origin	EPA/S	tate Compliance:
Denison (Mines		Nitra	te					State	INT	Yes [
Report Mail Address: P.O. Brx 8	719		Contact Na		Phone	Fax:			Emai		Sample	er: (Please Print)
Blanding UT	84511		Ryan	Palmer	678	222)					Tanner	A. & Ryan P.
Invoice Address:			Invoice Cor	ntact & Phon	e:				Purch	nase Order:	Quote	/Bottle Order:
Same			So	ine								
Special Report/Formats – EL prior to sample submittal for f GSA POTW/WWTP State:	the following: A2LA EDD/EDT(Elec		Number of Containers Sample Type: A W S V B O Ar Water Soils/Solids Vegetation Bioassay <u>O</u> ther		LYSIS (REQUE	ATTACHED	Vormal Turnaround (TAT)	R U S	Contact ELI prio RUSH sample s for charges and scheduling – Se Instruction Page Comments: one Femp Blant	ubmittal e	Shipped by: AR Cooler ID(s): Cooler ID(s): Cool
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time		× Nithate					н	per "		Coolers B V Intact Y N Signature Match
$\frac{2}{3}$ $\frac{1}{100}$ $\frac{1}{100}$ $\frac{1}{100}$ $\frac{1}{100}$	/ /	1026	/	X								
4 Piez- 2		0945		X								E S D
5 Piez- 3		1010		X								
6 Diez - 4		0807		X								A HO
Piez-5	7-14.09	0852	1-W	X								
8												AN AN
9												ABORAT
10												2010766F3
Custody Relinquished by (print)	Date/Time	09 1045	Signa	ature:		Received by (pr	int):	_	Date/Time		Signa	ature:
Record Relinquished by (print): MUST be	Date/Time		Sign	ature:		Received by (pr			Date/Time		Signa	1
Signed	Return to Client:		Lab Dispo	sal:		Adres		Ser	Date/Time	17/09 9	15 C	Hure -

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc Workorder Receipt Checklist



Reviewed by:

Reviewed Date:



	· /	
Login completed by:	Edith McPike	

Date and Time Received: 7/17/2009 9:15 AM

Received by: al

Carrier name: Next Day Air

Shipping container/cooler in good condition?	Yes 🗸	No 🗌	Not Present
Custody seals intact on shipping container/cooler?	Yes 🗸	No 🗌	Not Present
Custody seals intact on sample bottles?	Yes 🗌	No 🗌	Not Present 🗹
Chain of custody present?	Yes 🗹	No 🗌	
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌	
Chain of custody agrees with sample labels?	Yes 🗹	No 🗌	
Samples in proper container/bottle?	Yes 🗹	No 🗌	
Sample containers intact?	Yes 🗸	No 🗌	
Sufficient sample volume for indicated test?	Yes 🗹	No 🗌	
All samples received within holding time?	Yes 🗹	No 🗌	
Container/Temp Blank temperature:	2°C On Ice		
Water - VOA vials have zero headspace?	Yes 🗌	No 🗌	No VOA vials submitted
Water - pH acceptable upon receipt?	Yes 🗹	No 🗌	Not Applicable

Contact and Corrective Action Comments:

None



Project:

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

CLIENT: Denison Mines (USA) Corp

Nitrate

Date: 30-Jul-09

CASE NARRATIVE

Sample Delivery Group: C09070693

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS USING EPA 505

Data for Atrazine and Simazine are reported from EPA 525.2, not from EPA 505. Data reported by ELI using EPA method 505 reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER:

The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER,WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT



ANALYTICAL SUMMARY REPORT

August 03, 2009

Denison Mines (USA) Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09070903

Project Name: Nitrate

Energy Laboratories, Inc. received the following 8 samples for Denison Mines (USA) Corp on 7/23/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09070903-001	TWN-1	07/21/09 13:23	8 07/23/09	Aqueous	Nitrogen, Nitrate + Nitrite
C09070903-002	TWN-2	07/21/09 13:34	07/23/09	Aqueous	Same As Above
C09070903-003	TWN-3	07/21/09 13:55	07/23/09	Aqueous	Same As Above
C09070903-004	TWN-4	07/21/09 13:43	07/23/09	Aqueous	Same As Above
C09070903-005	TWN-60	07/21/09 09:30	07/23/09	Aqueous	Same As Above
C09070903-006	TWN-63	07/21/09 09:48	07/23/09	Aqueous	Same As Above
C09070903-007	TWN-64	07/21/09 11:45	07/23/09	Aqueous	Same As Above
C09070903-008	TWN-65	07/21/09 13:43	07/23/09	Aqueous	Same As Above
	the second se				

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Stephanie D. Waldrop Stephanie D. Waldrop **Reporting Supervisor**



LABORATORY ANALYTICAL REPORT

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Client: Site Name:	Denison Mines (USA Nitrate	A) Corp					Report D	ate: 08/03/09
Lab ID: Client Sample ID: Matrix:	C09070903-001 TWN-1 Aqueous							Pate: 07/21/09 13:23 ved: 07/23/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	0.4	mg/L		0.1		E353.2	07/24/09 11:23 / jal
Lab ID: Client Sample ID: Matrix:	C09070903-002 TWN-2 Aqueous							ved: 07/21/09 13:34
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	25.0	mg/L	D	0.3		E353.2	07/24/09 11:25 / jal
ab ID: C09070903-003 Client Sample ID: TWN-3 Matrix: Aqueous								ved: 07/21/09 13:55
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	25.3	mg/L	D	0.3		E353.2	07/31/09 14:36 / jal
Lab ID: Client Sample ID: Matrix:	C09070903-004 TWN-4 Aqueous							ved: 07/21/09 13:43
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	0.5	mg/L		0.1		E353.2	07/31/09 14:39 / jal

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

D - RL increased due to sample matrix interference.



LABORATORY ANALYTICAL REPORT

) Corp					Penert D	oto: 08/03/00
CONTRACTOR STOCK FROM CONTRACT					C		
						Dateriecen	eu. 01125105
	Result	Units	Qualifiers	RL	QCL	Method	Analysis Date / By
te as N	ND	mg/L		0.1		E353.2	07/31/09 14:41 / jal
C09070903-006					(Collection D	ate: 07/21/09 09:48
TWN-63						DateReceiv	red: 07/23/09
Aqueous							
	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
te as N	ND	mg/L		0.1		E353.2	07/31/09 14:44 / jal
C09070903-007					(Collection D	ate: 07/21/09 11:45
TWN-64						DateReceiv	ed: 07/23/09
Aqueous							
	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
te as N	ND	mg/L		0.1		E353.2	07/31/09 14:54 / jal
C09070903-008					(Collection D	ate: 07/21/09 13:43
TWN-65						DateReceiv	red: 07/23/09
Aqueous							
	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
	Nitrate C09070903-005 TWN-60 Aqueous te as N C09070903-006 TWN-63 Aqueous te as N C09070903-007 TWN-64 Aqueous te as N C09070903-007 TWN-64 Aqueous	C09070903-005 TWN-60 Aqueous Result te as N ND C09070903-006 TWN-63 Aqueous Result te as N ND C09070903-007 TWN-64 Aqueous Result te as N ND	Nitrate C09070903-005 TWN-60 Aqueous Result Units te as N ND mg/L C09070903-006	Nitrate C09070903-005 TWN-60 Aqueous Result Units Qualifiers te as N ND mg/L C09070903-006 TWN-63 Aqueous Result Units Qualifiers te as N ND mg/L C09070903-007 TWN-64 Aqueous Result Units Qualifiers te as N ND mg/L C09070903-007 TWN-64 Aqueous	Nitrate C09070903-005 TWN-60 Aqueous Result Units Qualifiers RL te as N ND mg/L 0.1 0.1 C09070903-006 VIN-63 Aqueous Result Units Qualifiers RL C09070903-006 VIN MD mg/L 0.1 0.1 C09070903-006 VINIts Qualifiers RL 0.1 te as N ND mg/L 0.1 0.1 C09070903-007 VINIts Qualifiers RL te as N ND mg/L 0.1 C09070903-007 VINIts Qualifiers RL te as N ND mg/L 0.1 C09070903-008 VINIts Qualifiers RL C09070903-008 VINIts Aqueous 0.1	Nitrate C09070903-005 TWN-60 Aqueous Result Units Qualifiers RL QCL te as N ND mg/L 0.1 C09070903-006 TWN-63 Aqueous Result Units Qualifiers RL QCL te as N ND mg/L 0.1 C09070903-007 TWN-64 Aqueous Result Units Qualifiers RL QCL te as N ND mg/L 0.1 C09070903-007 TWN-64 Aqueous Result Units Qualifiers RL QCL te as N ND mg/L 0.1 C09070903-008 TWN-65 Aqueous MCL/	Nitrate Report D C09070903-005 Collection D TWN-60 DateReceiv Aqueous Result Units Qualifiers RL MCL/ Method te as N ND mg/L 0.1 E353.2 Collection D C09070903-006 Collection D DateReceiv DateReceiv C09070903-006 Collection D DateReceiv Result Units Qualifiers RL MCL/ Method mg/L 0.1 E353.2 Collection D C09070903-006 Collection D DateReceiv MCL/ te as N ND mg/L 0.1 E353.2 C09070903-007 Collection D DateReceiv Aqueous Result Units Qualifiers RL MCL/ te as N ND mg/L 0.1 E353.2 Method te as N ND mg/L 0.1 E353.2 Method C09070903-008 Collection D DateReceiv Aqueous Method MUN-65 ND mg/L 0.1

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Denison Mines (USA) Corp

Project: Nitrate

Report Date: 08/03/09 Work Order: C09070903

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2								Batch:	R121364
Sample ID: MBLK-1	Method Blank				Run: TECH	HNICON_090724/	A	07/24	/09 10:13
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Co	ntrol Sample			Run: TECH	INICON_090724/	Ą	07/24	/09 10:15
Nitrogen, Nitrate+Nitrite as N	2.53	mg/L	0.10	101	90	110			
Sample ID: C09070793-002CMS	Sample Matrix	Spike			Run: TECH	INICON_090724/	A	07/24	/09 11:08
Nitrogen, Nitrate+Nitrite as N	2.74	mg/L	0.10	110	90	110			
Sample ID: C09070793-002CMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON 090724/	4	07/24	/09 11:10
Nitrogen, Nitrate+Nitrite as N	2.71	mg/L	0.10	108	90	110	1.1	10	
Method: E353.2								Batch:	R121744
Sample ID: MBLK-1	Method Blank			Run: TECHNICON_090731A		07/31	/09 14:29		
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Co	ntrol Sample			Run: TECH	INICON_090731/	A	07/31	/09 14:31
Nitrogen, Nitrate+Nitrite as N	2.57	mg/L	0.10	103	90	110			
Sample ID: C09070903-004AMS	Sample Matrix	Spike			Run: TECH	INICON_090731/	4	07/31	/09 14:46
Nitrogen, Nitrate+Nitrite as N	2.55	mg/L	0.10	102	90	110			
Sample ID: C09070903-004AMS	Sample Matrix	Spike			Run: TECH	INICON_090731/	A	07/31	/09 14:49
Nitrogen, Nitrate+Nitrite as N	2.58	mg/L	0.10	104	90	110			
Sample ID: C09071061-002CMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_090731	A	07/31	/09 15:24
Nitrogen, Nitrate+Nitrite as N	2.21	mg/L	0.10	103	90	110	2.7	10	

ENERGY Chain of Cus	tody and Analytic PLEASE PRINT- Provide as much	cal Request Reco	ord	Page of			
Company Name:	Project Name, PWS, Permit, E	tc.	Sample Origin	EPA/State Compliance:			
DENISON MINES	NitraTE		State: UT	Yes 🗋 No 🗖			
Report Mail Address: Raw S()9		none/Fax:	Email:	Sampler: (Please Print)			
Report Mail Address: Box 809 Blanding UT 84511	KYAN PAlmer	678-2221		Transet land			
Invoice Address:	Invoice Contact & Phone:	070 0001	Purchase Order:	Quote/Bottle Order:			
Same	Sa	m					
Special Report/Formats - ELI must be notified	ANALYS	IS REQUESTED	Contact ELI prior				
prior to sample submittal for the following:			RUSH sample su for charges and	Cooler ID(s):			
	av Old <	TATED	scheduling – See Instruction Page	e allegent			
	of Containers De: A W S V B O Per Solis/Solids Bioassay Other	SEE ATTACHED	Comments:	Receipt Temp			
GSA EDD/EDT(Electronic Data	Number of Sample Type: Sample Type: Ar Water S Vegetation Bit	TA		On Ice:			
POTW/WWTP Format:	etation of the T	Tart Turt	S	Tes No			
State: LEVEL IV Other: NELAC	Sam No	SEE		Custody Seal Y N Bottles/			
	tar	N N N	н	Bottles/ B C Coolers B N			
SAMPLE IDENTIFICATION Collection Collection (Name, Location, Interval, etc.) Date Time				Signature N Match N			
TWN-1 7.21.09 1323	2-W X			\gg			
2 TWN-2 / 1334	1-W X			OWE			
3 TWN-3 (1355	1-W X						
* TWN-4 1343	1-w X						
"TWN-60 0930	1-W X		0	\geq			
°TWN-63 0948	I-WX		(09000	202 6			
TWN-64 (1145	1-w X			ATT			
"TWN-65 7.21.09 1343	2-W X			ORAT			
" one this blank per container	<u>A</u>			AB			
10							
Custody Reinquished by (print): Date/Time: 040 Signature: Beceived by (print): Date/Time: Signature:							
Record Relinquished by (print): Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:			
MUST be		Received by Laboratory:	9.30 1/23/09	Signature			
Signed Sample Disposal: Return to Client:	Lab Disposal:	Indrew Jarsen	9.30 7/23/09	0//			

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc Workorder Receipt Checklist





Login completed by: Corinne Wagner Reviewed by:

Reviewed Date:

Date and Time Received: 7/23/2009 9:30 AM

Received by: al

Carrier name: Next Day Air

Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present
Custody seals intact on shipping container/cooler?	Yes 🗹	No 🗌	Not Present
Custody seals intact on sample bottles?	Yes	No 🗌	Not Present
Chain of custody present?	Yes 🗸	No 🗌	
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌	
Chain of custody agrees with sample labels?	Yes 🗸	No 🗌	
Samples in proper container/bottle?	Yes 🗸	No 🗌	
Sample containers intact?	Yes 🗸	No 🗌	
Sufficient sample volume for indicated test?	Yes 🗹	No 🗌	
All samples received within holding time?	Yes 🗹	No 🗌	
Container/Temp Blank temperature:	2°C On Ice		
Water - VOA vials have zero headspace?	Yes	No 🗌	No VOA vials submitted
Water - pH acceptable upon receipt?	Yes 🗹	No 🗌	Not Applicable

Contact and Corrective Action Comments:

None



ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

CLIENT: Denison Mines (USA) Corp

Project: Nitrate

Sample Delivery Group: C09070903

Date: 03-Aug-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS USING EPA 505

Data for Atrazine and Simazine are reported from EPA 525.2, not from EPA 505. Data reported by ELI using EPA method 505 reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER:

The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER, WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT



ANALYTICAL SUMMARY REPORT

July 30, 2009

Denison Mines (USA) Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09070691

Project Name: Chloride

Energy Laboratories, Inc. received the following 7 samples for Denison Mines (USA) Corp on 7/17/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09070691-001	MW 18	07/14/09 08:12	07/17/09	Aqueous	E300.0 Anions
C09070691-002	MW 19	07/14/09 10:26	07/17/09	Aqueous	Same As Above
C09070691-003	Piez-1	07/14/09 09:25	07/17/09	Aqueous	Same As Above
C09070691-004	Piez-2	07/14/09 09:45	07/17/09	Aqueous	Same As Above
C09070691-005	Piez-3	07/14/09 10:10	07/17/09	Aqueous	Same As Above
C09070691-006	Piez-4	07/14/09 08:07	07/17/09	Aqueous	Same As Above
C09070691-007	Piez-5	07/14/09 08:52	07/17/09	Aqueous	Same As Above

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Steven E. Carlston Technical Director



LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines (USA Chloride	A) Corp					Report [Date: 07/30/09
Lab ID: Client Sample ID: Matrix:	C09070691-001 MW 18 Aqueous					(Date: 07/14/09 08:12 ved: 07/17/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		51	mg/L		1		E300.0	07/21/09 23:16 / Ijl
Lab ID: Client Sample ID: Matrix:	C09070691-002 MW 19 Aqueous					0		Date: 07/14/09 10:26 ved: 07/17/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		24	mg/L		1		E300.0	07/21/09 23:31 / lji
Lab ID: Client Sample ID: Matrix:	C09070691-003 Piez-1 Aqueous					C		Date: 07/14/09 09:25 ved: 07/17/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		60	mg/L		1		E300.0	07/21/09 23:47 / lji
Lab ID: Client Sample ID: Matrix:	C09070691-004 Piez-2 Aqueous					C		Pate: 07/14/09 09:45 ved: 07/17/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		7	mg/L		1		E300.0	07/22/09 00:02 / Iji



Client:	Denison Mines (USA)	Corp						
Site Name:	Chloride						Report D	ate: 07/30/09
Lab ID:	C09070691-005					(Collection D	ate: 07/14/09 10:10
Client Sample ID:	Piez-3						DateRecei	ved: 07/17/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		12	mg/L		1		E300.0	07/22/09 01:04 / Ijl
Lab ID:	C09070691-006					(Collection D	ate: 07/14/09 08:07
Client Sample ID:	Piez-4						DateReceiv	ved: 07/17/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
Analyses		Rosuit	Onits	quaimers		QUE	method	Analysis Date / Dy
MAJOR IONS								
Chloride		46	mg/L		1		E300.0	07/22/09 01:50 / ljl
Lab ID:	C09070691-007					C	Collection D	ate: 07/14/09 08:52
Client Sample ID:	Piez-5						DateReceiv	ved: 07/17/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		18	mg/L		1		E300.0	07/22/09 02:05 / ljl



QA/QC Summary Report

Client: Denison Mines (USA) Corp

Project: Chloride

Report Date: 07/30/09 Work Order: C09070691

Analyte		Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	E300.0								Batch:	R121271
Sample ID:	LCS	Laboratory Co	ntrol Sample			Run: IC1-C	_090721A		07/21	/09 16:50
Chloride		9.49	mg/L	1.0	95	90	110			
Sample ID:	MBLK	Method Blank				Run: IC1-C	_090721A		07/21	/09 17:21
Chloride		ND	mg/L	0.04						
Sample ID:	C09070650-001AMS	Sample Matrix	Spike			Run: IC1-C	_090721A		07/21	/09 21:28
Chloride		73.5	mg/L	1.0	133	90	110			S
Sample ID:	C09070650-001AMSD	Sample Matrix	Spike Duplicate			Run: IC1-C	_090721A		07/21	/09 21:43
Chloride		73.7	mg/L	1.0	134	90	110	0.3	20	S
Sample ID:	C09070691-005AMS	Sample Matrix	Spike			Run: IC1-C	_090721A		07/22	/09 01:19
Chloride		62.7	mg/L	1.0	103	90	110			
Sample ID:	C09070691-005AMSD	Sample Matrix	Spike Duplicate			Run: IC1-C	_090721A		07/22	/09 01:34
Chloride		62.7	mg/L	1.0	103	90	110	0.1	20	

Qualifiers:

RL - Analyte reporting limit.

S - Spike recovery outside of advisory limits.

ENERGY	Chain of	f Cust	ody an	id Ana	lytica	I Reque	st Rec	ord		Page	of
Company Name: Denison N			PLEASE PRI	me, PWS, Pe	s much info ermit, Etc.	ormation as pos	sible.	Sam	ole Origin	EPA/State	e Compliance: No 🔲
Report Mail Address: P. O. Box 809 Blanding UT			Contact Na	me:	Phone	e/Fax: Y 222/		Emai		Sampler:	(Please Print)
Same	0.00		Invoide Cor	ntact & Phon	e:			Purc	hase Order:	Quote/Bo	ttle Order:
Special Report/Formats – EL prior to sample submittal for			Number of Containers Sample Type: A W S V B O Air Water Soils/Solids Vegetation Bioassay Other	1	LYSIS	REQUEST	SEE ATTACHED	R U S H	Contact ELI prior RUSH sample su for charges and scheduling – See Instruction Page Comments: Sample Diez	LUD Ubmittal	inlipped by: 2PS ARS YUD icoler ID(s): C \i C \i Receipt Temp C On Ica: Yes No ustody Seal (Y) N ottles/ boolers B C tact (Y) N
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time		0					PN at 1/17	Sille Si	ignature atch
MW 18 MW 19	7.14.09	0812	1-w	XX					pudrew		
Piez-1	- (0925 0945	- (X						n	n
Piez- 3		1010		X							2
Piez-4 D- E	7.14.09	0807	(1-W	X						ATTOR ATTOR	Annual second se
<u> </u>	<u>F110</u>	0002	1 00							Value	
											× 09070691
Relinquished by (print):	Date/Time <i>Alt 7.16.0</i> Date/Time	9 1045	Signa	Vel		Received by (print): Received by (print):		Date/Time		Signature	
Signed Sample Disposal:	Return to Client:		Lab Dispo	sal:		Received by Labor	atory: lansen	Date/Time	2109 915	Signature	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc Workorder Receipt Checklist





Login completed by: Edith McPike		Date and Time I	Received: 7/17/2009 9:15 AM				
Reviewed by:		Received by: al					
Reviewed Date:		Carrier name: Next Day Air					
Shipping container/cooler in good condition?	Yes 🗸	No 🗌	Not Present				
Custody seals intact on shipping container/cooler?	Yes 🗹	No 🗌	Not Present				
Custody seals intact on sample bottles?	Yes	No 🗌	Not Present				
Chain of custody present?	Yes 🗹	No 🗌					
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌					
Chain of custody agrees with sample labels?	Yes 🗹	No 🗌					
Samples in proper container/bottle?	Yes 🗸	No 🗌					
Sample containers intact?	Yes 🗹	No 🗌					
Sufficient sample volume for indicated test?	Yes 🗹	No 🗌					
All samples received within holding time?	Yes 🗹	No 🗌					
Container/Temp Blank temperature:	2°C On Ice						
Water - VOA vials have zero headspace?	Yes 🗌	No 🗌	No VOA vials submitted				
Water - pH acceptable upon receipt?	Yes 🗹	No 🗌	Not Applicable				

Contact and Corrective Action Comments:

None



CLIENT: Denison Mines (USA) Corp

Project: Chloride

Sample Delivery Group: C09070691

Date: 30-Jul-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS USING EPA 505

Data for Atrazine and Simazine are reported from EPA 525.2, not from EPA 505. Data reported by ELI using EPA method 505 reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER: The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER,WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT

August Sampling Event



ANALYTICAL SUMMARY REPORT

August 31, 2009

Denison Mines (USA) Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09081076

Project Name: Nitrate Initial

Energy Laboratories, Inc. received the following 6 samples for Denison Mines (USA) Corp on 8/28/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09081076-001	TWN-5	08/27/09 06:40	08/28/09	Aqueous	Nitrogen, Nitrate + Nitrite
C09081076-002	TWN-6	08/27/09 06:57	08/28/09	Aqueous	Same As Above
C09081076-003	TWN-7	08/27/09 06:25	08/28/09	Aqueous	Same As Above
C09081076-004	TWN-8	08/27/09 07:06	08/28/09	Aqueous	Same As Above
C09081076-005	TWN-9	08/27/09 07:27	08/28/09	Aqueous	Same As Above
C09081076-006	TWN-10	08/27/09 07:15	08/28/09	Aqueous	Same As Above

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

). Waldep Stephanie D. Waldrop **Reporting Supervisor**



Client: Site Name:	Denison Mines (USA Nitrate Initial	() Corp					Report D	Pate: 08/31/09
Lab ID: Client Sample ID: Matrix:	C09081076-001 TWN-5 Aqueous	2				(ved: 08/27/09 06:40
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	0.22	mg/L		0.10		E353.2	08/31/09 11:33 / jal
Lab ID: Client Sample ID: Matrix:	C09081076-002 TWN-6 Aqueous					(Not to Link 1	ved: 08/27/09 06:57
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	3.2	mg/L		0.10		E353.2	08/31/09 11:35 / jal
Lab ID: Client Sample ID: Matrix:	C09081076-003 TWN-7 Aqueous					C		ate: 08/27/09 06:25 ved: 08/28/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.10		E353.2	08/31/09 11:38 / jal
Lab ID: Client Sample ID: Matrix:	C09081076-004 TWN-8 Aqueous					(ved: 08/27/09 07:06
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.10		E353.2	08/31/09 11:40 / jal

MCL - Maximum contaminant level.



Client: Site Name:	Denison Mines (US/ Nitrate Initial	A) Corp					Report D	Date: 08/31/09
Lab ID: Client Sample ID: Matrix:	C09081076-005 TWN-9 Aqueous					(Date: 08/27/09 07:27 ved: 08/28/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	9.3	mg/L		0.15		E353.2	08/31/09 11:50 / jal
Lab ID: Client Sample ID: Matrix:	C09081076-006 TWN-10 Aqueous					(Date: 08/27/09 07:15 ved: 08/28/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Nitrogen, Nitrate+Nitr	ite as N	1.1	mg/L		0.10		E353.2	08/31/09 11:53 / jal



QA/QC Summary Report

Client: Denison Mines (USA) Corp

Project: Nitrate Initial

Report Date: 08/31/09 Work Order: C09081076

Analyte	Result Units	RL	REC Low Limit High Limit RPD RPDLimi	t Qual
Method: E353.2			Bato	h: R12309
Sample ID: MBLK-1	Method Blank		Run: TECHNICON_090831A 08/	31/09 09:3
Nitrogen, Nitrate+Nitrite as N	ND mg/L	0.03		
Sample ID: LCS-2	Laboratory Control Sample		Run: TECHNICON_090831A 08/	31/09 09:3
Nitrogen, Nitrate+Nitrite as N	2.5 mg/L	0.10	102 90 110	
Sample ID: C09081076-004AMS	Sample Matrix Spike		Run: TECHNICON_090831A 08/	31/09 11:4
Nitrogen, Nitrate+Nitrite as N	2.1 mg/L	0.10	107 90 110	
Sample ID: C09081076-004AMSD	Sample Matrix Spike Duplicate		Run: TECHNICON_090831A 08/	31/09 11:4
Nitrogen, Nitrate+Nitrite as N	2.2 mg/L	0.10	108 90 110	

RL - Analyte reporting limit.

	Chain of Cus	tody ar	nd Analytic	cal Reques	st Rec	ord		Page of
LABORATORIES		PLEASE I	PRINT (Provide	as much inform	ation as p	ossible	.)	• <u> </u>
Company Name:	1 -		ne, PWS, Permit, E				ole Origin	EPA/State Compliance:
Report Mail Address: Blanding U	INES		te Initial			State		Yes No -
Report Mail Address: Box 8	-09	Contact Na	^{me:} ^{Ph}	one/Fax:		Email	:	Sampler: (Please Print)
Blanding	IT 84511	12000	Almer	678-222	21			12yun Palmer
Invoice Address:		Invoice Cor	Almer ntact & Phone:		-1	Purch	nase Order:	Quote/Bottle Order:
Sam		Sa	me					
Special Report/Formats:		-	ANAI VRIS	REQUESTED	0		Contact ELI prior	
		5 DW					RUSH sample su for charges and	ubmittal Y V 214 Cooler ID(s):
		ter lot				R	scheduling - See	
	EDD/EDT(Electronic Data)	V S V ils/S assa					Instruction Page	Receipt Temp
	Format:	Number of Containers Sample Type: A W S V B O DW <u>Air Water Solis/Solids</u> <u>Vegetation Bioassay Other</u> DW - Drinking Water			SEE ATTACHED	U	Comments:	Y °c
□ State: □ I	LEVEL IV NELAC	- Dri			LT			On Ice: Y N
		DV Air DV	L ا		EE A	S		
		Sam_	rah		SE			On Bottle On Cooler
			4.		to to	H		Intact 🕢 N
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Collection Date Time	MATRIX	2					Signature N Match N
TWN-5	8.27.09 8640	1-w	X					▶
2 TWN-6	1 0657	/	X					
3 TWN-7	0625	ζ	X					
* TINN- 8) 0706		X					NSI I
5 TWW-9	0727	(X					
6 Th(h(-11)	8.27-09 0715	Iw	X					LO L
7	001-101.0							177.00
8					-+-+-			
9								
10	1000							609081076
Custody Relingershed by (print):	Date/Time: 1050	16-	ature:	Received by (print):		Date/Time	6	Signature:
Record Relinquished by (print):	Date/Time:	Signa	ture:	Received by (print):		Date/Time		Signature:
MUST be		/	10	Received by Laborate	ory: ,	Date/Time	STA -	Signature:
Signed Sample Disposal: F	Return to Client:	Lab Dispo	sal:	Andrey	1		768709 9	301

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis represented. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc Workorder Receipt Checklist





Login completed by: Kimberly Humiston		Date and Time F	Received: 8/28/2009 9:30 AM
Reviewed by:		Rec	eived by: al
Reviewed Date:		Carr	ier name: Next Day Air
Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present
Custody seals intact on shipping container/cooler?	Yes 🗸	No 📋	Not Present
Custody seals intact on sample bottles?	Yes	No 🗌	Not Present
Chain of custody present?	Yes 🗸	No 🗌	
Chain of custody signed when relinquished and received?	Yes Z	No 🗔	

Chain of custody present?	Yes 🗸	No 🗌	
Chain of custody signed when relinquished and received?	Yes 🗸	No 🗌	
Chain of custody agrees with sample labels?	Yes 🗸	No 🗌	
Samples in proper container/bottle?	Yes 🗸	No 🗌	
Sample containers intact?	Yes 🗹	No 🗌	
Sufficient sample volume for indicated test?	Yes 🗸	No 🗌	
All samples received within holding time?	Yes 🗸	No 🗌	
Container/Temp Blank temperature:	4°C On Ice		
Water - VOA vials have zero headspace?	Yes 🗌	No 🗌	No VOA vials submitted
Water - pH acceptable upon receipt?	Yes 🗹	No 🗌	Not Applicable

Contact and Corrective Action Comments:

None

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ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

CLIENT: Denison Mines (USA) Corp

Project: Nitrate Initial

Sample Delivery Group: C09081076

Date: 31-Aug-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS

Data for PCBs, Atrazine and Simazine are reported from EPA 525.2. PCB data reported by ELI reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER:

The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER, WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT

ABORATORIES

ANALYTICAL SUMMARY REPORT

September 04, 2009

Denison Mines (USA) Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09081078

Project Name: Chloride Inv. Initial

Energy Laboratories, Inc. received the following 6 samples for Denison Mines (USA) Corp on 8/28/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09081078-00	1 TWN-5	08/27/09 06:40	08/28/09	Aqueous	Chloride
C09081078-002	2 TWN-6	08/27/09 06:57	08/28/09	Aqueous	Same As Above
C09081078-003	3 TWN-7	08/27/09 06:25	5 08/28/09	Aqueous	Same As Above
C09081078-004	4 TWN-8	08/27/09 07:06	08/28/09	Aqueous	Same As Above
C09081078-005	5 TWN-9	08/27/09 07:27	08/28/09	Aqueous	Same As Above
C09081078-006	5 TWN-10	08/27/09 07:15	08/28/09	Aqueous	Same As Above

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Wald Stephanie D. Waldrop

Reporting Supervisor

V-K

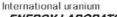


32/37

LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines (USA Chloride Inv. Initial) Corp					Report Da	ate: 09/04/09
Lab ID: Client Sample ID: Matrix:	C09081078-001 TWN-5 Aqueous							ate: 08/27/09 06:40 ed: 08/28/09
Analyses	· · · ·	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		42	mg/L		1		A4500-CI B	09/04/09 13:47 / jal
Lab ID: Client Sample ID: Matrix:	C09081078-002 TWN-6 Aqueous	,				0		tte: 08/27/09 06:57 ed: 08/28/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		32	mg/L		1	-	A4500-CI B	09/04/09 13:49 / jal
Lab ID: Client Sample ID: Matrix:	C09081078-003 TWN-7 Aqueous				ε	(te: 08/27/09 06:25 ed: 08/28/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride	e Fore o	4	mg/L		1		A4500-CI B	09/04/09 13:51 / jal
Lab ID: Client Sample ID: Matrix:	C09081078-004 TWN-8 Aqueous					C		te: 08/27/09 07:06 ad: 08/28/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		11	mg/L		1		A4500-CI B	09/04/09 13:53 / jal

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.





12:30:06 p.m. 12-22-2009 ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 335.0515 • Fax 307.234.1639 • casper@energyl m • www.energylab.com Toll Free 888.235.0515 · {

LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines (USA) Chloride Inv. Initial	Corp	5		X.		Report Da	ate: 09/04/09
Lab ID: Client Sample ID: Matrix:	C09081078-005 TWN-9 Aqueous	2 P 2		-	ł			ate: 08/27/09 07:27 ed: 08/28/09
Analyses		Result	Units	Qualifiers	RL		Method	Analysis Date / By
MAJOR IONS Chloride		169	mg/L		1		A4500-CI B	09/04/09 13:55 / jal
Lab ID: Client Sample ID: Matrix:	C09081078-006 TWN-10 Aqueous					(nte: 08/27/09 07:15 ed: 08/28/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		19	mg/L		1		A4500-CI B	09/04/09 13:58 / jal

RL - Analyte reporting limit. Report Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level. ND - Not detected at the reporting limit. LABORATORIES

Client: Denison Mines (USA) Corp

Project: Chloride Inv. Initial

Report Date: 09/04/09 Work Order: C09081078

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-CI B							Batch	: 090904B-C	L-TTR-W
Sample ID: MBLK9-090904B	Method Blank				Run: TITR	ATION_090904C		09/04	/09 13:45
Chloride	ND	mg/L	0.4						
Sample ID: C09081078-005AMS	Sample Matrix	Spike			Run: TITR	ATION_090904C		09/04	/09 14:02
Chloride	523	mg/L	1.0	100	90	110			
Sample ID: LCS35-090904B	Laboratory Cor	ntrol Sample			Run: TITR	ATION_090904C		09/04	/09 14:04
Chloride	3500	mg/L	1.0	99	90	110			
Sample ID: C09081078-005AMSD	Sample Matrix	Spike Duplicate			Run: TITR/	ATION_090904C		09/04	/09 14:15
Chloride	523	mg/L	1.0	100	90	110	0	10	

	tody and Analytical Request Rec	ord	Page of
LABORATORIES	PLEASE PRINT (Provide as much information as po		
Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
DENISON MINES	Chloride Inv. Initial	State: UT	Yes 🔲 No 🗌
Report Mail Address: Box 809	Contact Name: A Phone/Fax:	Email:	Sampler: (Please Print)
Blanding UT 84511	Kyow Palmer 678-2221		Vie Ala
Invoice Address:	Invoice Contact & Phone:	Purchase Order:	Qupte/Bottle Order:
Same	Same		Qupte/Bottle Order:
Special Report/Formats:		Contact ELI prior	to Shipped by:
		RUSH sample sul	bmittal <u>NNA</u> Cooler ID(s):
		K scheduling – See	Alina
DW EDD/EDT(Electronic Data)	a sists/S sist	Instruction Page	Bernint Temp
POTW/WWTP Format:	Number of Container. Sample Type: A W S V B C <u>Air Water Soils/Solids</u> <u>Vegetation Bioassay Oth</u> DW - Drinking Water <i>hlo.l.i.d.</i> SEE ATTACHED SEE ATTACHED	U Comments:	4 °c
State: LEVEL IV Other: NELAC	Sample Type: A Air Water of Air Water D DW - Drink DW - Drink Collice SEE ATTA		On Ice: (Y) N
		S	Custody Seal
	Sample Pove Dove Dove Dove Dove Dove Dove Dove D		On Bottle N On Cooler N
	sta	Н	Intact N
SAMPLE IDENTIFICATION Collection Collection (Name, Location, Interval, etc.) Date Time	MATRIX		Signature Anton Match
TWN-5 8:27-09 0640	1-W X		A
2 TWN-6 / 0657			
3 think - 7 1 1625			
+ TWN-8 D706			S.
5 tul-9 1522			
BAR DICT			
" TWN-10 8:27-09 0715	$-Fw\chi$		Q
			J. We
8			
9			
10			Signature:
Custody Relinquished by (print): Date/Time: 105 Becord Relinquished by (print): Parlet Becord	Signature: Received by (print):	Date/Time:	Signature:
Record Relinquished by (print): Date/Time:	Ginature: Received by (print):	Date/Time:	Signature:
MUST be	Received by,Laboratory:	Datation	Signature
Signed Sample Disposal: Return to Client:	Lab Disposal:	Date 128709 93	Durance
	arov Laboratories. Inc. may be subcontracted to other certified laborato		

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

12:30:24 p.m. 12-22-2009

Energy Laboratories Inc Workorder Receipt Checklist

Denison Mines (USA) Corp

C09081078

Login completed by: Kimberly Humiston Reviewed by:

Reviewed Date:

Date and Time Received: 8/28/2009 9:30 AM

Received by: al Carrier name: Next Day Air

Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present
Custody seals intact on shipping container/cooler?	Yes 🗸	No 🗌	Not Present
Custody seals intact on sample bottles?	Yes 📋	No 🗌	Not Present 🗹
Chain of custody present?	Yes 🗹	No 🗌	
Chain of custody signed when relinquished and received?	Yes 🗸	No 🗌	
Chain of custody agrees with sample labels?	Yes 🗸	No 🗌	
Samples in proper container/bottle?	Yes 🗸	No 🗌	
Sample containers intact?	Yes 🗹	No 🗌	
Sufficient sample volume for indicated test?	Yes 🗹	No 📋	
All samples received within holding time?	Yes 🗹	No 🗌	
Container/Temp Blank temperature:	4°C On Ice		
Water - VOA vials have zero headspace?	Yes	No 🗌	No VOA vials submitted
Water - pH acceptable upon receipt?	Yes 🗹	No 🗌	Not Applicable

Contact and Corrective Action Comments:

None

LABORATORIES

CLIENT:

4356782224

Denison Mines (USA) Corp

Project: Chloride Inv. Initial

Sample Delivery Group: C09081078

Date: 04-Sep-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS

Data for PCBs, Atrazine and Simazine are reported from EPA 525.2. PCB data reported by ELI reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER:

The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER, WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT

September Sampling Event



ANALYTICAL SUMMARY REPORT

October 06, 2009

Denison Mines USA Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09090891

Project Name: 3rd Quarter Nitrate and Chloride

Energy Laboratories, Inc. received the following 27 samples for Denison Mines USA Corp on 9/23/2009 for analysis.

C09090891-001 TWN-1R 09/21/09 07:50 09/23/09 Aqueous Chloride Nitrogen, Nitrate + Nitrite C09090891-002 TWN-2R 09/21/09 08:57 09/23/09 Aqueous Same As Above C09090891-003 TWN-3R 09/21/09 09:47 09/23/09 Aqueous Same As Above C09090891-004 TWN-4R 09/21/09 10:44 09/23/09 Aqueous Same As Above C09090891-005 TWN-5R 09/21/09 14:12 09/23/09 Aqueous Same As Above C09090891-006 TWN-6R 09/22/09 09:50 09/23/09 Aqueous Same As Above C09090891-007 TWN-7R 09/21/09 13:20 09/23/09 Aqueous Same As Above C09090891-007 TWN-8R 09/21/09 15:10 09/23/09 Aqueous Same As Above C09090891-008 TWN-8R 09/22/09 07:43 09/23/09 Aqueous Same As Above C09090891-010 TWN-1R 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-010 TWN-10R 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-011 TWN-10 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 13:21 09/23/09 Aqueous Same As Above <t< th=""><th>Sample ID</th><th>Client Sample ID</th><th>Collect Date</th><th>Receive Date</th><th>Matrix</th><th>Test</th></t<>	Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09090891-003 TWN-3R 09/21/09 09:47 09/23/09 Aqueous Same As Above C09090891-004 TWN-4R 09/21/09 10:44 09/23/09 Aqueous Same As Above C09090891-005 TWN-5R 09/21/09 14:12 09/23/09 Aqueous Same As Above C09090891-006 TWN-6R 09/22/09 09:50 09/23/09 Aqueous Same As Above C09090891-007 TWN-7R 09/21/09 13:20 09/23/09 Aqueous Same As Above C09090891-007 TWN-7R 09/21/09 15:10 09/23/09 Aqueous Same As Above C09090891-008 TWN-8R 09/22/09 07:43 09/23/09 Aqueous Same As Above C09090891-010 TWN-9R 09/22/09 08:51 09/23/09 Aqueous Same As Above C09090891-010 TWN-10R 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-011 TWN-1 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:00 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 13:10 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 13:20 09/23/09 Aqueous Same As Above C09090891-016 TWN-5	C09090891-001	TWN-1R	09/21/09 07:50	09/23/09	Aqueous	Chloride Nitrogen, Nitrate + Nitrite
C09090891-004 TWN-4R 09/21/09 10:44 09/23/09 Aqueous Same As Above C09090891-005 TWN-5R 09/21/09 14:12 09/23/09 Aqueous Same As Above C09090891-006 TWN-6R 09/22/09 09:50 09/23/09 Aqueous Same As Above C09090891-007 TWN-7R 09/21/09 13:20 09/23/09 Aqueous Same As Above C09090891-008 TWN-8R 09/22/09 07:43 09/23/09 Aqueous Same As Above C09090891-009 TWN-9R 09/22/09 07:43 09/23/09 Aqueous Same As Above C09090891-010 TWN-10R 09/22/09 08:51 09/23/09 Aqueous Same As Above C09090891-011 TWN-10R 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-011 TWN-10R 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-011 TWN-10 09/22/09 13:60 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 13:20 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 13:44 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 </td <td>C09090891-002</td> <td>TWN-2R</td> <td>09/21/09 08:57</td> <td>09/23/09</td> <td>Aqueous</td> <td>Same As Above</td>	C09090891-002	TWN-2R	09/21/09 08:57	09/23/09	Aqueous	Same As Above
C09090891-005 TWN-5R 09/21/09 14:12 09/23/09 Aqueous Same As Above C09090891-006 TWN-6R 09/22/09 09:50 09/23/09 Aqueous Same As Above C09090891-007 TWN-7R 09/21/09 13:20 09/23/09 Aqueous Same As Above C09090891-008 TWN-8R 09/21/09 15:10 09/23/09 Aqueous Same As Above C09090891-009 TWN-9R 09/22/09 07:43 09/23/09 Aqueous Same As Above C09090891-010 TWN-10R 09/22/09 08:51 09/23/09 Aqueous Same As Above C09090891-011 TWN-10R 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-011 TWN-10R 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-011 TWN-1 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:40 09/23/09 Aqueous Same As Above C09090891-016 TWN-7 <td>C09090891-003</td> <td>TWN-3R</td> <td>09/21/09 09:47</td> <td>09/23/09</td> <td>Aqueous</td> <td>Same As Above</td>	C09090891-003	TWN-3R	09/21/09 09:47	09/23/09	Aqueous	Same As Above
C09090891-006 TWN-6R 09/22/09 O9/23/09 Aqueous Same As Above C09090891-007 TWN-7R 09/21/09 13:20 09/23/09 Aqueous Same As Above C09090891-008 TWN-8R 09/21/09 15:10 09/23/09 Aqueous Same As Above C09090891-009 TWN-9R 09/22/09 07:43 09/23/09 Aqueous Same As Above C09090891-010 TWN-10R 09/22/09 08:51 09/23/09 Aqueous Same As Above C09090891-011 TWN-10R 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-011 TWN-1 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-011 TWN-2 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 13:21 09/23/09 Aqueous Same As Above <t< td=""><td>C09090891-004</td><td>TWN-4R</td><td>09/21/09 10:44</td><td>09/23/09</td><td>Aqueous</td><td>Same As Above</td></t<>	C09090891-004	TWN-4R	09/21/09 10:44	09/23/09	Aqueous	Same As Above
C09090891-007 TWN-7R 09/21/09 13:20 09/23/09 Aqueous Same As Above C09090891-008 TWN-8R 09/21/09 15:10 09/23/09 Aqueous Same As Above C09090891-009 TWN-9R 09/22/09 07:43 09/23/09 Aqueous Same As Above C09090891-010 TWN-10R 09/22/09 08:51 09/23/09 Aqueous Same As Above C09090891-010 TWN-10R 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-011 TWN-1 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-012 TWN-2 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-014 TWN-5 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-019 TWN-9	C09090891-005	TWN-5R	09/21/09 14:12	09/23/09	Aqueous	Same As Above
C09090891-008 TWN-8R 09/21/09 15:10 09/23/09 Aqueous Same As Above C09090891-009 TWN-9R 09/22/09 07:43 09/23/09 Aqueous Same As Above C09090891-010 TWN-10R 09/22/09 08:51 09/23/09 Aqueous Same As Above C09090891-011 TWN-10R 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-011 TWN-1 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-012 TWN-2 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:06 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 13:44 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:49 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-019 TWN-9	C09090891-006	TWN-6R	09/22/09 09:50	09/23/09	Aqueous	Same As Above
C09090891-009 TWN-9R 09/22/09 07:43 09/23/09 Aqueous Same As Above C09090891-010 TWN-10R 09/22/09 08:51 09/23/09 Aqueous Same As Above C09090891-011 TWN-1 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-011 TWN-1 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-012 TWN-2 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:06 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 13:44 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:49 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-020 TWN-10	C09090891-007	TWN-7R	09/21/09 13:20	09/23/09	Aqueous	Same As Above
C09090891-010 TWN-10R 09/22/09 08:51 09/23/09 Aqueous Same As Above C09090891-011 TWN-1 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-012 TWN-2 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 14:06 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:44 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:49 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2	C09090891-008	TWN-8R	09/21/09 15:10	09/23/09	Aqueous	Same As Above
C09090891-011 TWN-1 09/22/09 14:12 09/23/09 Aqueous Same As Above C09090891-012 TWN-2 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 14:06 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:44 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3	C09090891-009	TWN-9R	09/22/09 07:43	09/23/09	Aqueous	Same As Above
C09090891-012 TWN-2 09/22/09 13:56 09/23/09 Aqueous Same As Above C09090891-013 TWN-3 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 14:06 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:44 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:49 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3	C09090891-010	TWN-10R	09/22/09 08:51	09/23/09	Aqueous	Same As Above
C09090891-013 TWN-3 09/22/09 14:01 09/23/09 Aqueous Same As Above C09090891-014 TWN-4 09/22/09 14:06 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:44 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:49 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-011	TWN-1	09/22/09 14:12	09/23/09	Aqueous	Same As Above
C09090891-014 TWN-4 09/22/09 14:06 09/23/09 Aqueous Same As Above C09090891-015 TWN-5 09/22/09 13:44 09/23/09 Aqueous Same As Above C09090891-015 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:49 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-012	TWN-2	09/22/09 13:56	09/23/09	Aqueous	Same As Above
C09090891-015 TWN-5 09/22/09 13:44 09/23/09 Aqueous Same As Above C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:49 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-013	TWN-3	09/22/09 14:01	09/23/09	Aqueous	Same As Above
C09090891-016 TWN-6 09/22/09 13:21 09/23/09 Aqueous Same As Above C09090891-017 TWN-7 09/22/09 13:49 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:24 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-014	TWN-4	09/22/09 14:06	09/23/09	Aqueous	Same As Above
C09090891-017 TWN-7 09/22/09 13:49 09/23/09 Aqueous Same As Above C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-015	TWN-5	09/22/09 13:44	09/23/09	Aqueous	Same As Above
C09090891-018 TWN-8 09/22/09 13:17 09/23/09 Aqueous Same As Above C09090891-019 TWN-9 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-016	TWN-6	09/22/09 13:21	09/23/09	Aqueous	Same As Above
C09090891-019 TWN-9 09/22/09 13:34 09/23/09 Aqueous Same As Above C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-022 Piez 3 09/22/09 11:50 09/23/09 Aqueous Same As Above	C09090891-017	TWN-7	09/22/09 13:49	09/23/09	Aqueous	Same As Above
C09090891-020 TWN-10 09/22/09 13:28 09/23/09 Aqueous Same As Above C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-018	TWN-8	09/22/09 13:17	09/23/09	Aqueous	Same As Above
C09090891-021 Piez 1 09/22/09 11:10 09/23/09 Aqueous Same As Above C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-019	TWN-9	09/22/09 13:34	09/23/09	Aqueous	Same As Above
C09090891-022 Piez 2 09/22/09 11:50 09/23/09 Aqueous Same As Above C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-020	TWN-10	09/22/09 13:28	09/23/09	Aqueous	Same As Above
C09090891-023 Piez 3 09/22/09 12:05 09/23/09 Aqueous Same As Above	C09090891-021	Piez 1	09/22/09 11:10	09/23/09	Aqueous	Same As Above
	C09090891-022	Piez 2	09/22/09 11:50	09/23/09	Aqueous	Same As Above
C09090891-024 WLPU 09/22/09 10:55 09/23/09 Aqueous Same As Above	C09090891-023	Piez 3	09/22/09 12:05	09/23/09	Aqueous	Same As Above
	C09090891-024	WLPU	09/22/09 10:55	09/23/09	Aqueous	Same As Above



ANALYTICAL SUMMARY REPORT

C09090891-025 TWN-6D	09/22/09 13:21 09/23/09	Aqueous	Same As Above	
C09090891-026 TWN-0	09/22/09 08:20 09/23/09	Aqueous	Same As Above	
C09090891-027 Temp Blank	09/23/09	Aqueous	Temperature	

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Stephanie D. Waldy Stephanie D. Waldrop Reporting Supervisor



Client: Site Name:	Denison Mines USA 3rd Quarter Nitrate a	and Second second	e				Report Da	te: 10/06/09
Lab ID: Client Sample ID: Matrix:	C09090891-001 TWN-1R Aqueous			a a fail a sha		C	Collection Da	te: 09/21/09 07:50 ed: 09/23/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		ND	mg/L		1		A4500-CI B	10/02/09 14:07 / jal
Nitrogen, Nitrate+Nitri	ite as N	ND	mg/L		0.1		E353.2	10/05/09 13:18 / jal
Lab ID:	C09090891-002							te: 09/21/09 08:57
Client Sample ID:	TWN-2R						DateReceive	d: 09/23/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		ND	mg/L		1		A4500-CI B	10/02/09 14:15 / jal
Nitrogen, Nitrate+Nitri	ite as N	ND	mg/L		0.1		E353.2	10/05/09 13:20 / jal
Lab ID:	C09090891-003					· · ·	ollection Da	te: 09/21/09 09:47
Lab ID: Client Sample ID:						, c	DateReceive	
						,		
Client Sample ID: Matrix:	TWN-3R	Result	Units	Qualifiers	RL			
Client Sample ID: Matrix: Analyses	TWN-3R	Result	Units	Qualifiers	RL	MCL/	DateReceive	d: 09/23/09
Client Sample ID: Matrix: Analyses MAJOR IONS	TWN-3R	Result	Units mg/L	Qualifiers	RL 1	MCL/	DateReceive	nd: 09/23/09 Analysis Date / By 10/02/09 14:19 / jal
Client Sample ID: Matrix: Analyses MAJOR IONS Chloride	TWN-3R Aqueous			Qualifiers		MCL/	DateReceive Method	nd: 09/23/09 Analysis Date / By
Client Sample ID:	TWN-3R Aqueous Ite as N C09090891-004	1	mg/L	Qualifiers	1	MCL/ QCL	DateReceive Method A4500-Cl B E353.2	Analysis Date / By 10/02/09 14:19 / jal 10/05/09 13:23 / jal te: 09/21/09 10:44
Client Sample ID: Matrix: Analyses MAJOR IONS Chloride Nitrogen, Nitrate+Nitri Lab ID: Client Sample ID:	TWN-3R Aqueous Ite as N C09090891-004	1	mg/L	Qualifiers	1	MCL/ QCL	DateReceive Method A4500-Cl B E353.2	Analysis Date / By 10/02/09 14:19 / jal 10/05/09 13:23 / jal te: 09/21/09 10:44
Client Sample ID: Matrix: Analyses MAJOR IONS Chloride Nitrogen, Nitrate+Nitri	TWN-3R Aqueous Ite as N C09090891-004 TWN-4R	1	mg/L	Qualifiers	1	MCL/ QCL	DateReceive Method A4500-Cl B E353.2	Analysis Date / By 10/02/09 14:19 / jal 10/05/09 13:23 / jal te: 09/21/09 10:44 ad: 09/23/09
Client Sample ID: Matrix: Analyses MAJOR IONS Chloride Nitrogen, Nitrate+Nitri Lab ID: Client Sample ID: Matrix:	TWN-3R Aqueous Ite as N C09090891-004 TWN-4R	1 ND	mg/L mg/L		1 0.1	MCL/ QCL (MCL/	DateReceive Method A4500-Cl B E353.2 Collection Da DateReceive	Analysis Date / By 10/02/09 14:19 / jal 10/05/09 13:23 / jal te: 09/21/09 10:44 ad: 09/23/09
Client Sample ID: Matrix: Analyses MAJOR IONS Chloride Nitrogen, Nitrate+Nitri Lab ID: Client Sample ID: Matrix: Analyses	TWN-3R Aqueous Ite as N C09090891-004 TWN-4R	1 ND	mg/L mg/L		1 0.1	MCL/ QCL (MCL/	DateReceive Method A4500-Cl B E353.2 Collection Da DateReceive	Analysis Date / By 10/02/09 14:19 / jal 10/05/09 13:23 / jal te: 09/21/09 10:44

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level.



Client: Site Name:	Denison Mines USA 3rd Quarter Nitrate a		Ð				Report Da	te: 10/06/09
Lab ID: Client Sample ID: Matrix:	C09090891-005 TWN-5R Aqueous					C		te: 09/21/09 14:12 ed: 09/23/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		2	mg/L		1		A4500-CI B	10/02/09 15:35 / jal
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	10/05/09 13:35 / jal
Lab ID:	C09090891-006					(Collection Da	te: 09/22/09 09:50
Client Sample ID:							DateReceive	ed: 09/23/09
Matrix:	Aqueous						()	
Analyses		Result	Units	Qualifiers	RL	QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		ND	mg/L		1		A4500-CI B	10/02/09 15:38 / jal
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	10/05/09 13:38 / jal
Lab ID:	C09090891-007					0	Collection Da	te: 09/21/09 13:20
Client Sample ID:	TWN-7R						DateReceive	ed: 09/23/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		1	mg/L		1		A4500-CI B	10/02/09 15:41 / jal
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	10/05/09 13:40 / jal
Lab ID:	C09090891-008					(Collection Da	te: 09/21/09 15:10
Client Sample ID: Matrix:	TWN-8R Aqueous						DateReceive	ed: 09/23/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
								· ····································
MAJOR IONS Chloride		1	mg/L		1		A4500-CI B	10/02/09 15:44 / jal

Report RL - Analyte reporting limit. Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.



0891-009 R Js 0891-010 0R Js	Result ND ND Result ND	Units mg/L mg/L Units mg/L mg/L	Qualifiers Qualifiers	RL 1 0.1 RL	MCL/ QCL	DateReceive Method A4500-Cl B E353.2 Collection DateReceive Method	Analysis Date / By 10/02/09 15:59 / jal 10/05/09 13:45 / jal te: 09/22/09 08:51 ed: 09/23/09 Analysis Date / By
0R	ND ND Result	mg/L mg/L Units mg/L		1 0.1 RL	QCL C	A4500-CI B E353.2 Collection Date DateReceive	10/02/09 15:59 / jal 10/05/09 13:45 / jal te: 09/22/09 08:51 ed: 09/23/09 Analysis Date / By
0R	ND Result ND	mg/L Units mg/L	Qualifiers	0.1 RL	MCL/	E353.2 Collection Date DateReceive	10/05/09 13:45 / jal te: 09/22/09 08:51 ed: 09/23/09 Analysis Date / By
0R	ND Result ND	mg/L Units mg/L	Qualifiers	0.1 RL	MCL/	E353.2 Collection Date DateReceive	10/05/09 13:45 / jal te: 09/22/09 08:51 ed: 09/23/09 Analysis Date / By
0R	Result	Units mg/L	Qualifiers	RL	MCL/	Collection Date DateReceive Method	te: 09/22/09 08:51 ed: 09/23/09 Analysis Date / By
0R	ND	mg/L	Qualifiers		MCL/	DateReceive Method	d: 09/23/09 Analysis Date / By
	ND	mg/L	Qualifiers			Method	Analysis Date / By
	ND	mg/L	Qualifiers				
	ND	mg/L	Qualifiers		QCL		
		-		1			
		-		1		A 4500 OL 5	10/00/00 10 00 11 1
	ND	ma/L				A4500-CI B	10/02/09 16:02 / jal
				0.1		E353.2	10/05/09 13:55 / jal
0891-011					c	Collection Da	te: 09/22/09 14:12
						DateReceive	ed: 09/23/09
JS							
	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
	19						10/02/09 16:15 / jal
	0.4	mg/L		0.1		E353.2	10/05/09 13:57 / jal
0891-012					(Collection Da	te: 09/22/09 13:56
						DateReceive	ed: 09/23/09
ıs							
	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
	17	mg/L		1		A4500-CI B	10/02/09 16:16 / jal
	22.6	mg/L	D	0.3		E353.2	10/05/09 14:00 / jal
	JS 0891-012 JS	Result 19 0.4 0891-012 JS Result 17	Result Units 19 mg/L 0.4 mg/L 0891-012 JS Result Units 17 mg/L	Result Units Qualifiers 19 mg/L 0.4 mg/L 0891-012 Js Result 17 mg/L	Result Units Qualifiers RL 19 mg/L 1 0.4 mg/L 0.1 0891-012	Result Units Qualifiers RL MCL/ QCL 19 mg/L 1 0.4 mg/L 0.1 0891-012 0.1 Us 1 Result Units Qualifiers 17 mg/L 1	Result Units Qualifiers RL MCL/ QCL Method 19 mg/L 1 A4500-Cl B 0.4 mg/L 0.1 E353.2 0891-012 Collection Da Js Result Units Qualifiers RL MCL/ QCL Method 17 mg/L 1 A4500-Cl B

RL - Analyte reporting limit. Report

Definitions: QCL - Quality control limit. MCL - Maximum contaminant level.

D - RL increased due to sample matrix interference.



	a for a contra	9				Report Da	te: 10/06/09
C09090891-013 TWN-3 Aqueous					C		te: 09/22/09 14:01 d: 09/23/09
	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
ite as N	99 27.1	mg/L mg/L	D	1 0.3		A4500-CI B E353.2	10/02/09 16:27 / jal 10/05/09 14:02 / jal
C09090891-014 TWN-4 Aqueous					(te: 09/22/09 14:06 d: 09/23/09
	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
ite as N	13 0.4	mg/L mg/L		1 0.1		A4500-CI B E353.2	10/02/09 16:37 / jal 10/05/09 14:05 / jal
C09090891-015 TWN-5 Aqueous					(and the same that	te: 09/22/09 13:44 d: 09/23/09
	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
ite as N	45 0.5	mg/L mg/L		1 0.1		A4500-CI B E353.2	10/05/09 13:35 / jal 10/05/09 14:15 / jal
C09090891-016 TWN-6 Aqueous					(te: 09/22/09 13:21 ed: 09/23/09
	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
ite as N	23 1.6	mg/L mg/L		1 0.1		A4500-CI B E353.2	10/05/09 13:38 / jal 10/05/09 14:17 / jal
	3rd Quarter Nitrate a C09090891-013 TWN-3 Aqueous ite as N C09090891-014 TWN-4 Aqueous ite as N C09090891-015 TWN-5 Aqueous ite as N C09090891-015 TWN-5 Aqueous Aqueous	C09090891-013 Result Aqueous 99 ite as N 27.1 C09090891-014 Result TWN-4 Aqueous Aqueous Result Ite as N 0.4 C09090891-015 Result Ite as N 0.4 C09090891-015 Result Ite as N 0.4 C09090891-015 Second TWN-5 Aqueous Result 45 Ite as N 0.5 C09090891-016 Result Result 45 Ite as N 0.5	3rd Quarter Nitrate and Chloride C09090891-013 TWN-3 Aqueous Result Units ite as N 99 mg/L 27.1 mg/L C09090891-014 rww4 TWN-4 Queous Result Units Result Units Ite as N 0.4 mg/L C09090891-015 rww5 Aqueous Result Units C09090891-015 rww5 rmg/L Ite as N 0.4 mg/L C09090891-015 rmg/L rmg/L C09090891-015 rmg/L rmg/L Ite as N 0.5 mg/L Ite as N 0.5 mg/L C09090891-016 rww6 rmg/L C09090891-016 rwww6 rwww6 Result Units rmg/L	3rd Quarter Nitrate and Chloride C09090891-013 TWN-3 Qualifiers Aqueous 99 rng/L D ite as N 27.1 mg/L D C09090891-014 TWN-4 Aqueous Qualifiers Result Units Qualifiers C09090891-014 TWN-4 Aqueous Qualifiers Ite as N 0.4 mg/L Cualifiers C09090891-015 TWN-5 Qualifiers Qualifiers Result Units Quali	3rd Quarter Nitrate and Chloride C09090891-013 TWN-3 Aqueous Qualifiers RL Aqueous 99 mg/L D 1 ite as N 27.1 mg/L D 1 C09090891-014 TWN-4 Aqueous Result Units Qualifiers RL C09090891-014 TWN-4 Aqueous 13 mg/L 1 0.1 C09090891-014 TWN-4 Aqueous 13 mg/L 1 0.1 C09090891-015 TWN-5 Aqueous 1 0.1 C09090891-015 TWN-5 Mg/L 1 0.1 C09090891-015 TWN-5 Mg/L 1 0.1 C09090891-015 TWN-5 mg/L 1 0.1 C09090891-016 TWN-6 Mg/L 1 0.1 C09090891-016 TWN-6 Aqueous RL 1 23 mg/L 1 1 1	3rd Quarter Nitrate and Chloride C09090891-013 TWN-3 Aqueous Result Units Qualifiers RL MCL/ QCL he as N 99 27.1 mg/L mg/L D 1 0.3 CO C09090891-014 TWN-4 Aqueous Result Units Qualifiers RL MCL/ QCL he as N 13 0.4 mg/L mg/L 1 0.1 MCL/ QCL C09090891-015 TWN-5 Aqueous Result Units Qualifiers RL MCL/ QCL Ite as N 0.5 mg/L 1 0.1 0 <t< td=""><td>3rd Quarter Nitrate and Chloride Report Dai C09090891-013 TWN-3 Aqueous Collection Dai Result Units Qualifiers RL MCL/ QCL Method ite as N 27.1 mg/L D 1 A4500-Cl B C09090891-014 TWN-4 Aqueous Collection Dai D D 0.3 Edition Dai C09090891-014 TWN-4 Aqueous Vinits Qualifiers RL MCL/ QCL Method Result Units Qualifiers RL MCL/ QCL Method Ite as N 0.4 mg/L 1 A4500-Cl B Ite as N 0.4 mg/L 0.1 Edition Dai C09090891-015 TWN-5 Aqueous 0.4 mg/L 1 A4500-Cl B Ite as N 0.5 mg/L 1 A4500-Cl B Ite as N 0.5 mg/L 1 A4500-Cl B C09090891-016 TWN-6 Aqueous S mg/L 1 A4500-Cl B C09090891-016 Collection Dai DateReceive Aqueous DateReceive Acueous MCL/ QCL Method 23 mg/L 1 <td< td=""></td<></td></t<>	3rd Quarter Nitrate and Chloride Report Dai C09090891-013 TWN-3 Aqueous Collection Dai Result Units Qualifiers RL MCL/ QCL Method ite as N 27.1 mg/L D 1 A4500-Cl B C09090891-014 TWN-4 Aqueous Collection Dai D D 0.3 Edition Dai C09090891-014 TWN-4 Aqueous Vinits Qualifiers RL MCL/ QCL Method Result Units Qualifiers RL MCL/ QCL Method Ite as N 0.4 mg/L 1 A4500-Cl B Ite as N 0.4 mg/L 0.1 Edition Dai C09090891-015 TWN-5 Aqueous 0.4 mg/L 1 A4500-Cl B Ite as N 0.5 mg/L 1 A4500-Cl B Ite as N 0.5 mg/L 1 A4500-Cl B C09090891-016 TWN-6 Aqueous S mg/L 1 A4500-Cl B C09090891-016 Collection Dai DateReceive Aqueous DateReceive Acueous MCL/ QCL Method 23 mg/L 1 <td< td=""></td<>

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

D - RL increased due to sample matrix interference.



Client: Site Name:	Denison Mines USA 3rd Quarter Nitrate a	1. Stranger and	9				Report Dat	te: 10/06/09
Lab ID: Client Sample ID: Matrix:	C09090891-017 TWN-7 Aqueous				A CONTRACTOR OF CONTRACTOR	C	Collection Date DateReceive	te: 09/22/09 13:49 d: 09/23/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		7	mg/L		1		A4500-CI B	10/05/09 13:41 / jal
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	10/05/09 14:20 / jal
Lab ID:	C09090891-018		1			c	Collection Dat	te: 09/22/09 13:17
Client Sample ID:	TWN-8						DateReceive	d: 09/23/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / B
MAJOR IONS								
Chloride		12	mg/L		1		A4500-CI B	10/05/09 13:45 / jal
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	10/05/09 14:22 / jal
Lab ID:	C09090891-019							te: 09/22/09 13:34
Client Sample ID:	TWN-9						DateReceive	d: 09/23/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		201	mg/L		1		A4500-CI B	10/05/09 14:01 / jal
Nitrogen, Nitrate+Nitr	rite as N	8.9	mg/L		0.2		E353.2	10/05/09 14:25 / jal
						(Collection Da	te: 09/22/09 13:28
	C09090891-020							
Client Sample ID:							DateReceive	d: 09/23/09
Lab ID: Client Sample ID: Matrix: Analyses	TWN-10	Result	Units	Qualifiers	RL	MCL/ QCL	DateReceive	d: 09/23/09 Analysis Date / B
Client Sample ID: Matrix: Analyses	TWN-10	Result	Units	Qualifiers	RL			
Client Sample ID: Matrix:	TWN-10	Result 35	Units mg/L	Qualifiers	RL 1			

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level.



Client: Site Name:	Denison Mines USA 3rd Quarter Nitrate a	starter at the	Э				Report Da	te: 10/06/09
Lab ID: Client Sample ID: Matrix:	C09090891-021 Piez 1 Aqueous					C	Collection Da	te: 09/22/09 11:10 ed: 09/23/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		78	mg/L		1		A4500-CI B	10/05/09 14:14 / jal
Nitrogen, Nitrate+Nitr	ite as N	7.3	mg/L		0.2		E353.2	10/05/09 14:35 / jal
Lab ID:	C09090891-022						Collection Da	te: 09/22/09 11:50
Client Sample ID:							DateReceive	ed: 09/23/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		17	mg/L		1		A4500-CI B	10/05/09 14:26 / jal
Nitrogen, Nitrate+Nitr	ite as N	0.5	mg/L		0.1		E353.2	10/05/09 14:37 / jal
Lab ID:	C09090891-023					0	collection Da	te: 09/22/09 12:05
Client Sample ID:	Piez 3						DateReceive	ed: 09/23/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		24	mg/L		1		A4500-CI B	10/05/09 14:41 / jal
Nitrogen, Nitrate+Nitr	ite as N	0.9	mg/L		0.1		E353.2	10/05/09 14:40 / jal
Lab ID:	C09090891-024					(te: 09/22/09 10:55
Client Sample ID:							DateReceive	ad: 09/23/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
MAJOR IONS Chloride Nitrogen, Nitrate+Nitr		5	mg/L mg/L		1 0.1		A4500-CI B	10/05/09 14:54 / jal

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level.



Client: Site Name:	Denison Mines USA 3rd Quarter Nitrate a		е				Report Da	te: 10/06/09
Lab ID: Client Sample ID: Matrix:	C09090891-025 TWN-6D Aqueous					C	Collection Da	te: 09/22/09 13:21 ed: 09/23/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride Nitrogen, Nitrate+Nitr	ite as N	22 1.6	mg/L mg/L		1 0.1		A4500-CI B E353.2	10/05/09 14:57 / jal 10/05/09 14:52 / jal
Lab ID:	C09090891-026					C		te: 09/22/09 08:20
Client Sample ID: Matrix:	Aqueous						DateReceive	ed: 09/23/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride Nitrogen, Nitrate+Nitr	ite as N	2 ND	mg/L mg/L		1 0.1		A4500-CI B E353.2	10/05/09 15:02 / jal 10/05/09 14:55 / jal
Lab ID: Client Sample ID: Matrix:	C09090891-027 Temp Blank Aqueous					C	Collection Da	te: Not Provided ad: 09/23/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPE	ERTIES							
Temperature		4.0	°C				E170.1	09/23/09 14:30 / kbh



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: 3rd Quarter Nitrate and Chloride

Report Date: 10/06/09 Work Order: C09090891

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	A4500-CI B								Batch	: 091002A-C	L-TTR-W
Sample ID:	MBLK9-091002A	Me	thod Blank				Run: TITRA	TION_091002A		10/02/	/09 10:58
Chloride			ND	mg/L	0.4						
Sample ID:	C09090875-002AMS	Sa	mple Matrix	Spike			Run: TITRA	TION_091002A		10/02/	/09 11:40
Chloride			34.7	mg/L	1.0	96	90	110			
Sample ID:	C09090875-002AMSD) Sa	mple Matrix	Spike Duplicate			Run: TITRA	TION_091002A		10/02	/09 11:41
Chloride			34.0	mg/L	1.0	94	90	110	2	10	
Sample ID:	LCS35-091002A	La	boratory Cor	trol Sample			Run: TITRA	TION_091002A		10/02	/09 15:08
Chloride			3540	mg/L	1.0	100	90	110			
Sample ID:	C09090981-014BMS	Sa	mple Matrix	Spike			Run: TITRA	TION_091002A		10/02	/09 17:08
Chloride			96.2	mg/L	1.0	108	90	110			
Sample ID:	C09090981-014BMSE) Sa	mple Matrix	Spike Duplicate			Run: TITRA	TION_091002A		10/02	/09 17:08
Chloride			91.9	mg/L	1.0	104	90	110	4.5	10	
Method:	A4500-CI B								Batch	n: 091005A-C	L-TTR-W
Sample ID:	MBLK9-091005A	Me	thod Blank				Run: TITRA	TION_091005C		10/05/	/09 12:38
Chloride			ND	mg/L	0.4						
Sample ID:	C09090891-022BMS	Sa	mple Matrix	Spike			Run: TITRA	TION_091005C		10/05	/09 14:37
Chloride			99.8	mg/L	1.0	94	90	110			
Sample ID:	C09090891-022BMSD) Sa	mple Matrix	Spike Duplicate			Run: TITRA	TION_091005C		10/05	/09 14:37
Chloride			99.8	mg/L	1.0	94	90	110	0	10	
Sample ID:	LCS35-091005A	La	boratory Cor	trol Sample			Run: TITRA	TION_091005C		10/05	/09 16:10
Chloride			3780	mg/L	1.0	107	90	110			



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: 3rd Quarter Nitrate and Chloride

Report Date: 10/06/09 Work Order: C09090891

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Batch:	R124617
Sample ID: MBLK-1	Me	thod Blank				Run: TECH	NICON_091005A		10/05	/09 11:08
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.03						
Sample ID: LCS-2	Lat	poratory Cor	ntrol Sample			Run: TECH	NICON_091005A		10/05	/09 11:10
Nitrogen, Nitrate+Nitrite as N		2.57	mg/L	0.10	103	90	110			
Sample ID: C09090891-004AMS	Sa	mple Matrix	Spike			Run: TECH	NICON_091005A		10/05	/09 13:28
Nitrogen, Nitrate+Nitrite as N		2.13	mg/L	0.10	103	90	110			
Sample ID: C09090891-004AMSE) Sa	mple Matrix	Spike Duplicate			Run: TECH	INICON_091005A		10/05	/09 13:30
Nitrogen, Nitrate+Nitrite as N		2.16	mg/L	0.10	105	90	110	1.4	10	
Sample ID: C09090891-014AMS	Sa	mple Matrix	Spike			Run: TECH	NICON_091005A		10/05	/09 14:07
Nitrogen, Nitrate+Nitrite as N		2.47	mg/L	0.10	102	90	110			
Sample ID: C09090891-014AMSC) Sa	mple Matrix	Spike Duplicate			Run: TECH	NICON_091005A		10/05	/09 14:10
Nitrogen, Nitrate+Nitrite as N		2.46	mg/L	0.10	101	90	110	0.4	10	
Sample ID: C09090891-024AMS	Sa	mple Matrix	Spike			Run: TECH	NICON_091005A		10/05	/09 14:45
Nitrogen, Nitrate+Nitrite as N		2.01	mg/L	0.10	100	90	110			
Sample ID: C09090891-024AMSE) Sa	mple Matrix	Spike Duplicate			Run: TECH	NICON_091005A		10/05	/09 14:47
Nitrogen, Nitrate+Nitrite as N		1.99	mg/L	0.10	100	90	110	1	10	

	stody and Analytic	al Request Rec	ord	Pageof
LABORATORIES Company Name:	PLEASE PRINT (Provide Project, Name, PWS, Permit, Et	as much information as p	ossible.) Sample Origin	
			State: 11-	EPA/State Compliance: Yes No
Report Mail Address:		prote \$ Chloride	Email:	Sampler: (Please Print)
po Bax 809		JIIe/Fax.		Sampier. (Please Print)
Blanding WT 84511	Kyun Vislover 67	1555-8		Tunner H.
Invoice Address:	Invoice Contact & Phone:		Purchase Order:	Quote/Bottle Order:
Same	Same			
Special Report/Formats:	ANALYSIS	REQUESTED	Contact ELI prio	
	ther 00		RUSH sample s for charges and	Cooler ID(s):
	ag Old	(TAT)	R scheduling – Se Instruction Page	e allat
DW EDD/EDT(Electronic Data	Number of Containers Sample Type: A W S V B 0 DV Air Water Solis/Solids Vegetation Bioassay Other DW - Drinking Water	ACHED	Comments:	Receipt Temp
POTW/WWTP Format: State: LEVEL IV		ATTACH	U Comments:	4 °c
State: LEVEL IV Other: NELAC	/- D	ATT		On Ice: (Y N
				Custody Seal On Bottle
	Sar	Standard		On Bottle V N On Cooler N
SAMPLE IDENTIFICATION Collection Collection	2 2		н	Intact N Signature N
(Name, Location, Interval, etc.) Date Time				Match
TWN-1R 9.21.09 07.50	2-WXX			
2TWN-2R 9.21.09 0857				\$ 009090891
JWN-3R 9.21.09 0947				
TWN-4R 9.21.09 1044				NS (
* TWN-5R 9.21.09 1412	XX			2
6 1.0 0.00.0000				
				11/0
TWN-7R 9.21.09 1320				
TWN-8R 9.21-09 1510	XX			<u>Ö</u>
* JWN-9R 9.22.09 0743	Xx			
10 TWN - 10 Performent 9.22.09 0851	2-WXX	Persolicial bu (mint)	Data/Time:	
Custody James Hill 9.78.19 142	gnature: 11 AA	Received by (print):	Date/Time:	Signature:
Record Relinquished by (print): Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Signed Sample Disposal: Return to Client:	N 6 201 0	Received by Laboratory:	Date/Time: CIT23104 14-	Signature:
Signed Sample Disposal: Return to Client:	Lab Disposal:	Francia	LID 1021 14	SU ////

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

ENERGY Chain of Cus	tody an	d Analytic	al Request F	Record		Page 2 of 3
	PLEASE F	PRINT (Provide a	as much information	as possible.)	
Company Name:	Project Nam	pe, PWS, Permit, Etc.			e Origin	EPA/State Compliance:
L'ENISON TUINES		WaxTER Nite	ate \$ chloride	State:	00	Yes No
Denison MinES Report Mail Address: p. O. Brax 809 Blanding WI 84511	Contact Nar Ryan	Λ.	78 2721	Email:		Sampler: (Please Print)
Invoice Address:	Invoice Con	tact & Phone:		Purch	ase Order:	Quote/Bottle Order:
Sam	San	ىر				
Special Report/Formats:	-	AMAI VRIG F	REQUESTED		Contact ELI prior	to thoped by:
DW EDD/EDT(Electronic Data)	trainers S V B O DW /Solids say <u>O</u> ther Nater			(ITAT) R	RUSH sample su for charges and scheduling – See Instruction Page	Cdoler MD(s):
POTW/WWTP Format:	e: AW ter Soils on Bioas			U around	Comments:	Receipt Temp
State: LEVEL IV Other: NELAC	Number of Containers Sample Type: A W S V B O DW Åir Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water	Nishak Chlaridu		C andard		On Ice: Y N Custody Seal On Bottle On Cooler N Intact Y N
SAMPLE IDENTIFICATION Collection Collection (Name, Location, Interval, etc.) Date Time	MATRIX	Chl		α Η		Signature Match
TWV-1 9.22-09 1412	2-W	XX				
2 TWN-2 9.22.69 1356	1	XX				20909089
3 TWN-3 9.22.09 1401		XX				
TWN-4 9.22.09 1406		XX				
5 TWN-5 9.22-09 1344		XX				1 Al
"TWN-6 9.22.09 1321		XX				<u>40</u>
TWN-7 9.22.09 1349		XX				AT
* TWN-6 9.22.09 1321 * TWN-7 9.22.09 1349 * TWN-8 9.22.09 1349		××				NO
"TWN-9 9.22-09 1334		XX				AB(
10 TINN-10 9.22.09 1328	2-00	XX				
Custody Relinguished by (print); Date/ lime:	Signa		Received by (print):	Date/Time:		Signature:
Record Relinquished by (print): 9:23:09 1430	Signa	ature:	Received by (print):	Date/Time:		Signature:
Signed Sample Disposal: Return to Client:	Lab Dispos	sal:	Received by Laboratory:	G 23	3/09/143	Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis reduested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

ENERGY Chain of Cus	tody and Analytic	al Request Rec	ord	Page of
LABORATORIES	PLEASE PRINT (Provide	as much information as p	ossible.)	
Company Name:	Project Name, PWS, Permit, Etc	2.	Sample Origin	EPA/State Compliance:
Denison Mines	3rd Quarrer Nitra	te \$ Chloride	State: UT	Yes No
Report Mail Address:	Contact Name: Pho	ne/Fax:	Email:	Sampler: (Please Print)
P.O. Box 809		678 2221		5. 11
Invoice Address:	Invoice Contact & Phone:	610 000	Purchase Order:	Junner H. Quote/Bottle Order:
	0			
Spacial Dapart/Earmata:	Jame		Contact ELI prio	Shipped by:
Special Report/Formats:	ANALYSIS	REQUESTED	RUSH sample s	ubmittal Hand
	Number of Containers Sample Type: A W S V B 0 DV Air Water Solis/Solids Vegetation Bioassay Other DW - Drinking Water	Ê	R for charges and scheduling – Se	Cooler ID(s):
	Soli Soli	LA ED	Instruction Page	
DW EDD/EDT(Electronic Data) POTW/WWTP Format:	Con ng V so	SEE ATTACHED	Commonto	Receipt Temp
State: LEVEL IV		TA	U Comments.	<u> </u>
Other: NELAC	- Diates			On Ice: Y N
		SEE	S	Custody Seal On Bottle X
	San San	S E S E		On Cooler (Y) N
SAMPLE IDENTIFICATION Collection Collection	2 3	Ste	H	Intact
(Name, Location, Interval, etc.) Date Time				Signature Match
Diez 1 9.22.09 4050 1110	2-W X X			
² Piez 2 9.22.09 Perm 1150) / X X			2 CUGOGOSAN
3 Piez 3 9.22.09 1205				
"WLPU 9.22.09 055	5 X X			JS.
* TWN-6D 9.22.09 1.32	XX			
"TWN- () 9.22.09 0820	2WXX			OPP.
-2 Temp blanks per container top				TAT
TEMP BLANK.				90
9				<u>M</u>
10				L J
Custody Relinquished by (print): Date/Time:	Signature: // / A. /	Received by (print):	Date/Time:	Signature:
Record Relinquished by (print): Date/Time:	Dance Holliday	Received by (print):	Date/Time:	Signature:
MUST be		Received by Laboratory:	Date Time:	30 ignature:
Signed Sample Disposal: Return to Client:	Lab Disposal:		Mastod In	D C

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis reduested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc Workorder Receipt Checklist

Denison Mines USA Corp





Date and Time Received: 9/23/2009 2:30 PM Received by: al

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present	
Custody seals intact on shipping container/cooler?	Yes 🗸	No 🗌	Not Present	
Custody seals intact on sample bottles?	Yes	No 🗌	Not Present	
Chain of custody present?	Yes 🗹	No 🗌		
Chain of custody signed when relinquished and received?	Yes 🗸	No 🗌		
Chain of custody agrees with sample labels?	Yes 🗹	No 🗌		
Samples in proper container/bottle?	Yes 🗸	No 🗌		
Sample containers intact?	Yes 🗹	No 📋		
Sufficient sample volume for indicated test?	Yes 🗸	No 🗌		
All samples received within holding time?	Yes 🗹	No 🗌		
Container/Temp Blank temperature:	4°C On Ice			
Water - VOA vials have zero headspace?	Yes	No 🗌	No VOA vials submitted	
Water - pH acceptable upon receipt?	Yes 🗸	No 🗌	Not Applicable	

Contact and Corrective Action Comments:

None



CLIENT: Denison Mines USA Corp

Project: 3rd Quarter Nitrate and Chloride

Date: 06-Oct-09

CASE NARRATIVE

Sample Delivery Group: C09090891

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS

Data for PCBs, Atrazine and Simazine are reported from EPA 525.2. PCB data reported by ELI reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER:

The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER,WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT

October/November Sampling Event



ANALYTICAL SUMMARY REPORT

November 11, 2009

Denison Mines USA Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09110253

Project Name: 4th Quarter Nitrate and Chloride

Energy Laboratories, Inc. received the following 25 samples for Denison Mines USA Corp on 11/6/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09110253-001	TWN 3R	11/02/09 09:54	11/06/09	Aqueous	Chloride Nitrogen, Nitrate + Nitrite
C09110253-002	TWN 3	11/02/09 14:00	11/06/09	Aqueous	Same As Above
C09110253-003	TWN 2R	11/02/09 11:05	11/06/09	Aqueous	Same As Above
C09110253-004	TWN 2	11/02/09 11:34	11/06/09	Aqueous	Same As Above
C09110253-005	TWN 19R	11/02/09 13:20	11/06/09	Aqueous	Same As Above
C09110253-006	TWN 19	11/02/09 13:42	11/06/09	Aqueous	Same As Above
C09110253-007	TWN 18R	11/02/09 15:00	11/06/09	Aqueous	Same As Above
C09110253-008	TWN 18	11/02/09 15:33	11/06/09	Aqueous	Same As Above
C09110253-009	TWN 11R	11/03/09 08:20	11/06/09	Aqueous	Same As Above
C09110253-010	TWN 11	11/03/09 08:53	11/06/09	Aqueous	Same As Above
C09110253-011	TWN 12R	11/03/09 09:47	11/06/09	Aqueous	Same As Above
C09110253-012	TWN 12	11/03/09 10:30	11/06/09	Aqueous	Same As Above
C09110253-013	TWN 8R	11/03/09 13:10	11/06/09	Aqueous	Same As Above
C09110253-014	TWN 8	11/03/09 13:45	11/06/09	Aqueous	Same As Above
C09110253-015	TWN 6R	11/03/09 14:35	11/06/09	Aqueous	Same As Above
C09110253-016	TWN 6	11/03/09 15:02	11/06/09	Aqueous	Same As Above
C09110253-017	TWN 16R	11/04/09 07:47	11/06/09	Aqueous	Same As Above
C09110253-018	TWN 16	11/04/09 08:15	11/06/09	Aqueous	Same As Above
C09110253-019	TWN 17R	11/04/09 08:58	11/06/09	Aqueous	Same As Above
C09110253-020	TWN 17	11/04/09 09:24	11/06/09	Aqueous	Same As Above
C09110253-021	TWN 0	11/04/09 09:24	11/06/09	Aqueous	Same As Above
C09110253-022	TWN 13R	11/04/09 12:43	11/06/09	Aqueous	Same As Above
C09110253-023	TWN 13	11/04/09 13:11	11/06/09	Aqueous	Same As Above



ANALYTICAL SUMMARY REPORT

C09110253-024 TWN 14R	11/04/09 13:57 11/06/09	Aqueous	Same As Above	
C09110253-025 TWN 14	11/04/09 14:27 11/06/09	Aqueous	Same As Above	

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Stephanie D. Waldy Stephanie D. Waldrop **Reporting Supervisor**



Client: Site Name:	Denison Mines USA 4th Quarter Nitrate a		3				Report Da	te: 11/11/09
Lab ID: Client Sample ID: Matrix:	C09110253-001 TWN 3R Aqueous					C	Collection Da DateReceive	te: 11/02/09 09:54 ed: 11/06/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		3	mg/L		1		A4500-CI B	11/09/09 10:14 / Ir
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/09/09 10:54 / jal
Lab ID:	C09110253-002					(Collection Da	te: 11/02/09 14:00
Client Sample ID:	TWN 3						DateReceive	d: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		106	mg/L		1		A4500-CI B	11/09/09 10:18 / Ir
Nitrogen, Nitrate+Nitr	ite as N	29.0	mg/L	D	0.3		E353.2	11/09/09 11:11 / jal
Lab ID:	C09110253-003					(Collection Da	te: 11/02/09 11:05
Client Sample ID:	TWN 2R						DateReceive	ed: 11/06/09
Matrix:	Aqueous							
						MCL/		
Analyses		Result	Units	Qualifiers	RL	QCL	Method	Analysis Date / By
				Qualifiers		QUL		Analysis Date / By
MAJOR IONS Chloride		ND	mg/L	Qualifiers	1	QCL	A4500-CI B	Analysis Date / By 11/09/09 10:21 / Ir
MAJOR IONS Chloride	ite as N			Qualifiers		QUL		
MAJOR IONS Chloride Nitrogen, Nitrate+Nitr	ite as N C09110253-004	ND	mg/L	Qualifiers	1		A4500-CI B E353.2	11/09/09 10:21 / lr
MAJOR IONS Chloride Nitrogen, Nitrate+Nitr Lab ID:	C09110253-004	ND	mg/L	Qualifiers	1		A4500-CI B E353.2	11/09/09 10:21 / lr 11/09/09 10:59 / jal te: 11/02/09 11:34
MAJOR IONS Chloride Nitrogen, Nitrate+Nitr Lab ID: Client Sample ID:	C09110253-004	ND	mg/L	Qualifiers	1		A4500-CI B E353.2 Collection Da	11/09/09 10:21 / lr 11/09/09 10:59 / jal te: 11/02/09 11:34
MAJOR IONS Chloride Nitrogen, Nitrate+Nitr Lab ID: Client Sample ID: Matrix:	C09110253-004 TWN 2	ND	mg/L	Qualifiers Qualifiers	1		A4500-CI B E353.2 Collection Da	11/09/09 10:21 / lr 11/09/09 10:59 / jal te: 11/02/09 11:34
Analyses MAJOR IONS Chloride Nitrogen, Nitrate+Nitr Lab ID: Client Sample ID: Matrix: Analyses MAJOR IONS	C09110253-004 TWN 2	ND ND	mg/L mg/L		1 0.1	MCL/	A4500-CI B E353.2 Collection Da DateReceive	11/09/09 10:21 / lr 11/09/09 10:59 / jal te: 11/02/09 11:34 ed: 11/06/09
MAJOR IONS Chloride Nitrogen, Nitrate+Nitr Lab ID: Client Sample ID: Matrix: Analyses	C09110253-004 TWN 2	ND ND	mg/L mg/L		1 0.1	MCL/	A4500-CI B E353.2 Collection Da DateReceive	11/09/09 10:21 / lr 11/09/09 10:59 / jal te: 11/02/09 11:34 ed: 11/06/09

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

D - RL increased due to sample matrix interference.



Client: Site Name:	Denison Mines USA 4th Quarter Nitrate a	•	9				Report Da	te: 11/11/09
Lab ID: Client Sample ID: Matrix:	C09110253-005 TWN 19R Aqueous				-1 (n.). se (e	C	Collection Da DateReceive	te: 11/02/09 13:20 ed: 11/06/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		2	mg/L		1		A4500-CI B	11/09/09 10:30 / Ir
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/09/09 11:04 / jal
Lab ID:	C09110253-006					c	Collection Da	te: 11/02/09 13:42
Client Sample ID:							DateReceive	d: 11/06/09
Matrix:	Aqueous					MCL/		
Analyses		Result	Units	Qualifiers	RL	QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		125	mg/L		1		A4500-CI B	11/09/09 10:32 / Ir
Nitrogen, Nitrate+Nitr	ite as N	7.4	mg/L		0.2		E353.2	11/09/09 11:16 / jal
Lab ID:	C09110253-007					c	Collection Da	te: 11/02/09 15:00
Client Sample ID:	TWN 18R						DateReceive	d: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		1	mg/L		1		A4500-CI B	11/09/09 10:46 / Ir
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/09/09 11:19 / jal
Lab ID:	C09110253-008						Collection Da	te: 11/02/09 15:33
Client Sample ID:							DateReceive	d: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
Analyses								
MAJOR IONS Chloride Nitrogen, Nitrate+Nitr		57 1.3	mg/L mg/L		1 0.1		A4500-CI B E353.2	11/09/09 10:49 / Ir 11/09/09 11:21 / jal

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.



Client: Site Name:	Denison Mines USA 4th Quarter Nitrate a		e				Report Da	te: 11/11/09
Lab ID: Client Sample ID: Matrix:	C09110253-009 TWN 11R Aqueous					C	Collection Da DateReceive	te: 11/03/09 08:20 ed: 11/06/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / B
MAJOR IONS								
Chloride		ND	mg/L		1		A4500-CI B	11/09/09 10:56 / lr
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/09/09 11:24 / jal
Lab ID:	C09110253-010					(Collection Da	te: 11/03/09 08:53
Client Sample ID:	TWN 11						DateReceive	d: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / B
MAJOR IONS								
Chloride		74	mg/L		1		A4500-CI B	11/09/09 11:11 / Ir
Nitrogen, Nitrate+Nitr	ite as N	1.3	mg/L		0.1		E353.2	11/09/09 11:26 / jal
Lab ID:	C09110253-011	ad Bernard and				c	Collection Da	te: 11/03/09 09:47
Client Sample ID:	TWN 12R						DateReceive	d: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / B
MAJOR IONS								
Chloride		ND	mg/L		1		A4500-CI B	11/09/09 11:14 / Ir
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/09/09 11:34 / jal
Lab ID:	C09110253-012						Collection Da	te: 11/03/09 10:30
Client Sample ID:	TWN 12						DateReceive	ed: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
		109	mg/L		1		A4500-CI B	11/09/09 11:16 / Ir
Chloride Nitrogen, Nitrate+Nitri		0.5	mg/L				E353.2	

 Report
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Client: Site Name:	Denison Mines USA 4th Quarter Nitrate a	the second second second	9				Report Da	te: 11/11/09
Lab ID: Client Sample ID: Matrix:	C09110253-013 TWN 8R Aqueous				2111101202	(Collection Da DateReceive	te: 11/03/09 13:10 ed: 11/06/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		3	mg/L		1		A4500-CI B	11/09/09 11:18 / lr
Nitrogen, Nitrate+Nitr	rite as N	ND	mg/L		0.1		E353.2	11/09/09 11:39 / jal
Lab ID:	C09110253-014			Madat		(Collection Da	te: 11/03/09 13:45
Client Sample ID:							DateReceive	ed: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		12	mg/L		1		A4500-CI B	11/09/09 11:21 / lr
Nitrogen, Nitrate+Nitr	rite as N	ND	mg/L		0.1		E353.2	11/09/09 11:41 / jal
Lab ID:	C09110253-015					(Collection Da	te: 11/03/09 14:35
Client Sample ID:	TWN 6R						DateReceive	ed: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS			122					
Chloride	ar 44	ND	mg/L		1		A4500-CI B	11/09/09 11:25 / Ir
Nitrogen, Nitrate+Nitr	rite as N	ND	mg/L		0.1		E353.2	11/09/09 11:44 / jal
Lab ID:	C09110253-016			120MP-1		(Collection Da	te: 11/03/09 15:02
Client Sample ID:	TWN 6						DateReceive	ed: 11/06/09
Matrix:	Aqueous							
		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
Analyses								
Analyses MAJOR IONS								
		21	mg/L		1		A4500-CI B	11/09/09 11:27 / lr

 Report
 RL - Analyte reporting limit.

 Definitions:
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Client: Site Name:	Denison Mines USA 4th Quarter Nitrate a		e				Report Da	te: 11/11/09
Lab ID: Client Sample ID: Matrix:	C09110253-017 TWN 16R Aqueous					C	Collection Da DateReceive	te: 11/04/09 07:47 ed: 11/06/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		1	mg/L		1		A4500-CI B	11/09/09 11:34 / Ir
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/09/09 11:56 / jal
Lab ID:	C09110253-018					c	Collection Da	te: 11/04/09 08:15
Client Sample ID:							DateReceive	d: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		39	mg/L		1		A4500-CI B	11/09/09 11:37 / Ir
Nitrogen, Nitrate+Nitr	ite as N	1.0	mg/L		0.1		E353.2	11/09/09 11:59 / jal
Lab ID:	C09110253-019					c	Collection Da	te: 11/04/09 08:58
Client Sample ID:	TWN 17R						DateReceive	d: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		1	mg/L		1		A4500-CI B	11/09/09 11:39 / Ir
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/09/09 12:01 / jal
Lab ID:	C09110253-020					0	Collection Da	te: 11/04/09 09:24
Client Sample ID:	TWN 17						DateReceive	ed: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		152	mg/L		1		A4500-CI B	11/09/09 11:41 / Ir
Nitrogen, Nitrate+Nitr		6.7	mg/L		0.2		E353.2	11/09/09 12:04 / jal

 Report
 RL - Analyte reporting limit.

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Client: Site Name:	Denison Mines USA 4th Quarter Nitrate a		e				Report Da	te: 11/11/09
Lab ID: Client Sample ID: Matrix:	C09110253-021 TWN 0 Aqueous					C	Collection Da	te: 11/04/09 09:24 ed: 11/06/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		187	mg/L		1		A4500-CI B	11/09/09 11:43 / Ir
Nitrogen, Nitrate+Nitr	ite as N	6.7	mg/L		0.2		E353.2	11/09/09 12:14 / jal
Lab ID:	C09110253-022					C	Collection Da	te: 11/04/09 12:43
Client Sample ID:	TWN 13R						DateReceive	d: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		1	mg/L		1		A4500-CI B	11/09/09 11:51 / Ir
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/09/09 12:16 / jal
Lab ID:	C09110253-023					c	Collection Da	te: 11/04/09 13:11
Client Sample ID:	TWN 13						DateReceive	d: 11/06/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL		Method	Analysis Date / By
MAJOR IONS								
Chloride		83	mg/L		1		A4500-CI B	11/09/09 11:54 / Ir
Nitrogen, Nitrate+Nitr	ite as N	0.5	mg/L		0.1		E353.2	11/09/09 12:19 / jal
Lab ID:	C09110253-024						collection Da	te: 11/04/09 13:57
Client Sample ID:							DateReceive	
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
		ND	mg/L		1		A4500-CI B	11/09/09 11:56 / Ir
Chloride		ND	ing/L				A4000-01 D	11/03/03 11.3071

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level.



Client: Denison Mines USA Corp Site Name: 4th Quarter Nitrate and Chloride							Report Date: 11/11/09			
Lab ID: Client Sample ID: Matrix:	C09110253-025 TWN 14 Aqueous					C	Collection Da	te: 11/04/09 14:27 ed: 11/06/09		
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By		
MAJOR IONS										
Chloride		32	mg/L		1		A4500-CI B	11/09/09 11:59 / Ir		
Nitrogen, Nitrate+Nitr	ite as N	3.4	mg/L		0.2		E353.2	11/09/09 12:24 / jal		

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: 4th Quarter Nitrate and Chloride

Report Date: 11/11/09 Work Order: C09110253

								وي المراجع	
Analyte		Result U	nits RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	A4500-CI B						Bat	ch: 091109-C	L-TTR-V
Sample ID:	MBLK9-091109	Method Blank			Run: TITR	ATION_091109A		11/09	/09 08:3
Chloride		ND m	g/L 0.4						
Sample ID:	C09110083-001AMS	Sample Matrix Spi	ke		Run: TITR	ATION_091109A		11/09	/09 09:4
Chloride		5030 m	g/L 1.0	101	90	110			
Sample ID:	C09110083-001AMSD	Sample Matrix Spi	ke Duplicate		Run: TITR	ATION_091109A		11/09	/09 09:4
Chloride		4960 m	g/L 1.0	99	90	110	1.4	10	
Sample ID:	C09110253-006BMS	Sample Matrix Spi	ke		Run: TITR	ATION_091109A		11/09	/09 10:3
Chloride		300 m	g/L 1.0	99	90	110			
Sample ID:	C09110253-006BMSD	Sample Matrix Spi	ke Duplicate		Run: TITR	ATION_091109A		11/09	/09 10:3
Chloride		302 m	g/L 1.0	100	90	110	0.6	10	
Sample ID:	LCS35-091109	Laboratory Contro	I Sample		Run: TITR	ATION_091109A		11/09	/09 10:3
Chloride		3600 m	g/L 1.0	102	90	110			
Sample ID:	C09110253-016BMS	Sample Matrix Spi	ke		Run: TITR	ATION_091109A		11/09	/09 11:3
Chloride		105 m	g/L 1.0	95	90	110			
Sample ID:	C09110253-016BMSD	Sample Matrix Spi	ke Duplicate		Run: TITR	ATION_091109A		11/09	/09 11:3
Chloride		108 m	g/L 1.0	98	90	110	2.5	10	
Sample ID:	C09110266-001AMS	Sample Matrix Spi	ke		Run: TITR	ATION_091109A		11/09	/09 12:0
Chloride		52.1 m	g/L 1.0	96	90	110			
Sample ID:	C09110266-001AMSD	Sample Matrix Spi	ke Duplicate		Run: TITR	ATION_091109A		11/09	/09 12:1
Chloride		51.2 m	g/L 1.0	94	90	110	1.7	10	



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: 4th Quarter Nitrate and Chloride

Report Date: 11/11/09 Work Order: C09110253

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2								Batch:	R126210
Sample ID: MBLK-1	Method Blank				Run: TECH	INICON_091109	A	11/09	0/09 10:49
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Cor	ntrol Sample			Run: TECH	INICON_091109	A	11/09	9/09 10:51
Nitrogen, Nitrate+Nitrite as N	2.50	mg/L	0.10	97	90	110			
Sample ID: C09110253-005AMS	Sample Matrix	Spike			Run: TECH	INICON_091109	A	11/09	9/09 11:07
Nitrogen, Nitrate+Nitrite as N	1.93	mg/L	0.10	94	90	110			
Sample ID: C09110253-005AMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_091109	A	11/09	9/09 11:09
Nitrogen, Nitrate+Nitrite as N	1.94	mg/L	0.10	95	90	110	0.5	10	
Sample ID: C09110253-015AMS	Sample Matrix	Spike			Run: TECH	INICON_091109	A	11/09	9/09 11:47
Nitrogen, Nitrate+Nitrite as N	1.99	mg/L	0.10	100	90	110			
Sample ID: C09110253-015AMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_091109	A	11/09	9/09 11:49
Nitrogen, Nitrate+Nitrite as N	2.03	mg/L	0.10	101	90	110	2	10	
Sample ID: C09110253-024AMS	Sample Matrix	Spike			Run: TECH	INICON_091109	A	11/09	9/09 12:27
Nitrogen, Nitrate+Nitrite as N	2.18	mg/L	0.10	107	90	110			
Sample ID: C09110253-024AMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_091109	A	11/09	9/09 12:29
Nitrogen, Nitrate+Nitrite as N	2.37	mg/L	0.10	117	90	110	8.4	10	S

Qualifiers:

RL - Analyte reporting limit.

S - Spike recovery outside of advisory limits.

ENERGY Chain of Custody and Analytical Request Record															
LABORATORIES			PLEASE F	RIN	NT (Provide	as muo	ch infor	matio	n as	possi	ble.)		
Company Name: Denison M	1005		Project Nam	ie, P	ws, i	Permit, Etc	chlar	ide					e Origin		tate Compliance:
			and the second se										ut	Yes [
Report Mail Address: PO BO	(809		Contact Nar	ne:		Pho	ne/Fax:	ורר			Er	nail:			er: (Please Print)
Blanding, ut	84511		Ryan F	Ryan Palmer 435 67				~~(-	-		Tanne	r Holliday
Invoice Address:			Invoice Con	tact	& Pho	one:					P	urch	ase Order:	Quote/	Bottle Order:
Same					Sam	e									
Special Report/Formats:			DW 10		NA	lysis	REQU	JEST	ED		500		Contact ELI prior RUSH sample su		Shipped by: FCOOX
			ds O D								- -	.	for charges and		Cooler ID(s):
	Solic Solic Vater									R	scheduling – See Instruction Page	1	client		
	EDD/EDT(Ele Format:	ectronic Data)	Number of Containers Sample Type: A W S V B O DW <u>Air Water Soils/Solids</u> <u>Vegetation Bioassay Other</u> DW - Drinking Water							ATTACHED	Standard Lurnaround (LAT)	. İ	Comments:		Receipt Temp
State: Other:	LEVEL IV		on Bink		2					₽		J			°c
□ Other: □	NELAC		w - [R	10					A	5,	s			On Ice: N
			N M M	trat						SEE SEE	lard	2			On Bottle Y N
			Š	50	ChI					S I	l and	. I			On Cooler 💮 N Intact 💿 N
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	<	.)						" r	-			Signature (V)N Match
TWN 3R	11-2-09	0954	2-0	×	×										
TWN 3	11-2-09	1400	2-W	X	×										200110223
JUN 2R	11-2-09	1105	2-W	X	X										
TWN 2	11-2-09	1134	2-00	×	X										No.
5 TWN 19 R	11-2-09	1320	2-W	X	X										A
°TWN 19	11-2-09	1342	2-W	X	X										<u> </u>
7 TWN 18 R	11-2-09	1500	2-W	X	X										AT
* TWN 18	11-2-09	1533	2-W	х	X										8 0
"TWN II R	11-3-09	0820	2-W	χ	X										A B
"TWN 1]	11-3-09		2-2	X	X										
Relinquished by (print):	Date/Tin 11/5/09 Date/Tin		Janer Signa	ture:	Ali.	lenn	Receiv	ed by (print):		Date/	Time:		Signal	lure:
Record Relinquished by (print):	Date/Tin	ne:	Signa	ture:	- Cur	0	Receiv	ed by (print):		Date/	Time:		Signal	lure:
MUST be				_			Receiv	ed by Labo	oratory:		Date/		a. a.i	Signal	
Signed Sample Disposal: F	Return to Client:		Lab Dispos	al:			in	drew)		114	0.0	9 945	01	1

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

ENERGY	Chain o	f Cust	ody an	d	An	alytic	al R	eque	st	Re	ecc	ord		Pac	ge <u>2</u> of <u>0</u> 3,
LABORATORIES			PLEASE P	RIN	IT (Provide a	s muc	h inforn	ηatio	n as	s pos	ssible	.)		
Company Name:			Project Nam	ie, P	WS, F	Permit, Etc.	tabl	Nitro	ite,	8			le Origin		tate Compliance:
Denison Mi										State:		Yes [-		
Report Mail Address: PO BOX	809			Contact Name: Phone/								Email			er: (Please Print)
Blanding	809 14 84511		Ryan F	alm	ner	435	678	2221					-	Tan	ner Holliday
Invoice Address:			Invoice Con			one:						Purch	ase Order:	Quote/	Bottle Order:
Samo	-			Sar	nc										
Special Report/Formats:			M			lysis i	REQU	ESTE	D			-	Contact ELI prior RUSH sample su		Shipped by: Fect Ex
			ther								E	D	for charges and		Cooler ID(s):
			Solic Solic					(TA)	(TA	R	scheduling – See Instruction Page		client		
	EDD/EDT(Elec Format:	tronic Data)	Number of Containers Sample Type: A W S V B O DW <u>Air Water Soils/Solids</u> <u>Vegetation Bioassay Other</u> DW - Drinking Water							ACHED	Turnaround (TAT)	U	Comments:		Receipt Temp
State:	LEVEL IV		er of pe: A on B							¥	naro	0			<u>2 °c</u>
□ Other: □	NELAC		W - International	N	J					ATT.		S			On Ice: 🕐 N
			N M N	10	1. id					Ш	lard	З			On Bottle Y N
			ŝ	A) itrate	chlorid					S	Standard				On Cooler ON N Intact OP N
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	2	J						S)	Н			Signature Match
TWN 12R	11-3-09	0947	2-W	X	×										
2 TWN 12	11-3-09	1030	2-W	×	×										2009110253
"TWN 8R	11-3-09	1310	2-W	X	X										0 Mi
TWN 8	11-3-09	1345	2-W	Х	X										JSI I
TWN 6R	11-3-09	1435	2-2	X	X										
TWN 6	11-3-09	1502	2-6	×	X										<u>40</u>
TWN 16R	11-4-09	0747	2-00	X	X										AT
"TWN 16	11-4-09	0815	2-00	X	X										20 20
"TWN ITR	11-4-09	0858	2-62	X	X										
10 TWN 17		0924	2-W	X	X										
Custody Relinquished by (print):			Signa	ture:	10	lan	Receive	d by (print):			D	ate/Time		Signal	ture:
Relinquished by (print):	11/5/09 Date/Time		Janer	ture:		9	Receive	d by (print):			D	ate/Time		Signat	ture:
MUST be							Receive	d by Labor	atory:	_	D	ate/Time:	0.1	Signat	ture:
Signed Sample Disposal:	Return to Client:		Lab Dispos	sal:			the	retre	ى			11-	0.09 945	0	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

ENERGY	Chain o	of Cust	tody an	d	An	alytic	al F	Reque	est	Re	eco	ord		Par	ge 3 of 3
LABORATORIES			PLEASE F	RIN	T	(Provide	as mu					ssible	.)		
Company Name:	·		Project Nam						11			and a second			tate Compliance:
Denison M			4th Qu	art	ter		re a Chloride						Ut	Yes No	
Report Mail Address: PO BOX	809		Contact Nar				one/Fax					Email	:	Sample	er: (Please Print)
Blanding, UT	84511		Ryan	Ryan Palmer 435					678 2221 -					Tan	ner Holliday
Invoice Address:			Invoice Con	Invoice Contact & Phone:					Purchase Order:				ase Order:	Quote/	Bottle Order:
Same					50	me									
Special Report/Formats:			3	A	NA	lysis	REQ	UESTE	ED.				Contact ELI prior		Shipped by:
			s O D								-	-	RUSH sample su for charges and		Food Ox Cooler ID(s):
			Number of Containers Sample Type: A W S V B O DW <u>Air Water Soils/Solids</u> <u>Vegetation Bioassay Other</u> DW - Drinking Water							ATTACHED	Standard Turnaround (TAT)	R	scheduling – See Instruction Page	Ð	dient
	EDD/EDT(EI Format:	ectronic Data)	Con Soils/ Soils/ ng V							S	pur		Comments:		Receipt Temp
	LEVEL IV		r of ter of rinki							₹	arol	U			_ <u>2_</u> °c
	NELAC				Je					F	Turn	-			On Ice: 😧 N
			Degelain	Nitrate	-iJ					SEE	ard .	S			Custody Seal On Bottle Y N
			Sai	tu	10					ŝ	anda				On Cooler 🔿 N
SAMPLE IDENTIFICATION	Collection	Collection		ĨŽ	Chloride						St	Н			Intact 🕅 N
(Name, Location, Interval, etc.)	Date	Time	MATRIX									_			Signature Match
TWN O	11-4-09	0924	2-W	X	X										2
2 TWN 13 R	11-4-09	1243	2-W	×	X										2009110253
3 TWN 13	11-4-09	1311	2-12	X	X										
TWN 14 R	11-4-09	1357	2-W	X	χ										No.
TWN 14	11-4-09	1427	2-W	X	X										
6															00
7															AT
8															
9															
10															
Custody Relinquished by (print):	Date/Ti		Signa	ture:	11.1		Rece	ived by (print):	I		C	L Date/Time		Signal	ture:
Record Relinquished by (print):	11/5/09 Date/Ti	1050 me:	Jarrec	ture:	ino	9	Rece	ived by (print):			C	Date/Time		Signat	ture:
MUST be							Rece	iyed by Labor	ratory:		D)ate/Time		Signat	ture:
Signed Sample Disposal: F	Return to Client:		Lab Dispos	sal:		Discourse and an other		Indre				11.6			11

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Energy Laboratories Inc Workorder Receipt Checklist

Denison Mines USA Corp



Login completed by:	Halley Ackerman
Reviewed by:	

.

Reviewed Date:

Date and Time Received: 11/6/2009 9:45 AM

Received by: al

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present
Custody seals intact on shipping container/cooler?	Yes 🗹	No 🗌	Not Present
Custody seals intact on sample bottles?	Yes 🗌	No 🗌	Not Present
Chain of custody present?	Yes 🗹	No 📋	
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌	
Chain of custody agrees with sample labels?	Yes 🗹	No 🗌	
Samples in proper container/bottle?	Yes 🗹	No 🗌	
Sample containers intact?	Yes 🗹	No 🗌	
Sufficient sample volume for indicated test?	Yes 🗹	No 🗌	
All samples received within holding time?	Yes 🗹	No 🗌	
Container/Temp Blank temperature:	2°C On Ice		
Water - VOA vials have zero headspace?	Yes 🗌	No 🗌	No VOA vials submitted 🗹
Water - pH acceptable upon receipt?	Yes 🗹	No 🗌	Not Applicable

Contact and Corrective Action Comments:

None



ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

CLIENT: Denison Mines USA Corp

Project: 4th Quarter Nitrate and Chloride

Sample Delivery Group: C09110253

Date: 11-Nov-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS

Data for PCBs, Atrazine and Simazine are reported from EPA 525.2. PCB data reported by ELI reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER: The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER,WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT



ANALYTICAL SUMMARY REPORT

November 04, 2009

Denison Mines USA Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09101104

Project Name: 4th Quarter Nitrate & Chloride

Energy Laboratories, Inc. received the following 8 samples for Denison Mines USA Corp on 10/29/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09101104-001	UWLP	10/27/09 09:10	10/29/09	Aqueous	E300.0 Anions Nitrogen, Nitrate + Nitrite
C09101104-002	Piez 1	10/27/09 09:35	10/29/09	Aqueous	Same As Above
C09101104-003	Piez 2	10/27/09 10:20	10/29/09	Aqueous	Same As Above
C09101104-004	Piez 3	10/27/09 10:30	10/29/09	Aqueous	Same As Above
C09101104-005	TWN-1R	10/28/09 08:20	10/29/09	Aqueous	Same As Above
C09101104-006	TWN-1	10/28/09 13:20	10/29/09	Aqueous	Same As Above
C09101104-007	TWN-4R	10/28/09 10:10	10/29/09	Aqueous	Same As Above
C09101104-008	TWN-4	10/28/09 13:10	10/29/09	Aqueous	Same As Above

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Stephanie D. Waldy Stephanie D. Waldrop

Reporting Supervisor



Client: Site Name:	Denison Mines USA 4th Quarter Nitrate 8						Report D	ate: 11/04/09
Lab ID: Client Sample ID: Matrix:	C09101104-001 UWLP Aqueous					C		ved: 10/27/09 09:10
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		3	mg/L		1		E300.0	10/31/09 00:48 / Iji
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/02/09 14:07 / jal
Lab ID:	C09101104-002			an a		(Collection D	ate: 10/27/09 09:35
Client Sample ID:	Piez 1						DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL		Method	Analysis Date / By
MAJOR IONS								
Chloride		61	mg/L		1		E300.0	10/31/09 01:37 / Ijl
Nitrogen, Nitrate+Nitr	ite as N	7.4	mg/L		0.2		E353.2	11/02/09 14:14 / jal
Lab ID:	C09101104-003					(Collection D	ate: 10/27/09 10:20
Client Sample ID:	Piez 2						DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		7	mg/L		1		E300.0	10/31/09 01:53 / Ijl
Nitrogen, Nitrate+Nitr	ite as N	0.6	mg/L		0.1		E353.2	11/02/09 14:17 / jal
Lab ID:	C09101104-004					(Collection D	ate: 10/27/09 10:30
Client Sample ID: Matrix:	Piez 3 Aqueous						DateRecei	ved: 10/29/09
Analyses	A)	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS Chloride		19	mg/L		1		E300.0	10/31/09 02:10 / Iji

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level.



Client: Site Name:	Denison Mines USA 4th Quarter Nitrate &						Report D	ate: 11/04/09
Lab ID: Client Sample ID: Matrix:	C09101104-005 TWN-1R Aqueous					C		Pate: 10/28/09 08:20 ved: 10/29/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		ND	mg/L		1		E300.0	10/31/09 02:26 / ljl
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/02/09 14:22 / jal
Lab ID:	C09101104-006					(Collection D	ate: 10/28/09 13:20
Client Sample ID:	TWN-1						DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL		Method	Analysis Date / By
MAJOR IONS								
Chloride		18	mg/L		1		E300.0	10/31/09 02:42 / Ijl
Nitrogen, Nitrate+Nitr	ite as N	0.5	mg/L		0.1		E353.2	11/02/09 14:24 / jal
Lab ID:	C09101104-007			1.21.4.20.4.1.4.4.1.1.1.4.1.7.4.1.		(Collection D	ate: 10/28/09 10:10
Client Sample ID:	TWN-4R						DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		ND	mg/L		1		E300.0	10/31/09 02:59 / Ijl
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/03/09 10:35 / jal
Lab ID:	C09101104-008					(ate: 10/28/09 13:10
Client Sample ID:	TWN-4 Aqueous						DateRecei	ved: 10/29/09
Matrix.						MCL/	• • • • •	
Matrix: Analyses		Result	Units	Qualifiers	RL	QCL	Method	Analysis Date / By
Analyses		Result	Units	Qualifiers	RL		Method	Analysis Date / By
		Result	Units mg/L	Qualifiers	RL		Method E300.0	Analysis Date / By

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level.



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: 4th Quarter Nitrate & Chloride

Report Date: 11/04/09 Work Order: C09101104

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0								Batch:	R125839
Sample ID: LCS	Laboratory Co	ntrol Sample			Run: IC2-C	091029A		10/29	0/09 20:36
Chloride	9.74	mg/L	1.0	97	90	110			
Sample ID: MBLK	Method Blank				Run: IC2-C	_091029A		10/29	0/09 20:53
Chloride	ND	mg/L	0.04						
Sample ID: C09101104-001AMS	Sample Matrix	Spike			Run: IC2-C	_091029A		10/31	/09 01:04
Chloride	22.0	mg/L	1.0	95	80	120			
Sample ID: C09101104-001AMSD	Sample Matrix	Spike Duplicate			Run: IC2-C	_091029A		10/31	/09 01:20
Chloride	23.7	mg/L	1.0	104	80	120	7.8	20	
Sample ID: C09101121-003AMS	Sample Matrix	Spike			Run: IC2-C	_091029A		10/31	/09 05:10
Chloride	21.6	mg/L	1.0	98	80	120			
Sample ID: C09101121-003AMSD	Sample Matrix	Spike Duplicate			Run: IC2-C	_091029A		10/31	/09 05:27
Chloride	22.3	mg/L	1.0	101	80	120	2.8	20	
Method: E353.2								Batch:	R125900
Sample ID: MBLK-1	Method Blank				Run: TECH	INICON_091102	A	11/02	2/09 10:57
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Co	ntrol Sample			Run: TECH	INICON_091102	A	11/02	2/09 10:59
Nitrogen, Nitrate+Nitrite as N	2.50	mg/L	0.10	100	90	110			
Sample ID: C09101102-005HMS	Sample Matrix	Spike			Run: TECH	INICON_091102	A	11/02	2/09 13:49
Nitrogen, Nitrate+Nitrite as N	1.81	mg/L	0.10	91	90	110			
Sample ID: C09101102-005HMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_091102	A	11/02	2/09 13:52
Nitrogen, Nitrate+Nitrite as N	1.85	mg/L	0.10	93	90	110	2.2	10	
Sample ID: C09101104-006BMS	Sample Matrix	Spike			Run: TECH	INICON_091102	A	11/02	2/09 14:27
Nitrogen, Nitrate+Nitrite as N	2.60	mg/L	0.10	107	90	110			
Sample ID: C09101104-006BMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_091102	A	11/02	2/09 14:29
Nitrogen, Nitrate+Nitrite as N	2.54	mg/L	0.10	104	90	110	2.3	10	

Qualifiers: RL - Analyte reporting limit.



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: 4th Quarter Nitrate & Chloride

Report Date: 11/04/09 Work Order: C09101104

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2								Batch:	R12594
Sample ID: MBLK-1	Method Blank				Run: TECH	INICON_091103	A	11/03	8/09 10:10
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Cont	rol Sample			Run: TECH	INICON_091103	A	11/03	09 10:1:
Nitrogen, Nitrate+Nitrite as N	2.57	mg/L	0.10	103	90	110			
Sample ID: C09101127-001AMS	Sample Matrix S	pike			Run: TECH	INICON_091103	A	11/03	/09 10:28
Nitrogen, Nitrate+Nitrite as N	2.25	mg/L	0.10	106	90	110			
Sample ID: C09101127-001AMSD	Sample Matrix S	pike Duplicate			Run: TECH	INICON_091103	A	11/03	8/09 10:3
Nitrogen, Nitrate+Nitrite as N	2.26	mg/L	0.10	106	90	110	0.4	10	

ENERGY Chain of Custody and Analytical Request Record Page of											
	PLEASE PRINT (Provide	as much information as po	ssible.)	. ,							
Company Name:	Project Name, PWS, Permit, Etc.		Sample Origin	EPA/State Compliance:							
Devison Mines		te & Chlorede	State: UT	Yes 🚺 No 🗆							
Report Mail Address: Bax 809 Blanding UT 845/1	Contact Name: Pho Ryan PAIMER Invoice Contact & Phone:	678-2221	Email:	Sampler: (Please Print) Ryan PAIMER.							
Invoice Address:	0		Purchase Order:	Quote/Bottle Order:							
Special Report/Formats:	ame		Contact ELI prior	shipped by:							
Special ReportFormals.		REQUESTED	RUSH sample su for charges and								
DW EDD/EDT(Electronic Data)	Number of Containers Sample Type: A W S V B O DW Air Water Soils/Solids Legetation Bloassay Other DW - Drinking Water	SEE ATTACHED	R scheduling – See Instruction Page	e Various Client							
POTW/WWTP Format:	of Co A W Bloas	ATTACHED Turnaround (TA1	H Comments:	Receipt Temp							
State: LEVEL IV Other: NELAC	Type Type V - Dr	ATT	there will	be On Ice: (X) N							
	Nul Nul DV DV	SEE	S More Sampl	Custody Seal On Bottle Y W On Cooler (Y N							
SAMPLE IDENTIFICATION Collection Collection		Star	H Leek linder	Mins Intact ON							
(Name, Location, Interval, etc.) Date Time	MATRIX 23		protect Nar	ME Match N							
UWLP 10:27:09 0910	2-W XX		V V	≥							
² fiez 1 10.27.09 0935	1 XX			UNI							
Piez 2 10.27.09 1020				W							
* Piez 3 10.27.09 1030	S XX			 							
TWN-IR 10:28:09 0820											
TWN-1 10-28-09 1320				40 <u>1</u>							
TWN-4K 10.28.09 1010											
*TWN-4 10:28:09 1310	2-WXX										
10											
	Signature:	Received by (print):	Date/Time:	Signature:							
Custody Relinquished by (print): Date/Time: Record Relinquished by (print): Date/Time: Relinquished by (print): Pate/Time:	Aon Wallar a Signature:	Received by (print):	Date/Time:	Signature:							
MUST be	L .	N		Signature:							
Signed Sample Disposal: Return to Client:	Lab Disposal:	Andrew 10	Date/Time:	11/							

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Energy Laboratories Inc Workorder Receipt Checklist





Login completed by: Diane Downing		Date and Time	Received: 10/29/2009 2:10 PM
Reviewed by:		Re	eceived by: al
Reviewed Date:		Ca	rrier name: Hand Del
Shipping container/cooler in good condition?	Yes 🗸	No 🗌	Not Present
Custody seals intact on shipping container/cooler?	Yes 🗸	No 🗌	Not Present
Custody seals intact on sample bottles?	Yes	No 🗌	Not Present 🗹
Chain of custody present?	Yes 🗸	No 🗌	

Chain of custody present?	Yes 🗹	No 🗌		
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌		
Chain of custody agrees with sample labels?	Yes 🗸	No 🗌		
Samples in proper container/bottle?	Yes 🗹	No 🗌		
Sample containers intact?	Yes 🗸	No 🗌		
Sufficient sample volume for indicated test?	Yes 🗸	No 🗌		
All samples received within holding time?	Yes 🗹	No 🗌		
Container/Temp Blank temperature:	3°C On Ice			
Water - VOA vials have zero headspace?	Yes	No 🗌	No VOA vials submitted	
Water - pH acceptable upon receipt?	Yes 🗸	No 🗌	Not Applicable	

Contact and Corrective Action Comments:

None



ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

CLIENT: Denison Mines USA Corp Project: 4th Quarter Nitrate & Chloride

Sample Delivery Group: C09101104

Date: 04-Nov-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

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SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS

Data for PCBs, Atrazine and Simazine are reported from EPA 525.2. PCB data reported by ELI reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER:

The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER, WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT



ANALYTICAL SUMMARY REPORT

November 18, 2009

Denison Mines USA Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09110461

Project Name: 4th Quarter Nitrate & Chloride

Energy Laboratories, Inc. received the following 11 samples for Denison Mines USA Corp on 11/12/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09110461-001	TWN-D1	11/10/09 12:35	11/12/09	Aqueous	Chloride Nitrogen, Nitrate + Nitrite
C09110461-002	TWN-15R	11/10/09 08:25	11/12/09	Aqueous	Same As Above
C09110461-003	TWN-15	11/10/09 08:53	11/12/09	Aqueous	Same As Above
C09110461-004	TWN-10R	11/10/09 10:10	11/12/09	Aqueous	Same As Above
C09110461-005	TWN-10	11/10/09 10:22	11/12/09	Aqueous	Same As Above
C09110461-006	TWN-9R	11/10/09 11:05	11/12/09	Aqueous	Same As Above
C09110461-007	TWN-9	11/10/09 12:09	11/12/09	Aqueous	Same As Above
C09110461-008	TWN-5R	11/10/09 12:45	11/12/09	Aqueous	Same As Above
C09110461-009	TWN-5	11/10/09 13:19	11/12/09	Aqueous	Same As Above
C09110461-010	TWN-7R	11/10/09 14:00	11/12/09	Aqueous	Same As Above
C09110461-011	TWN-7	11/10/09 14:13	11/12/09	Aqueous	Same As Above

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Stephanie D. Willy Stephanie D. Waldrop

Reporting Supervisor



Client: Site Name:	Denison Mines USA 4th Quarter Nitrate 8						Report Da	te: 11/18/09
Lab ID: Client Sample ID: Matrix:	C09110461-001 TWN-D1 Aqueous					(Collection Da DateReceive	te: 11/10/09 12:35 ed: 11/12/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		ND	mg/L		1		A4500-CI B	11/13/09 14:16 / lr
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/17/09 12:51 / jal
Lab ID:	C09110461-002						Collection Da	te: 11/10/09 08:25
Client Sample ID:	TWN-15R						DateReceive	ed: 11/12/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		23	mg/L		1		A4500-CI B	11/13/09 14:18 / Ir
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/17/09 12:53 / jal
Lab ID:	C09110461-003						Collection Da	te: 11/10/09 08:53
Client Sample ID:	TWN-15						DateReceive	ed: 11/12/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		78	mg/L		1		A4500-CI B	11/13/09 14:21 / lr
Nitrogen, Nitrate+Nitr	ite as N	1.1	mg/L		0.1		E353.2	11/17/09 12:56 / jal
	C09110461-004					(Collection Da	te: 11/10/09 10:10
							DateReceive	ed: 11/12/09
Client Sample ID:								
Lab ID: Client Sample ID: Matrix:	TWN-10R Aqueous	Recult	Unite	Qualifiere	RI	MCL/	Method	Analysis Date / Bu
Client Sample ID: Matrix:		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
Client Sample ID:		Result	Units mg/L	Qualifiers	RL 1		Method A4500-CI B	Analysis Date / By 11/13/09 14:24 / Ir

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level.



Client: Site Name:	Denison Mines USA 4th Quarter Nitrate 8						Report Da	te: 11/18/09
Lab ID: Client Sample ID: Matrix:	C09110461-005 TWN-10 Aqueous					0		te: 11/10/09 10:22 ed: 11/12/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		26	mg/L		1		A4500-CI B	11/13/09 14:27 / Ir
Nitrogen, Nitrate+Nitr	ite as N	1.4	mg/L		0.1		E353.2	11/17/09 13:01 / jal
Lab ID:	C09110461-006					(Collection Da	te: 11/10/09 11:05
Client Sample ID:	TWN-9R						DateReceive	ed: 11/12/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		1	mg/L		1		A4500-CI B	11/13/09 14:30 / lr
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/17/09 13:11 / jal
Lab ID:	C09110461-007					(Collection Da	te: 11/10/09 12:09
Client Sample ID:	TWN-9						DateReceive	ed: 11/12/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		205	mg/L		1		A4500-CI B	11/13/09 14:33 / Ir
Nitrogen, Nitrate+Nitr	ite as N	12.0	mg/L		0.2		E353.2	11/17/09 13:13 / jal
Lab ID:	C09110461-008					(Collection Da	te: 11/10/09 12:45
Client Sample ID:							DateReceive	
Matrix:	Aqueous							
		Result	Units	Qualifiers	RL		Method	Analysis Date / By
Analyses								
Analyses MAJOR IONS								
		ND ND	mg/L		1 0.1		A4500-CI B	11/13/09 14:36 / lr

ReportRL - Analyte reporting limit.Definitions:QCL - Quality control limit.

MCL - Maximum contaminant level.



Client: Site Name:	Denison Mines USA 4th Quarter Nitrate &						Report Da	te: 11/18/09
Lab ID: Client Sample ID: Matrix:	C09110461-009 TWN-5 Aqueous					(te: 11/10/09 13:19 ed: 11/12/09
Analyses		Result	Units	Qualifiers	RL		Method	Analysis Date / By
MAJOR IONS								
Chloride		48	mg/L		1		A4500-CI B	11/13/09 14:40 / Ir
Nitrogen, Nitrate+Nitr	ite as N	0.2	mg/L		0.1		E353.2	11/17/09 13:18 / jal
Lab ID:	C09110461-010		adotta foto a com			(Collection Da	te: 11/10/09 14:00
Client Sample ID:	TWN-7R						DateReceive	ed: 11/12/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		ND	mg/L		1		A4500-CI B	11/13/09 14:47 / Ir
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/17/09 13:21 / jal
Lab ID:	C09110461-011						collection Da	te: 11/10/09 14:13
Client Sample ID:	TWN-7						DateReceive	ed: 11/12/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		7	mg/L		1		A4500-CI B	11/13/09 14:49 / Ir
Nitrogen, Nitrate+Nitri	bi	0.1	mg/L		0.1		E353.2	11/17/09 13:28 / jal



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: 4th Quarter Nitrate & Chloride

Report Date: 11/18/09 Work Order: C09110461

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-CI B							Bat	ch: 091113-C	L-TTR-W
Sample ID: MBLK9-091113 Chloride	Method Blank ND	mg/L	0.4		Run: TITR/	ATION_091113B		11/13	/09 14:04
Sample ID: C09110461-009AMS Chloride	Sample Matrix 222	Spike mg/L	1.0	99	Run: TITR/ 90	ATION_091113B 110		11/13	/09 14:43
Sample ID: C09110461-009AMSD Chloride	Sample Matrix 224	Spike Duplicate mg/L	1.0	100	Run: TITR/ 90	ATION_091113B 110	0.8	11/13 10	/09 14:44
Sample ID: LCS35-091113 Chloride	Laboratory Cor 3600	ntrol Sample mg/L	1.0	102	Run: TITR/ 90	ATION_091113B 110		11/13	/09 15:19
Method: E353.2								Batch:	R126597
Sample ID: MBLK-1 Nitrogen, Nitrate+Nitrite as N	Method Blank ND	mg/L	0.03		Run: TECH	INICON_091117/	4	11/17	/09 10:11
Sample ID: LCS-2 Nitrogen, Nitrate+Nitrite as N	Laboratory Cor 2.56	ntrol Sample mg/L	0.10	102	Run: TECH 90	INICON_091117/ 110	Ą	11/17	/09 10:13
Sample ID: C09110461-005BMS Nitrogen, Nitrate+Nitrite as N	Sample Matrix 3.93	Spike mg/L	0.10	84	Run: TECH 90	INICON_091117/ 110	4	11/17	/09 13:03 S
Sample ID: C09110461-005BMSD Nitrogen, Nitrate+Nitrite as N	Sample Matrix 3.90	Spike Duplicate mg/L	0.10	83	Run: TECH 90	INICON_091117/ 110	A 0.8	11/17 10	/09 13:06 S
Sample ID: C09110474-004FMS Nitrogen, Nitrate+Nitrite as N	Sample Matrix 2.09	Spike mg/L	0.10	104	Run: TECH 90	INICON_091117/ 110	4	11/17	/09 13:41
Sample ID: C09110474-004FMSD Nitrogen, Nitrate+Nitrite as N	Sample Matrix 2.16	Spike Duplicate mg/L	0.10	108	Run: TECF 90	INICON_091117/ 110	A 3.3	11/17 10	/09 13:43

Qualifiers:

RL - Analyte reporting limit.

S - Spike recovery outside of advisory limits.

ENERGY	Chain d	of Cust	tody ar	nd .	An	alytic	al R	eque	st	Red	ord	ł	Page of 2
LABORATORIES		-	PLEASE	PRIM	T	Provide	as muc	h inform	natio	n as p			
Company Name:	i.		Project Nan	ne, P	WS,	Permit, Etc						mple Origin	EPA/State Compliance:
Denison A	lines		4th Qu					hlori	de		Sta	ite: Ut	Yes No 🗌
Report Mail Address: PO BOX	809		Contact Na								Em	ail:	Sampler: (Please Print)
Blanding Ut	8451		Ryan				678 2	2221				-	Ryan Palmer
Invoice Address:			Invoice Cor	tact	& Pho	one:					Pu	rchase Order:	Quote/Bottle Order:
Same			S	ama	e								
	EDD/EDT(Ek Format: LEVEL IV NELAC	ectronic Data)	Number of Containers Sample Type: A W S V B O DW <u>Air Water Soils/Solids</u> <u>Vegetation Bioassay Other</u> DW - Drinking Water	A Nitrate	22 Chloride	lysis i	REQU	JESTE		SEE ATTACHED		Instruction Page Comments:	ubmittal Cooler ID(s): e Receipt Temp Con Ice: On Ice: On Bottle On Bottle On Cooler Y N
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX							ð	f F		Intact Signature Match
TWN-D1	11-10-09	1235	2-W	×	×						X	-	
2											1	·	2009110461
3													0
4				-			_				_		W
													SS.
5													
6											-		NB/
7				-									0
											_		ALL ALL
8													<u> 10</u>
9													
10				-							-		IT &
Custody Relinquished by (print):	Date/Tir	ne:	Signa	ature:/	71		Receive	d by (print):			Date/T	ime:	Signature:
Record Relinquished by (print):	- 11-11- Date/Tir	09 1100 me:	Figna	· F	Λ		Receive	d by (print):			Date/T	ime:	Signature:
MUST be			/				Receiv	d by Labor	atory:		Date/T	mertin 1	Signature:
Signed Sample Disposal: F	eturn to Client:		Lab Dispo	sal:				Lado		/		112/19 9:3	(PH

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

	tody and Analytic	al Request Reco	ord	Page <u>2</u> of <u>2</u> .
LABORATORIES	PLEASE PRINT (Provide	as much information as po	ssible.)	<i>,</i>
Company Name:	Project Name, PWS, Permit, Et	C.	Sample Origin	EPA/State Compliance:
Denison Mines	4th Quarree Nito	ste \$ chloreide	State: UT	Yes No
Report Mail Address:	Contact Name: Pho	one/Fax:	Email:	Sampler: (Please Print)
Blanking UT 84511	Ryan Dalmer	435 678 4063		D DI
Invoice Address:	Invoice Contact & Phone:	455 610 4005	Purchase Order:	Quote/Bottle Order:
Invoice Address.			Furchase Order.	Quote/Bottle Order.
Same Cracial Decent/Formation	Same			Shipperd by:
Special Report/Formats:	ANALYSIS	REQUESTED	Contact ELI prior RUSH sample su	
	ers dds 201	Ê	for charges and	Cooler ID(s):
	Solii Solii Vate		K scheduling – See Instruction Page	
DW EDD/EDT(Electronic Data) POTW/WWTP Format:	Number of Containers Sample Type: A W S V B 0 DW Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water	SEE ATTACHED Standard Turnaround (TAT)	Commenter	Receipt Temp
		TA	U Comments:	°c
State: LEVEL IV Other: NELAC	- Dio			On Ice: Y N
	N C Dege Jule	Ш 2	S	Custody Seal On Bottle Y
	San San	Didar BE		On Bottle N On Cooler N N
	San San	Sta	н	Intact YN
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.) Collection Date Collection	MATRIX			Signature Y N Match
TWN-15R 11.10.09 0825	2-WXX		X	
TWN-15 1 0853			X	\$C09110461
2 TWN-15 / 0853 3 TWN-10 / 1010			X	
TWN-10 (1022	XX		X	NS(
YWN-9R 1105			X	A
"TWN- #9 1209			X	018
TWN-5R 1245			X	ATT
TWN-5 1319			X	20 24
TWN-7R) 1400			×	
TWN-7 11.10.09 1413	2-W XX		X	
Custody Relinquished by (phnt): Date/Time: 100	Signature:	Received by (print):	Date/Time:	Signature:
Record Rejinguished by (print): Date/Time:	signature:	Received by (print):	Date/Time:	Signature:
MUST be	/	Rectived by Laboratory:	Date/Time/ / / / 0 0	Signature:
Signed Sample Disposal: Return to Client:	Lab Disposal:	Dridrew	Date/Time/2/09 93	0 11

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc Workorder Receipt Checklist

Denison Mines USA Corp

.

x

Login completed by: Halley Ackerman Reviewed by: Reviewed Date:



Date and Time Received: 11/12/2009 9:30 AM

Received by: al Carrier name: FedEx

Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present
Custody seals intact on shipping container/cooler?	Yes 🗹	No 🗌	Not Present
Custody seals intact on sample bottles?	Yes	No 🗌	Not Present 🗹
Chain of custody present?	Yes 🗹	No 🗌	
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌	
Chain of custody agrees with sample labels?	Yes 🗹	No 🗌	
Samples in proper container/bottle?	Yes 🗹	No 🗌	
Sample containers intact?	Yes 🗸	No 🗌	
Sufficient sample volume for indicated test?	Yes 🗹	No 🗌	
All samples received within holding time?	Yes 🗹	No 🗌	
Container/Temp Blank temperature:	2°C On Ice		
Water - VOA vials have zero headspace?	Yes 🗌	No 🗌	No VOA vials submitted
Water - pH acceptable upon receipt?	Yes 🗸	No 🗌	Not Applicable

Contact and Corrective Action Comments:

None



CLIENT: Denison Mines USA Corp

Project: 4th Quarter Nitrate & Chloride

Sample Delivery Group: C09110461

Date: 18-Nov-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS

Data for PCBs, Atrazine and Simazine are reported from EPA 525.2. PCB data reported by ELI reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

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CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

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ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT



ANALYTICAL SUMMARY REPORT

November 04, 2009

Denison Mines USA Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09101104

Project Name: 4th Quarter Nitrate & Chloride

Energy Laboratories, Inc. received the following 8 samples for Denison Mines USA Corp on 10/29/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09101104-001	UWLP	10/27/09 09:10	10/29/09	Aqueous	E300.0 Anions Nitrogen, Nitrate + Nitrite
C09101104-002	Piez 1	10/27/09 09:35	10/29/09	Aqueous	Same As Above
C09101104-003	Piez 2	10/27/09 10:20	10/29/09	Aqueous	Same As Above
C09101104-004	Piez 3	10/27/09 10:30	10/29/09	Aqueous	Same As Above
C09101104-005	TWN-1R	10/28/09 08:20	10/29/09	Aqueous	Same As Above
C09101104-006	TWN-1	10/28/09 13:20	10/29/09	Aqueous	Same As Above
C09101104-007	TWN-4R	10/28/09 10:10	10/29/09	Aqueous	Same As Above
C09101104-008	TWN-4	10/28/09 13:10	10/29/09	Aqueous	Same As Above

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

<u>Atphanie D. Waldy</u> Stephanie D. Waldrop

Reporting Supervisor



LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines USA 4th Quarter Nitrate &						Report D	ate: 11/04/09
Lab ID: Client Sample ID: Matrix:	C09101104-001 UWLP Aqueous					C	1.2	ved: 10/27/09 09:10
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		3	mg/L		1		E300.0	10/31/09 00:48 / ljl
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/02/09 14:07 / jal
Lab ID:	C09101104-002			and the state of the state		0	Collection D	ate: 10/27/09 09:35
Client Sample ID:	Piez 1						DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		61	mg/L		1		E300.0	10/31/09 01:37 / ljl
Nitrogen, Nitrate+Nitr	ite as N	7.4	mg/L		0.2		E353.2	11/02/09 14:14 / jal
Lab ID:	C09101104-003					(Collection D	ate: 10/27/09 10:20
Client Sample ID:	Piez 2						DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		7	mg/L		1		E300.0	10/31/09 01:53 / Ijl
Nitrogen, Nitrate+Nitr	ite as N	0.6	mg/L		0.1		E353.2	11/02/09 14:17 / jal
Lab ID:	C09101104-004					(ate: 10/27/09 10:30
Client Sample ID:							DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL		Method	Analysis Date / By
MAJOR IONS								
		10	mg/L		1		E300.0	10/31/09 02:10 / Ijl
Chloride Nitrogen, Nitrate+Nitri		19 1.2	mg/L		0.1		L300.0	10/3 1/09 02.10 / 10

RL - Analyte reporting limit. Report Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Site Name:	Denison Mines USA 4th Quarter Nitrate &						Report D	ate: 11/04/09
Lab ID: Client Sample ID: Matrix:	C09101104-005 TWN-1R Aqueous					C		eate: 10/28/09 08:20 ved: 10/29/09
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		ND	mg/L		1		E300.0	10/31/09 02:26 / ljl
Nitrogen, Nitrate+Nitr	ite as N	ND	mg/L		0.1		E353.2	11/02/09 14:22 / jal
Lab ID:	C09101104-006					(Collection D	ate: 10/28/09 13:20
Client Sample ID:	TWN-1						DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL		Method	Analysis Date / By
MAJOR IONS								
Chloride		18	mg/L		1		E300.0	10/31/09 02:42 / Ijl
Nitrogen, Nitrate+Nitri	te as N	0.5	mg/L		0.1		E353.2	11/02/09 14:24 / jal
Lab ID:	C09101104-007			A. 49.1 (C. 1996) (C. 1997) (C. 1997)		(Collection D	ate: 10/28/09 10:10
Client Sample ID:	TWN-4R						DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		ND	mg/L		1		E300.0	10/31/09 02:59 / Ijl
Nitrogen, Nitrate+Nitri	te as N	ND	mg/L		0.1		E353.2	11/03/09 10:35 / jal
Lab ID:	C09101104-008					(Collection D	ate: 10/28/09 13:10
Client Sample ID:	TWN-4						DateRecei	ved: 10/29/09
Matrix:	Aqueous							
Analyses		Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS								
Chloride		11	mg/L mg/L		1		E300.0	10/31/09 03:15 / Iji

 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: 4th Quarter Nitrate & Chloride

Report Date: 11/04/09 Work Order: C09101104

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0								Batch:	R125839
Sample ID: LCS	Laboratory Co	ntrol Sample			Run: IC2-C	_091029A		10/29	9/09 20:36
Chloride	9.74	mg/L	1.0	97	90	110			
Sample ID: MBLK	Method Blank				Run: IC2-C	_091029A		10/29	0/09 20:53
Chloride	ND	mg/L	0.04						
Sample ID: C09101104-001AMS	Sample Matrix	Spike			Run: IC2-C	_091029A		10/31	/09 01:04
Chloride	22.0	mg/L	1.0	95	80	120			
Sample ID: C09101104-001AMSD	Sample Matrix	Spike Duplicate			Run: IC2-C	_091029A		10/31	/09 01:20
Chloride	23.7	mg/L	1.0	104	80	120	7.8	20	
Sample ID: C09101121-003AMS	Sample Matrix	Spike			Run: IC2-C	_091029A		10/31	/09 05:10
Chloride	21.6	mg/L	1.0	98	80	120			
Sample ID: C09101121-003AMSD	Sample Matrix	Spike Duplicate			Run: IC2-C	_091029A		10/31	/09 05:27
Chloride	22.3	mg/L	1.0	101	80	120	2.8	20	
Method: E353.2								Batch:	R125900
Sample ID: MBLK-1	Method Blank				Run: TECH	INICON_091102	A	11/02	2/09 10:57
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Co	ntrol Sample			Run: TECH	INICON_091102	A	11/02	2/09 10:59
Nitrogen, Nitrate+Nitrite as N	2.50	mg/L	0.10	100	90	110			
Sample ID: C09101102-005HMS	Sample Matrix					INICON_091102	A	11/02	2/09 13:49
Nitrogen, Nitrate+Nitrite as N	1.81	mg/L	0.10	91	90	110			
Sample ID: C09101102-005HMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_091102	A	11/02	2/09 13:52
Nitrogen, Nitrate+Nitrite as N	1.85	mg/L	0.10	93	90	110	2.2	10	
Sample ID: C09101104-006BMS	Sample Matrix	Spike				INICON_091102	A	11/02	2/09 14:27
Nitrogen, Nitrate+Nitrite as N	2.60	mg/L	0.10	107	90	110			
Sample ID: C09101104-006BMSD	Sample Matrix	Spike Duplicate			Run: TECH	INICON_091102	A	11/02	2/09 14:29
Nitrogen, Nitrate+Nitrite as N	2.54	mg/L	0.10	104	90	110	2.3	10	



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: 4th Quarter Nitrate & Chloride

Report Date: 11/04/09 Work Order: C09101104

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2			Age					Batch:	R12594
Sample ID: MBLK-1 Nitrogen, Nitrate+Nitrite as N	Method Blank ND	mg/L	0.03		Run: TECH	INICON_091103	A	11/03	/09 10:10
Sample ID: LCS-2 Nitrogen, Nitrate+Nitrite as N	Laboratory Cor 2.57	ntrol Sample mg/L	0.10	103	Run: TECH 90	INICON_091103 110	A	11/03	/09 10:13
Sample ID: C09101127-001AMS Nitrogen, Nitrate+Nitrite as N	Sample Matrix 2.25	Spike mg/L	0.10	106	Run: TECH 90	INICON_091103 110	A	11/03	/09 10:2
Sample ID: C09101127-001AMSD Nitrogen, Nitrate+Nitrite as N	Sample Matrix 2.26	Spike Duplicate mg/L	0.10	106	Run: TECH 90	INICON_091103 110	A 0.4	11/03 10	/09 10:3

ENERGY Chain of Cus	tody an	d Analytic	al Request Rec	ord	Page of
LABORATORIES	PLEASE I	PRINT (Provide	as much information as p	ossible.)	
Company Name:	Project Nan	ne, PWS, Permit, Etc	o.	Sample Origin	EPA/State Compliance:
Denison Mines	41 00	AUTER Nitra	te & chloreide	State: IAT	Yes 🚺 No 🗆
Report Mail Address: Bax 809 Blanding UT 845/1	Contact Nar Ryan	Almer Pho	678-2221	Email:	Sampler: (Please Print) Ryan Palmer.
Invoice Address:	Invoice Cor	tact & Phone:		Purchase Order:	Quote/Bottle Order:
Special Report/Formats:				Contact ELI prio	shipped by:
DW EDD/EDT(Electronic Data) POTW/WWTP Format: State: LEVEL IV Other: NELAC	Number of Containers Sample Type: A W S V B O DW <u>Air Water Soils/Solids</u> <u>Vegetation Bioassay Other</u> DW - Drinking Water	ARIAL YSUS	CEE ATTACHED CEE A	RUSH sample s for charges and scheduling – Se Instruction Page U Comments: There will S More Samp omming Ne	be Cooler ID(s): Cooler ID(s): Vir iou's Circh(Receipt Temp $3^{\circ}C$ On Ice: N Custody Seal On Bottle Y N On Cooler N
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.) Collection Collection Time Time Time Time	MATRIX	Chi	, i i i i i i i i i i i i i i i i i i i	H Neck Under project Nav	Mrs Intact ON Signature ON Match ON
11/41/P 10.17.09 1910	1-W	XX			~
² Diez 1 111-27-19 1935	1	XX			ANG 1
3 Diaz 2 $(1.72.09 102)$					
* Piez. 3 10.27.09 1030	+(ŶX			—————————————————————————————————————
					 Ď
TWN- R 10:28:09 0820	+ /				
* TWN-1 10-28-09 1320	+ (0
7 TWN-4R 10.28.09 1010	2-10)	$\lambda \rightarrow$			
*TWN-4 10:28:09 1310	2-W,				
10					
Custody Record MUST be	An 200 Signa	iture:	Received by (print): Received by (print):	Date/Time: Date/Time: Date/Timę:	Signature: Signature: Signature:
Signed Sample Disposal: Return to Client:	Lab Dispo	sal:	Handrew 10	129/09 1410	111/

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at <u>www.energylab.com</u> for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc Workorder Receipt Checklist

Denison Mines USA Corp



Login completed by: Diane Downing		Date and Time R	eceived: 10/29/2009 2:10 PM				
Reviewed by:		Received by: al					
Reviewed Date:	Carrier name: Hand Del						
Shipping container/cooler in good condition?	Yes 🗸	No 🗌	Not Present				
Custody seals intact on shipping container/cooler?	Yes 🗸	No 🗌	Not Present				
Custody seals intact on sample bottles?	Yes 🗌	No 🗌	Not Present 🗹				
Chain of custody present?	Yes 🗹	No 🗌					
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌					

Yes 🗸

Yes 🔽

Yes 🔽

Yes 🔽

Yes 🔽

3°C On Ice

Yes 🗌

Yes 🗸

No 🗌

No 🗌

No 🗌

No 🗌

No 🗍

No 🗌

No 🗌

No VOA vials submitted 🔽

Not Applicable

Contact and Corrective Action Comments:

Chain of custody agrees with sample labels?

Sufficient sample volume for indicated test?

All samples received within holding time?

Water - VOA vials have zero headspace?

Container/Temp Blank temperature:

Water - pH acceptable upon receipt?

Samples in proper container/bottle?

Sample containers intact?

None



ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602 Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

CLIENT: Denison Mines USA Corp

Project: 4th Quarter Nitrate & Chloride

Sample Delivery Group: C09101104

Date: 04-Nov-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS

The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES

All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS

Data for PCBs, Atrazine and Simazine are reported from EPA 525.2. PCB data reported by ELI reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT eli-g - Energy Laboratories, Inc. - Gillette, WY eli-h - Energy Laboratories, Inc. - Helena, MT eli-r - Energy Laboratories, Inc. - Rapid City, SD eli-t - Energy Laboratories, Inc. - College Station, TX

CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER:

The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER,WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT



ANALYTICAL SUMMARY REPORT

October 21, 2009

Denison Mines USA Corp 6425 S Hwy 191 Blanding, UT 84511

Workorder No.: C09100620

Project Name: Frog Pond

Energy Laboratories, Inc. received the following 1 sample for Denison Mines USA Corp on 10/15/2009 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C09100620-00	1 Frog Pond	10/14/09 08:52	10/15/09	Aqueous	Nitrogen, Nitrate + Nitrite

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

Stephanie D. Waldy

Reporting Supervisor



LABORATORY ANALYTICAL REPORT

Client:	Denison Mines USA	Corp					Report Da	te: 10/21/09
Project:	Frog Pond					c	Collection Da	te: 10/14/09 08:52
Lab ID:	C09100620-001						DateReceive	ed: 10/15/09
Client Sample I	D: Frog Pond						Mati	rix: Aqueous
						MCL/		
Analyses		Result	Units	Qualifiers	RL	QCL	Method	Analysis Date / By
MAJOR IONS								
Nitrogen, Nitrate+I	Nitrite as N	ND	mg/L		0.1		E353.2	10/20/09 15:54 / jal

Report Definitions: RL - Analyte reporting limit. QCL - Quality control limit.



QA/QC Summary Report

Client: Denison Mines USA Corp

Project: Frog Pond

Report Date: 10/21/09 Work Order: C09100620

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Batch:	R12535
Sample ID: MBLK-1	Me	thod Blank				Run: TECH	NICON_091020A	4	10/20	/09 12:5
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.03						
Sample ID: LCS-2	Lat	poratory Cor	ntrol Sample			Run: TECH	NICON_091020A	4	10/20	/09 12:5
Nitrogen, Nitrate+Nitrite as N		2.44	mg/L	0.10	98	90	110			
Sample ID: C09100600-001DMS	Sa	mple Matrix	Spike			Run: TECH	NICON_091020A	4	10/20	/09 15:4
Nitrogen, Nitrate+Nitrite as N		1.93	mg/L	0.10	96	90	110			
Sample ID: C09100600-001DMSI) Sa	mple Matrix	Spike Duplicate			Run: TECH	NICON_091020A	4	10/20	/09 15:4
Nitrogen, Nitrate+Nitrite as N		1.92	mg/L	0.10	96	90	110	0.5	10	

	Chain of C	ustody ar	nd A	Analy	tical R	eque	est R	eco	ord		Page)of
LABORATORIES		PLEASE	PRIN	T (Prov	ide as mud	ch inform	nation a	is po	ssible	.)	-	
Company Name:		Project Nar	ne, PV	VS, Permit	, Etc.					ole Origin	EPA/State C	
Denison Mines (USA) corp.	Fros	Pond	L	Phone/Fax:				State	: Utah	Yes 🗌	No 🗌
Report Mail Address: P.O. Box 809		Contact Na	me:		Phone/Fax:				Emai	2	Sampler: (P	
Blanding, Utah	-	Davie	Turk	k	435.678.z	221 /435	678,22	24	dtor	kedenison miner	and the second se	
Invoice Address:		Invoice Co	ntact &	Phone:					Purch	nase Order:	Quote/Bottle	e Order:
-Same -			- 54	me-								
	EDD/EDT(Electronic Format: LEVEL IV NELAC	Number of Containers Sample Type: A W S V B O DW Air Water Solis/Solids Vegetation Bioassay Other DW - Drinking Water	Nithak B	IALYS	IS REQU	JESTE	SEE ATTACHED	Standard Turnaround (TAT)	R U S	Contact ELI prior RUSH sample su for charges and scheduling – See Instruction Page Comments:	Reci On I Cust	ody Seal Bottle Cooler
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Collection Date Time		2					00	Н		1. A	ature V N
Frog Pond	10/14/09 088	2 1-W									ATIM	09100620
3											0	
5				_							S	
6												
7								-			ITOR	
8					_						RA'	
9			+					-				
10			+	_							LANE	
Custody Relinquished by (print):	Date/Time:	Sign	ature:	M	Receiv	ed by (print):		<u> </u>	Date/Time		Signature:	
Becord David Turk	Date/Time:	200	ature:	Hal	Receiv	ed by (print):		[Date/Time	£	Signature:	
MUST be Signed Sample Disposal:	0	Lab Dispo	sal:	TOUM	Receiv	red by Labor:	amy	14	Date/Time	5/15 14:0	Signature:	

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Energy Laboratories Inc Workorder Receipt Checklist

Denison Mines USA Corp



Login completed by:	Tabitha Edwards
Reviewed by:	

Reviewed Date:

Date and Time Received: 10/15/2009 2:02 PM

Received by: em

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present
Custody seals intact on shipping container/cooler?	Yes 🗹	No 🗌	Not Present
Custody seals intact on sample bottles?	Yes 🗸	No 🗌	Not Present
Chain of custody present?	Yes 🗸	No 🗌	
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌	
Chain of custody agrees with sample labels?	Yes 🗹	No 🗌	
Samples in proper container/bottle?	Yes 🗹	No 🗌	
Sample containers intact?	Yes 🗸	No 🔲	
Sufficient sample volume for indicated test?	Yes 🗹	No 🗌	
All samples received within holding time?	Yes 🗹	No 🗌	
Container/Temp Blank temperature:	3°C On Ice		
Water - VOA vials have zero headspace?	Yes	No 🗌	No VOA vials submitted
Water - pH acceptable upon receipt?	Yes 🗹	No 🗌	Not Applicable

Contact and Corrective Action Comments:

None



CLIENT: Denison Mines USA Corp

Project: Frog Pond

Sample Delivery Group: C09100620

Date: 21-Oct-09

CASE NARRATIVE

ORIGINAL SAMPLE SUBMITTAL(S)

All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS

Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

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The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

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ATRAZINE, SIMAZINE AND PCB ANALYSIS

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CERTIFICATIONS:

USEPA: WY00002, Radiochemical WY00937; FL-DOH NELAC: E87641, Radiochemical E871017; California: 02118CA; Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

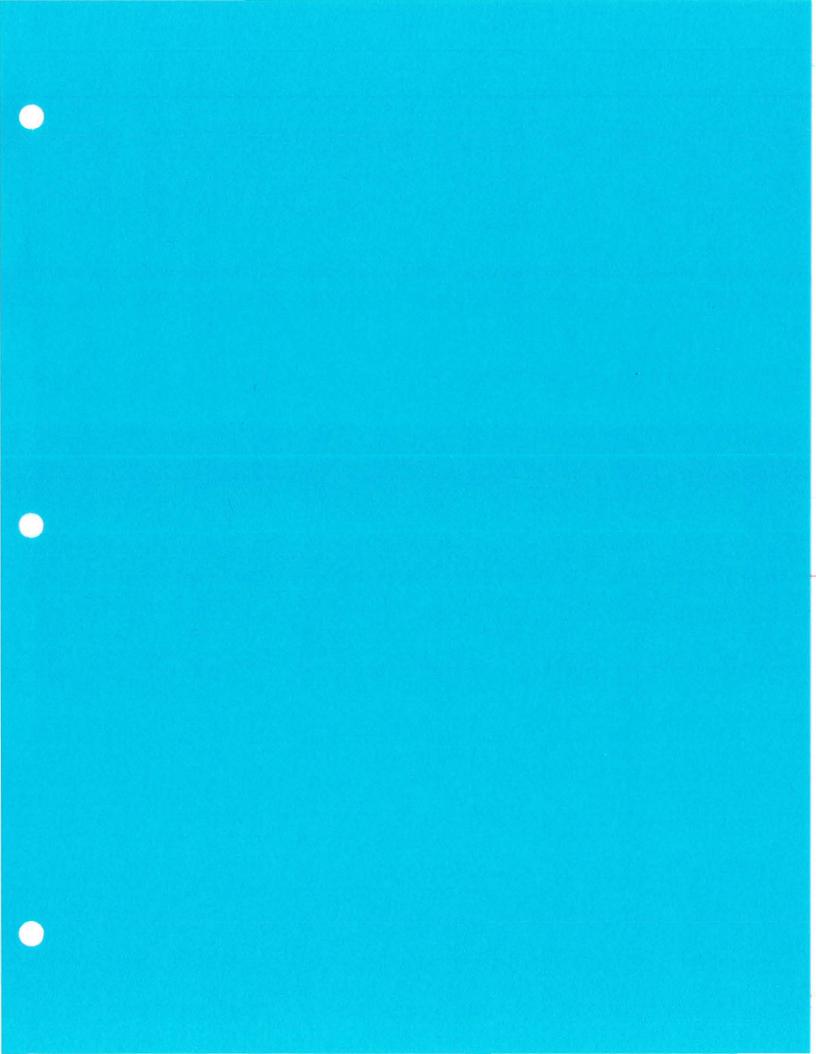
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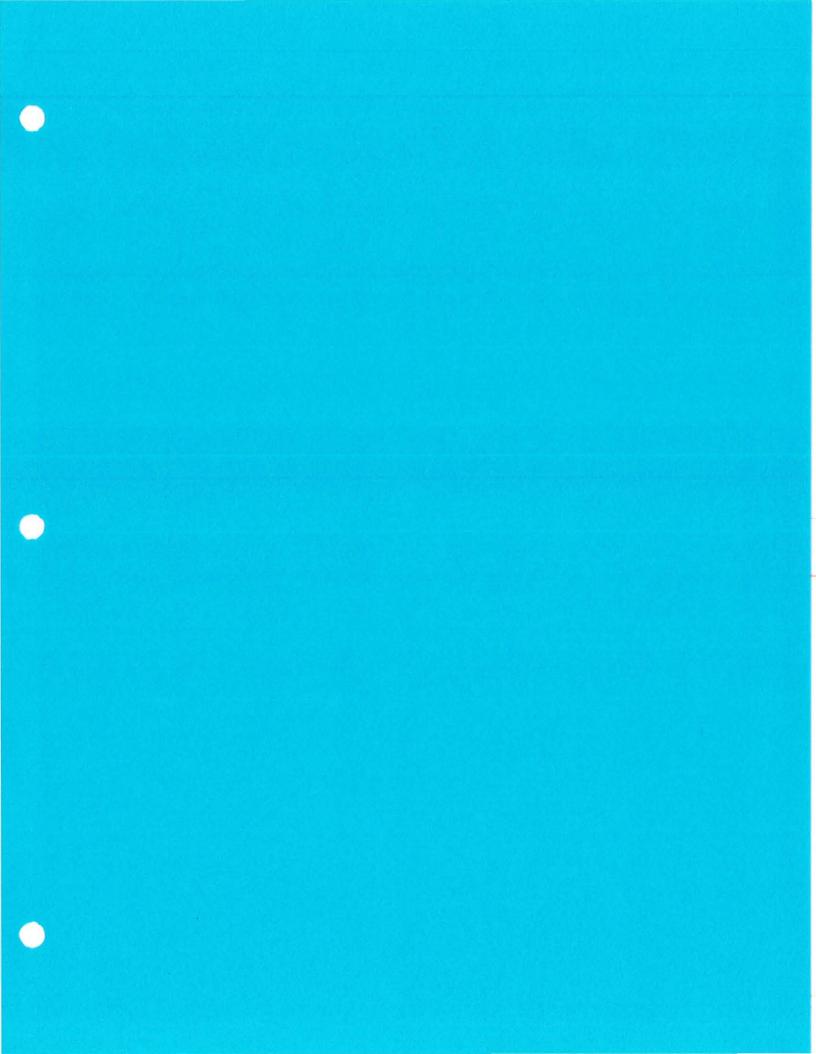
ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT



Tab G

CSV Files to be sent via email by 1-4-10



Tab H

TWN-1		
Date	Nitrate (mg/l)	Chloride (mg/l)
2/6/2009	0.7	19
7/21/2009	0.4	17
9/21/2009	0.4	19
10/28/2009	0.5	18

TWN-2	Nitrate (mg/l)	Chloride (mg/l)
Date		
2/6/2009	25.4	29
7/21/2009	25	25
9/21/2009	22.6	17
11/2/2009	20.8	55

TWN-3	Nitrate (mg/l)	Chloride (mg/l)
Date		
2/6/2009	23.6	96
7/21/2009	25.3	96
9/21/2009	27.1	99
11/2/2009	29	106

Nitrate (mg/l)	Chloride (mg/l)
1	13
0.05	12
0.4	13
0.4	11
	1 0.05 0.4

TWN-5	Nitrate (mg/l)	Chloride (mg/l)
Date		
8/25/2009	22	42
9/21/2009	0.5	45
11/10/2009	0.2	48

TWN-6	Nitrate (mg/l)	Chloride (mg/l)
Date		
8/25/2009	3.2	32
9/22/2009	1.6	13
11/3/2009	1.4	21

TWN-7	Nitrate (mg/l)	Chloride (mg/l)
Date		
8/25/2009	NE) 11
9/21/2009	NE) 7
11/10/2009	0.1	. 7

TWN-8 Date	Nitrate (mg/l)	Chloride (mg/l)	
8/25/2009	NC		
9/21/2009 11/10/2009	NC NC		

TWN-9	Nitrate (mg/l)	Chloride (mg/l)
Date		
8/25/2009	9.3	169
9/22/2009	8.9	201
11/10/2009	12	205

TWN-10	Nitrate (mg/l)	Chloride (mg/	1)
Date			
8/25/2009	1	.1	19
9/22/2009	1	.6	35
11/10/2009	1	.4	26

 TWN-11
 Nitrate (mg/l)
 Chloride (mg/l)

 Date
 11/3/2009
 1.3
 74

TWN-12 Nitrate (mg/l) Chloride (mg/l) Date 11/3/2009 0.5 109 TWN-13 Nitrate (mg/l) Chloride (mg/l) Date 11/4/2009 0.5 83 TWN-14 Nitrate (mg/l) Chloride (mg/l) Date 11/4/2009 3.4 32 TWN-15 Nitrate (mg/l) Chloride (mg/l) Date 11/10/2009 1.1 78 TWN-16 Nitrate (mg/l) Chloride (mg/l) Date 11/4/2009 1 39 TWN-17 Nitrate (mg/l) Chloride (mg/l) Date 11/4/2009 6.7 152
 TWN-18
 Nitrate (mg/l)
 Chloride (mg/l)

 Date
 11/2/2009
 1.3
 57

TWN-19 Nitrate (mg/l) Chloride (mg/l) Date 11/2/2009 7.4 125

Piezometer 1	Nitrate (mg/l)	Chloride (mg/l)
Date		
2/19/2009	6.8	NA
7/14/2009	6.8	60
9/22/2009	7.3	78
10/27/2009	7.4	61

Piezometer 2	Nitrate (mg/l)	Chloride (mg/l)
Date		
2/19/2009	0.5	NA
7/14/2009	0.5	7
9/22/2009	0.5	17
10/27/2009	0.6	7

Piezometer 3	Nitrate (mg/l)	Chloride (mg/l)
Date		
2/19/2009	0.7	NA
7/14/2009	0.8	12
9/22/2009	0.8	24
10/27/2009	1.2	19

Piezometer 4	Nitrate (mg/l)	Chloride (mg/l)
Date		
7/14/2009	1.	8 46

Piezometer 5	Nitrate (mg/l)	Chloride (mg/l)
Date		
7/14/2009	0.	7 18

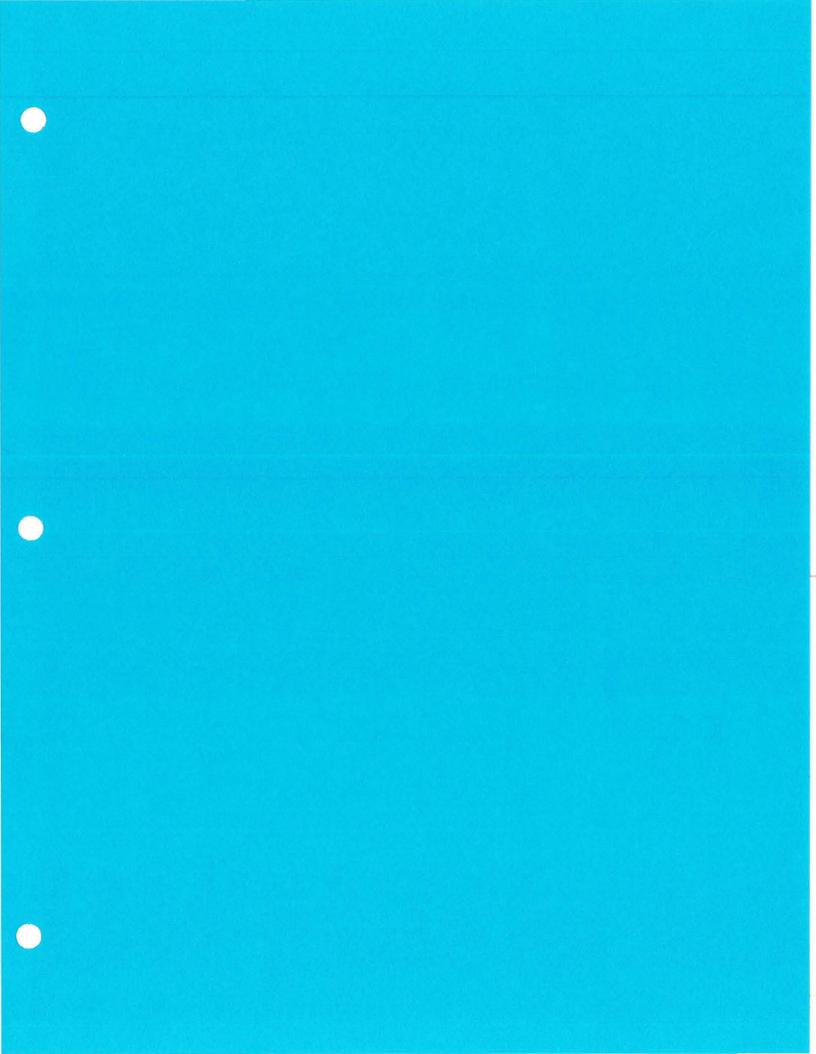
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Date		
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Date		
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Date	Nitrate (mg/l)	Chloride (mg/l)
9/22/2009	NI	D 5
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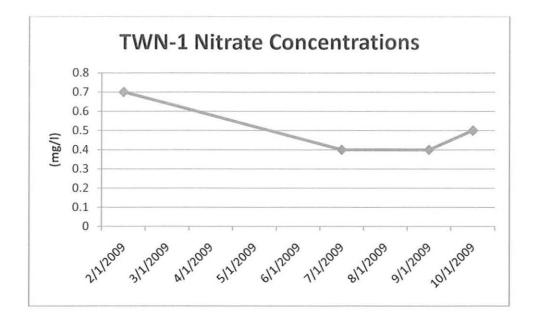
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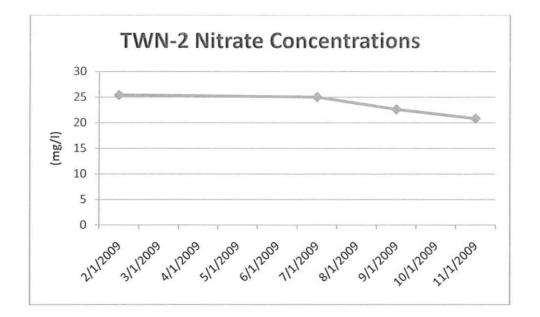
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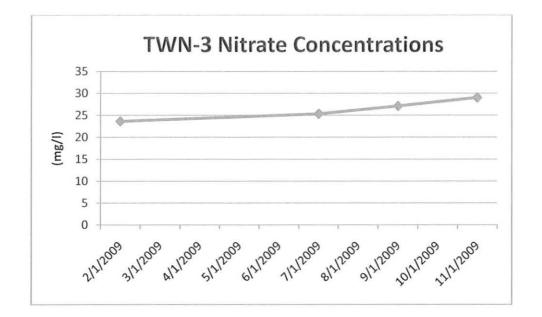


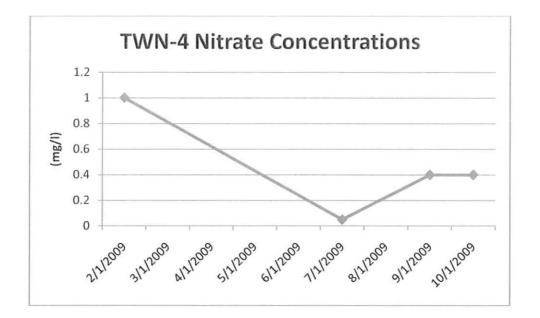
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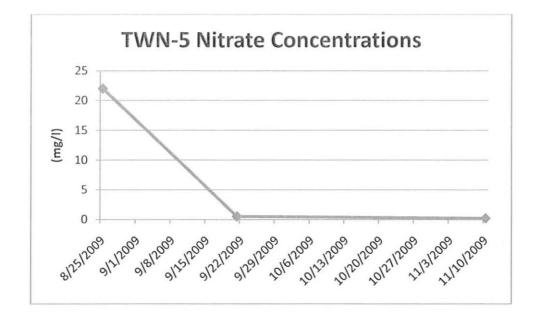
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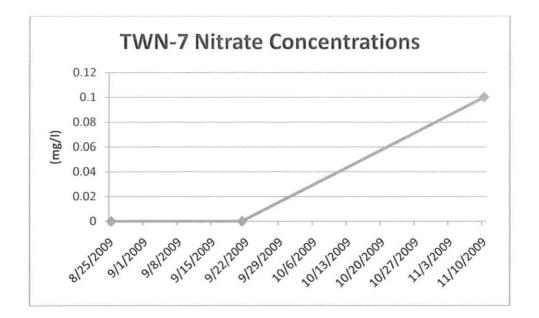


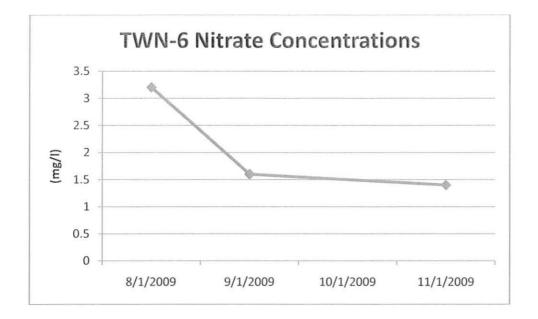


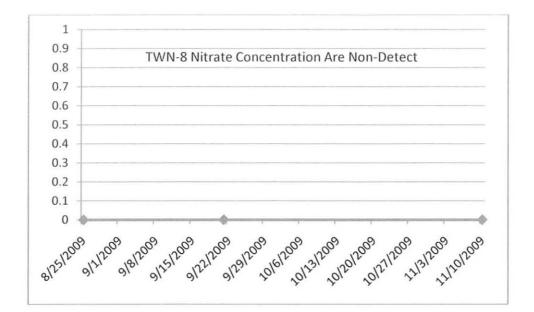


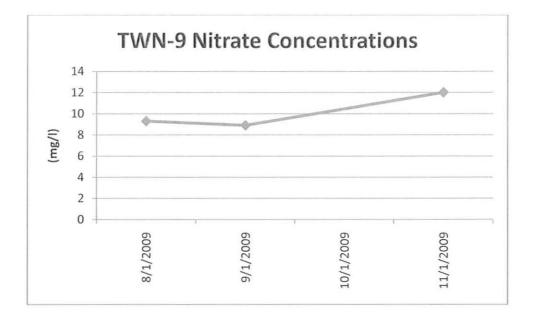


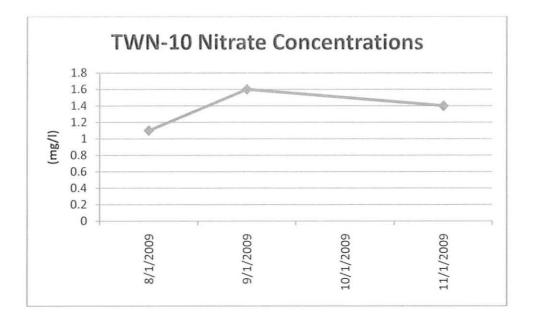


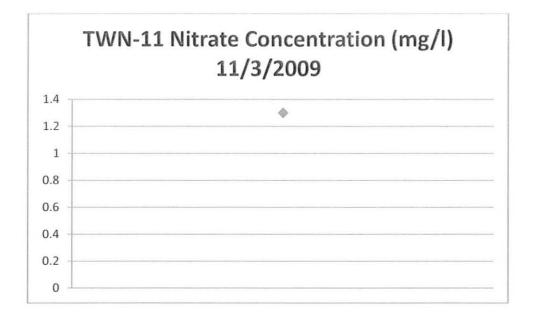


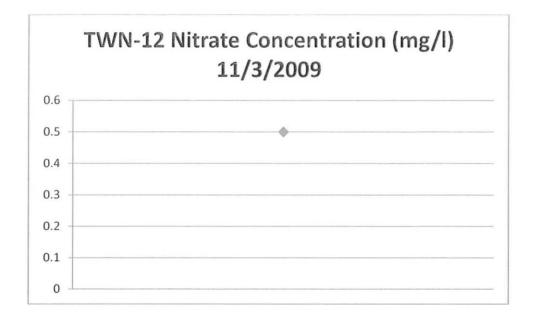


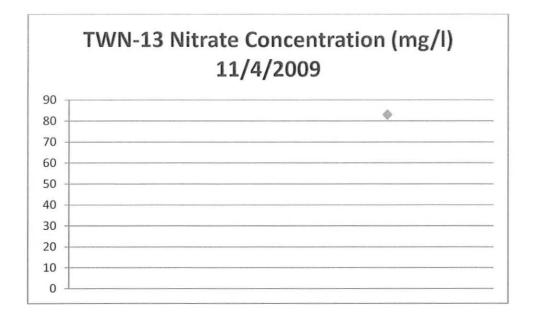


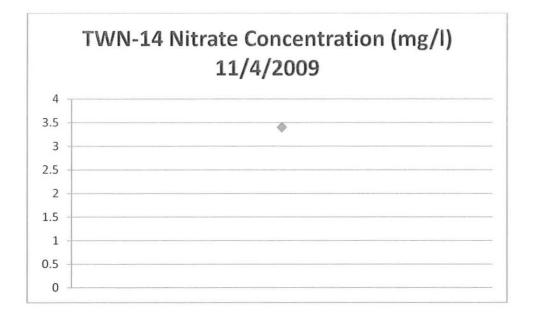


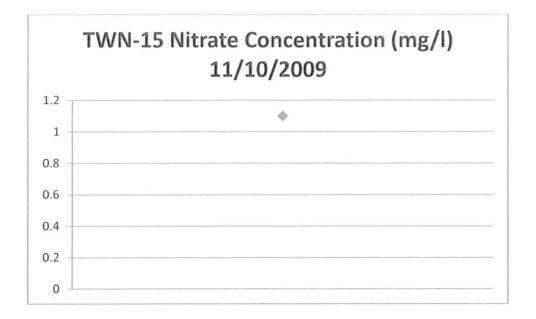


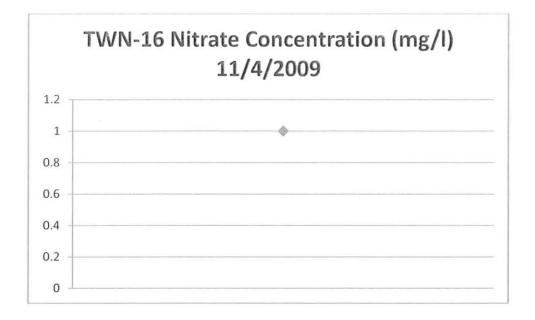


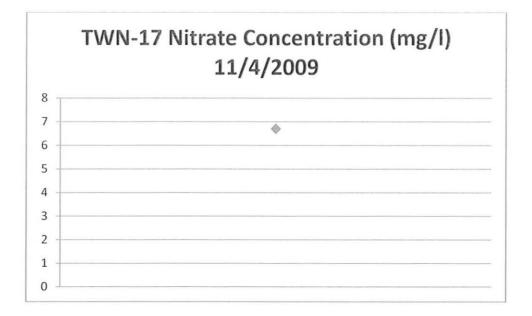


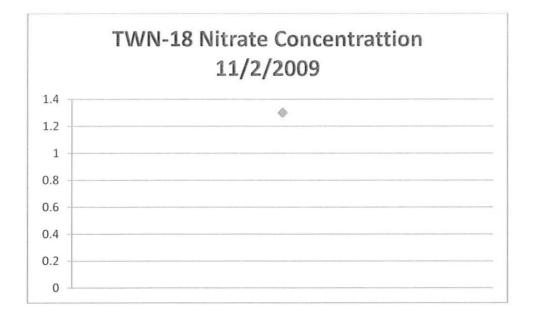


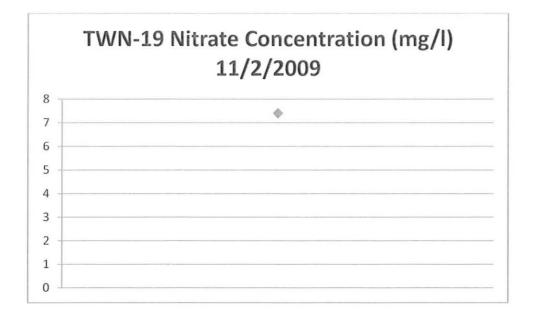


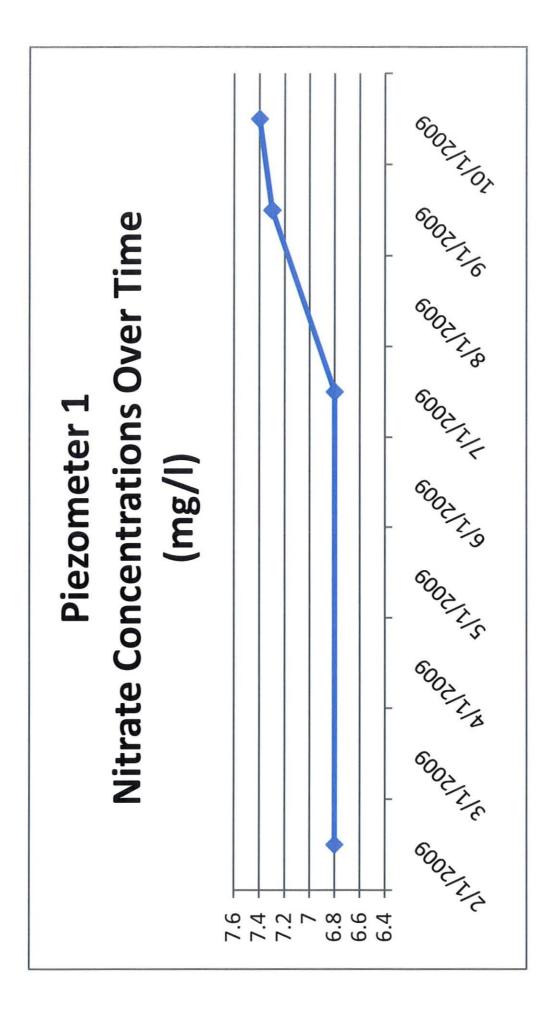


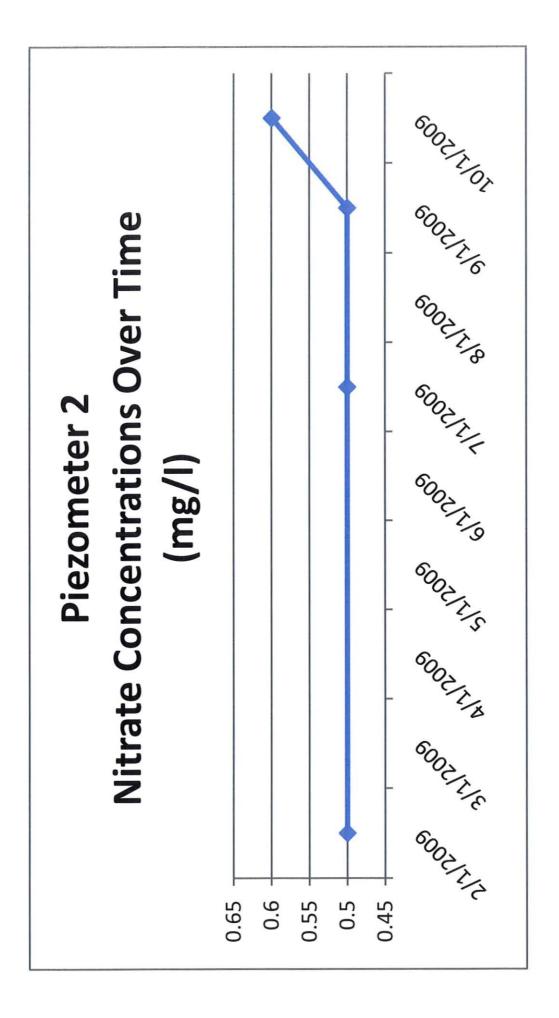


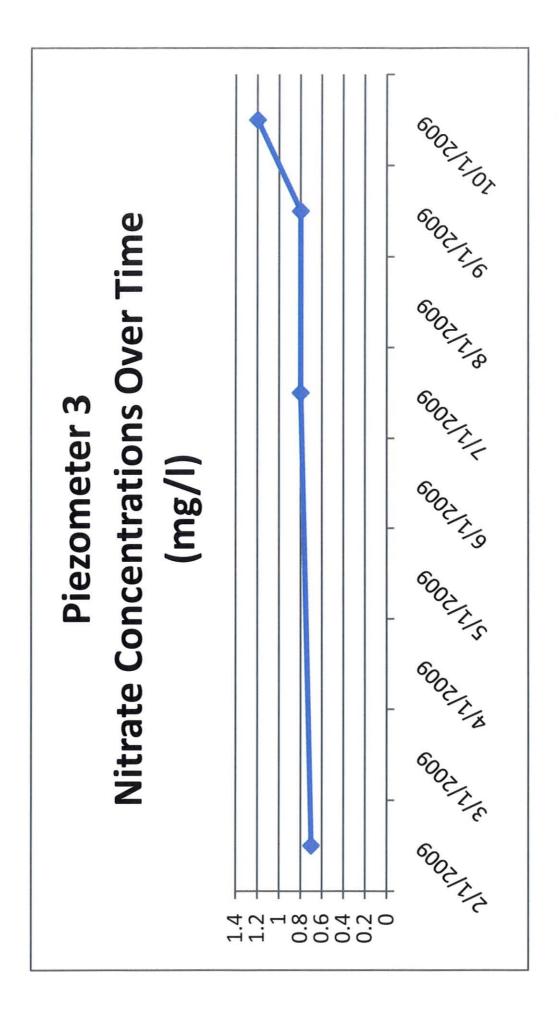


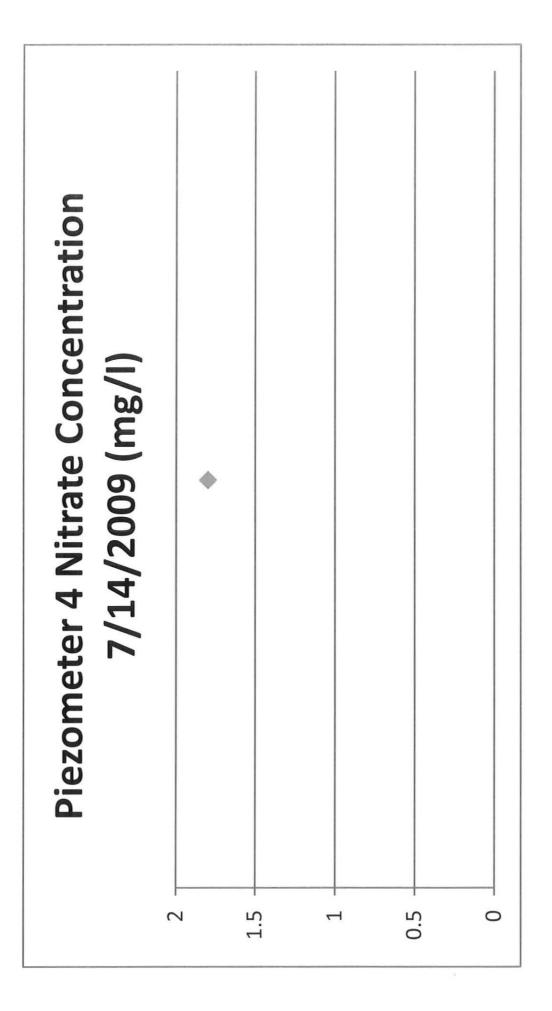


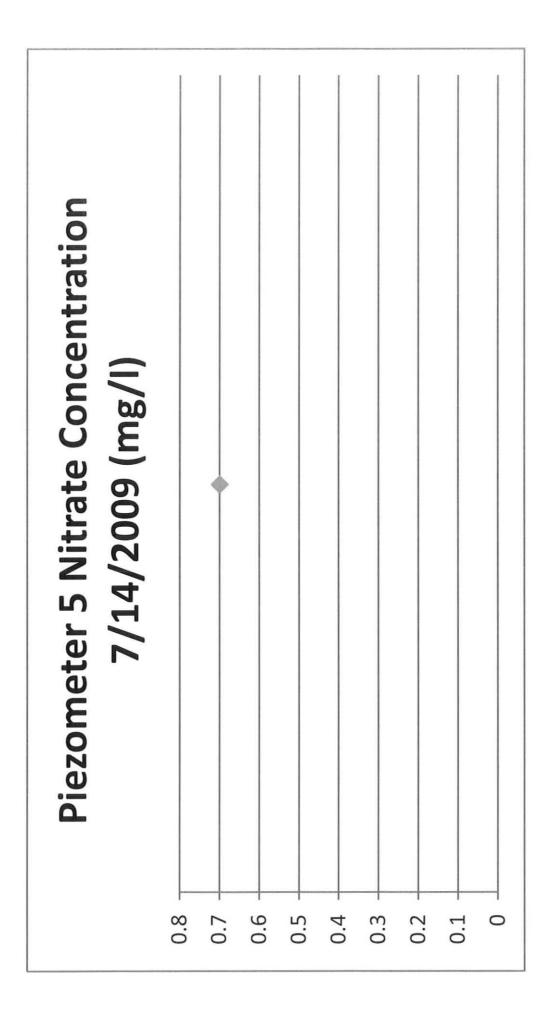


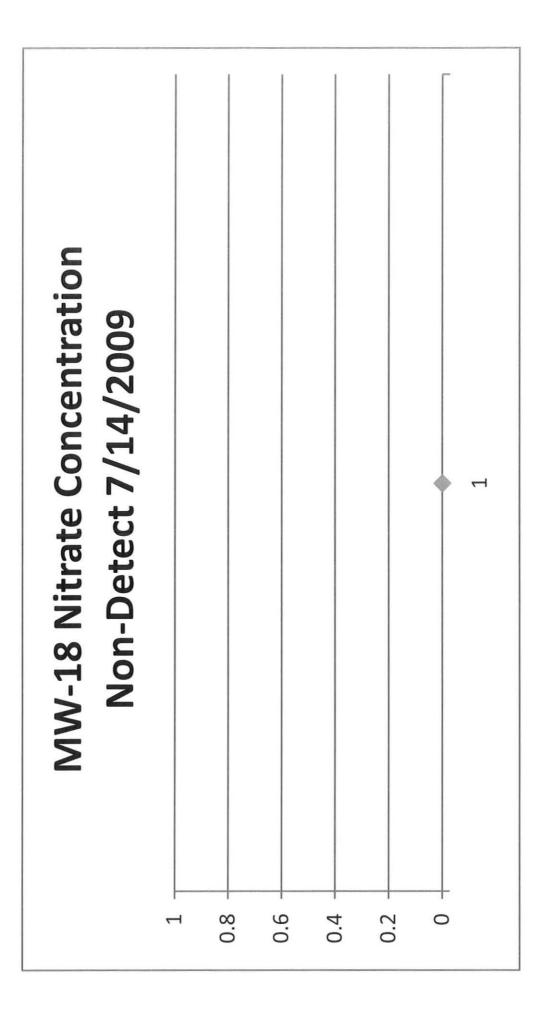


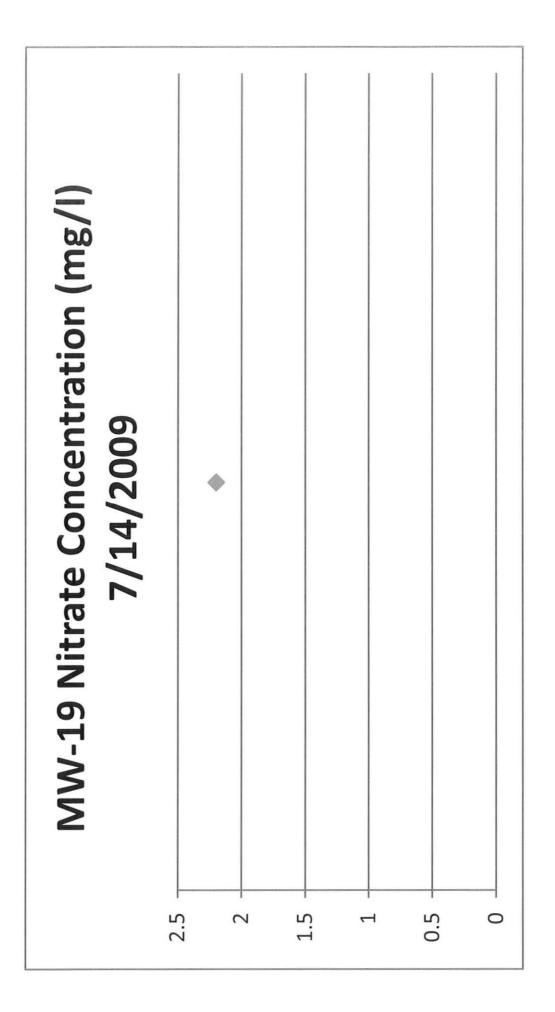


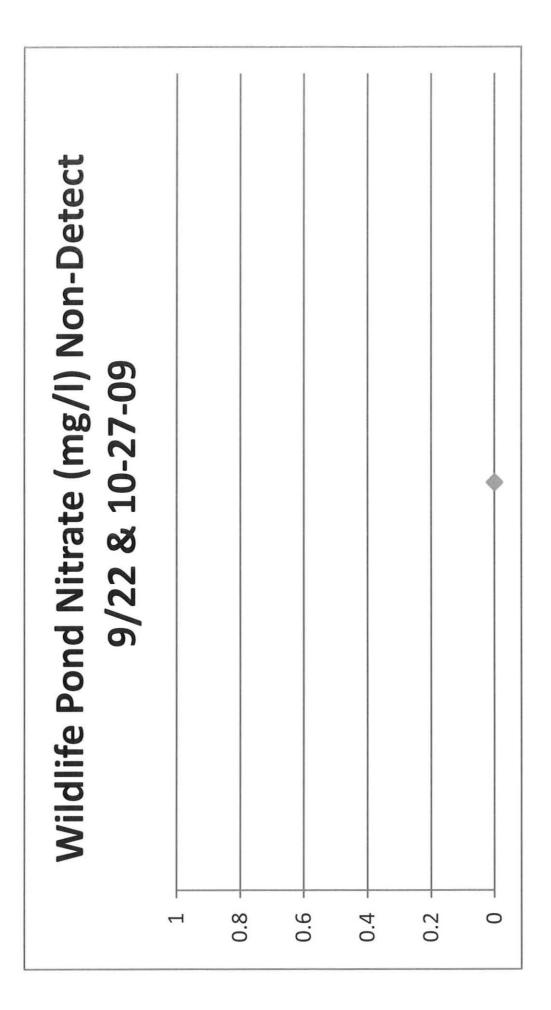


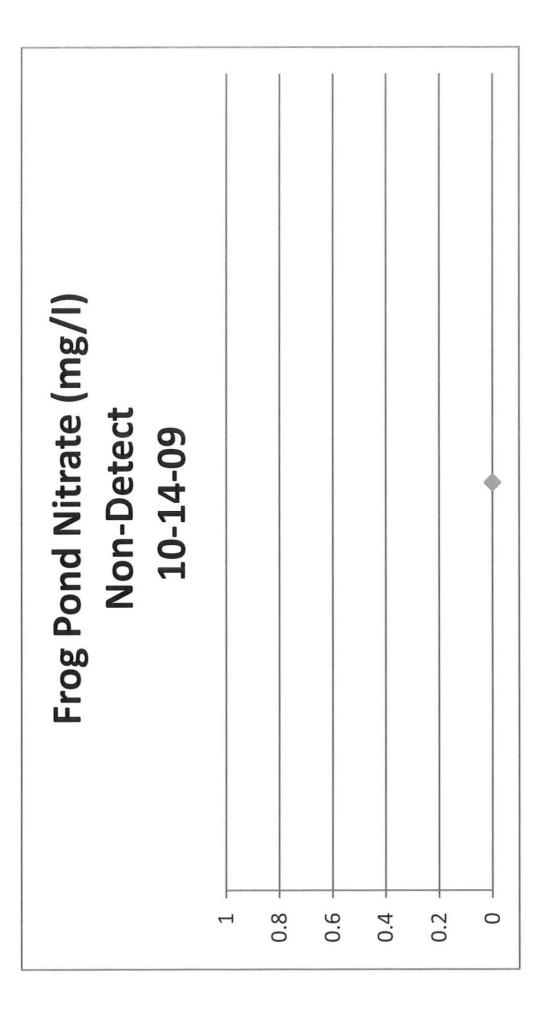




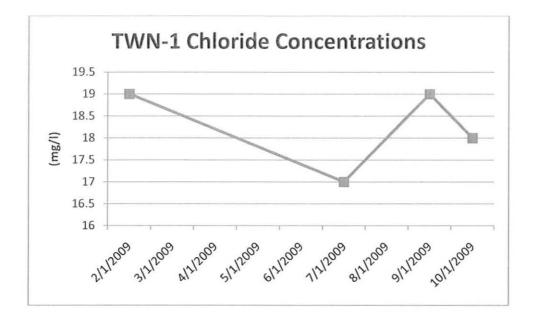


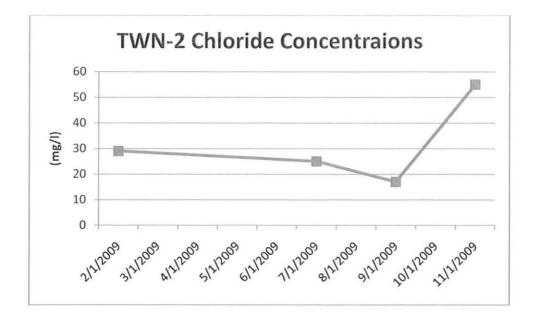


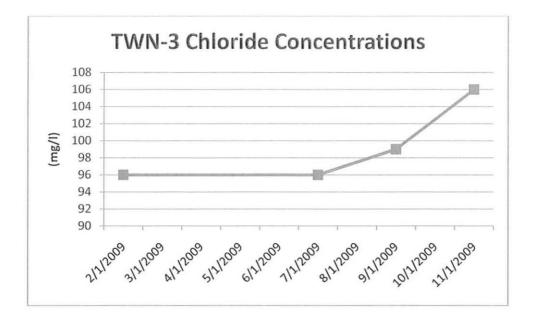


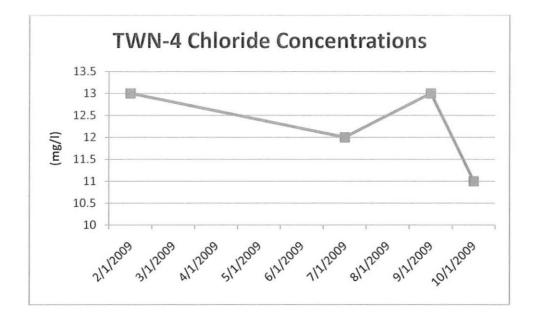


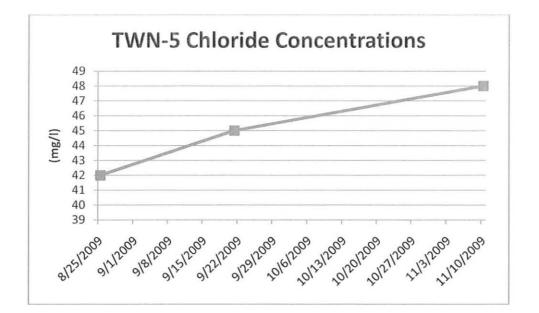
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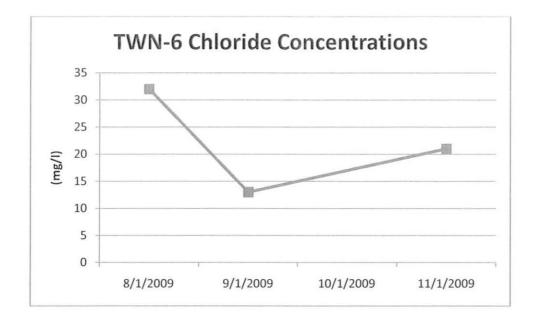


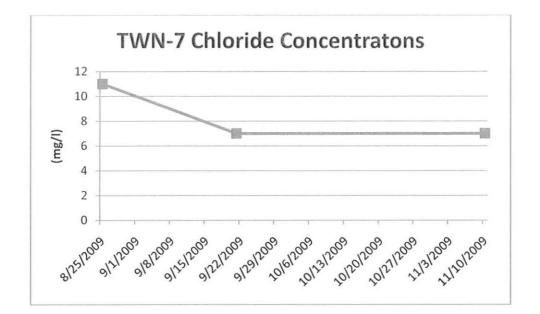


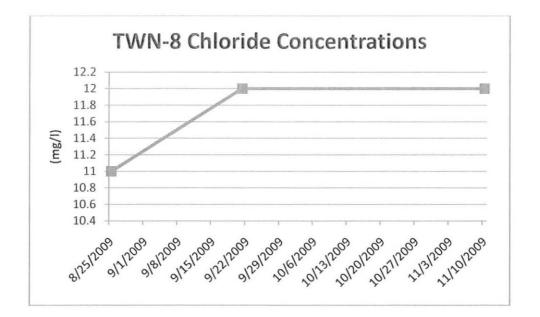


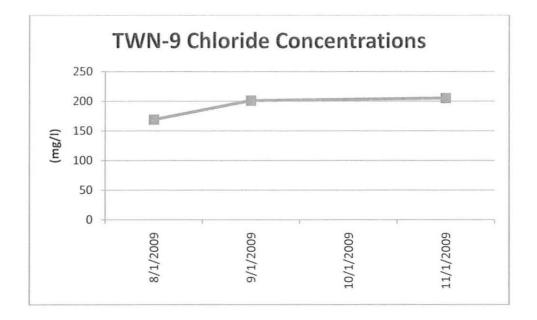


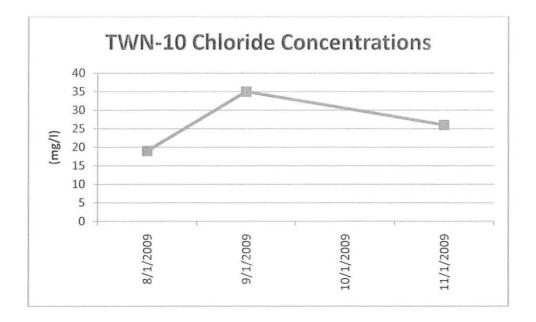


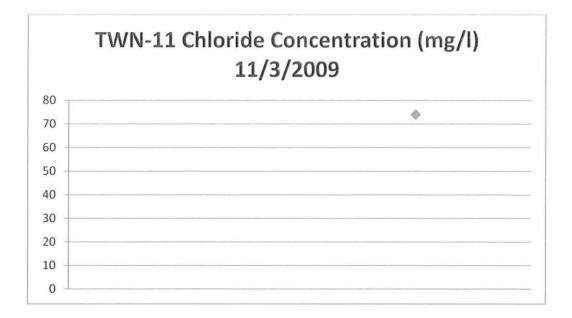


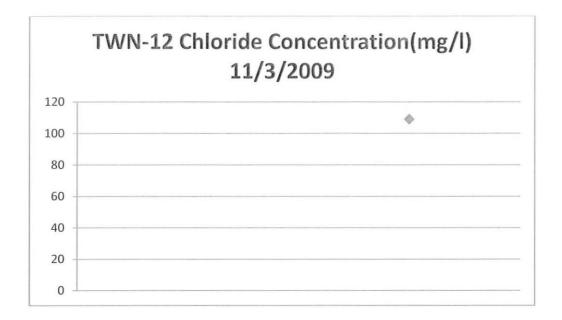


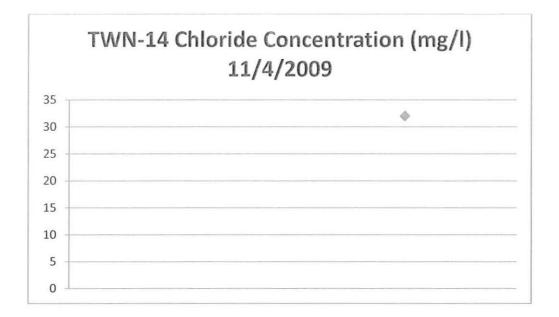


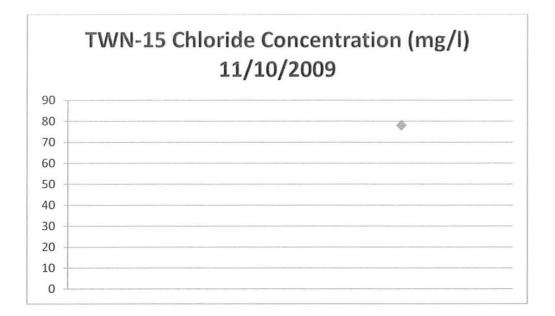


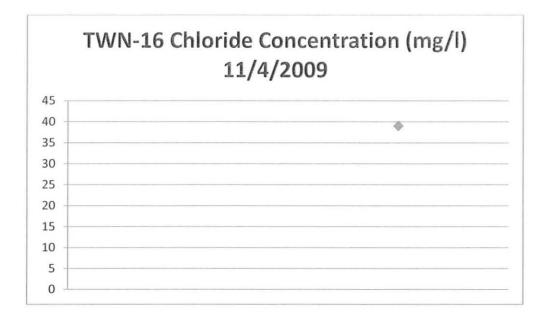


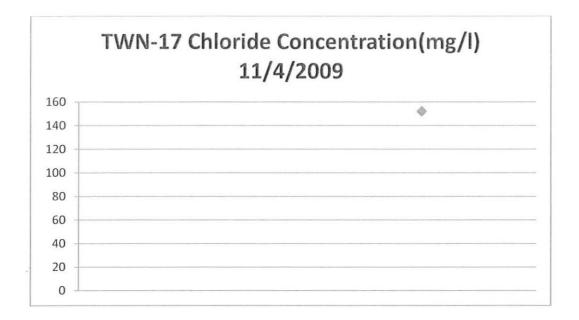


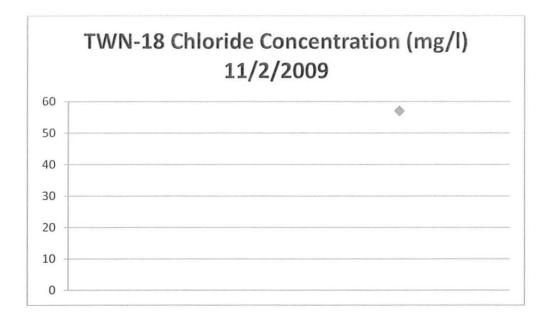


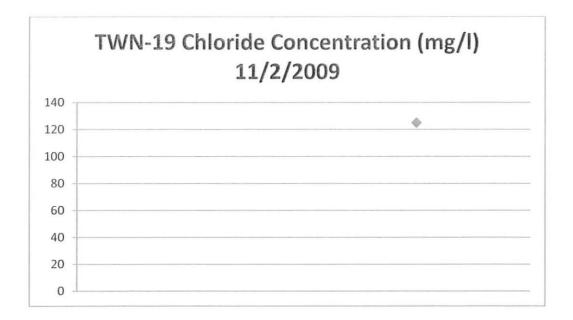


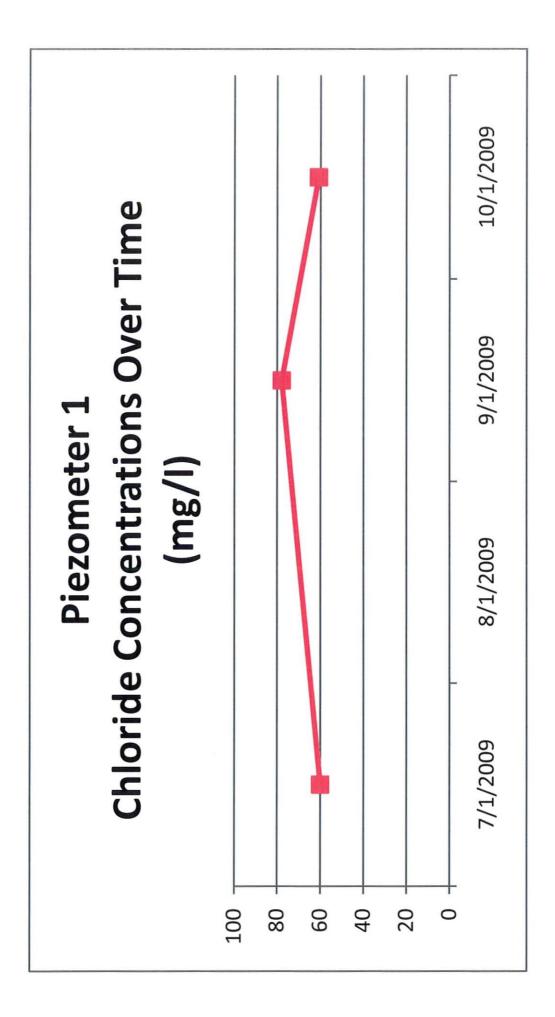


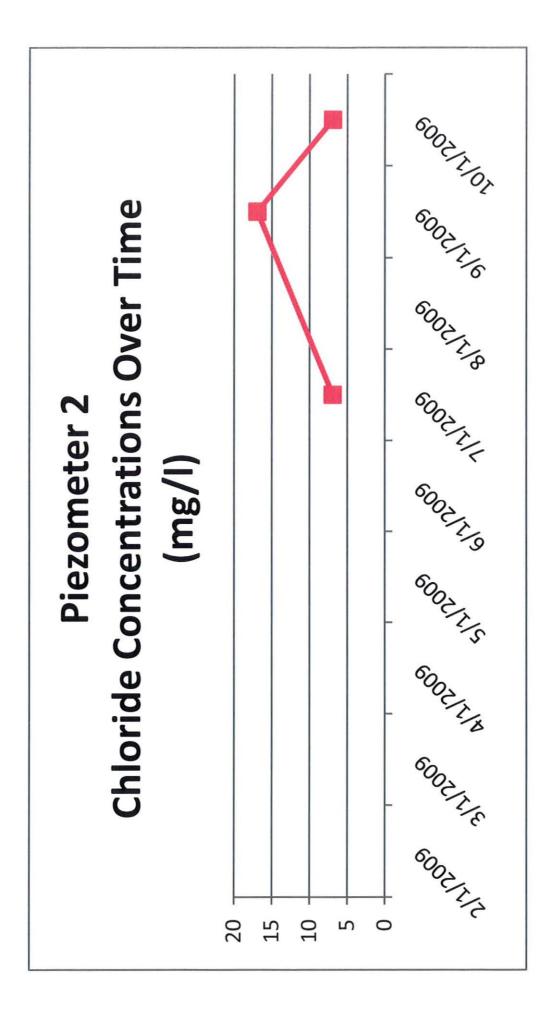


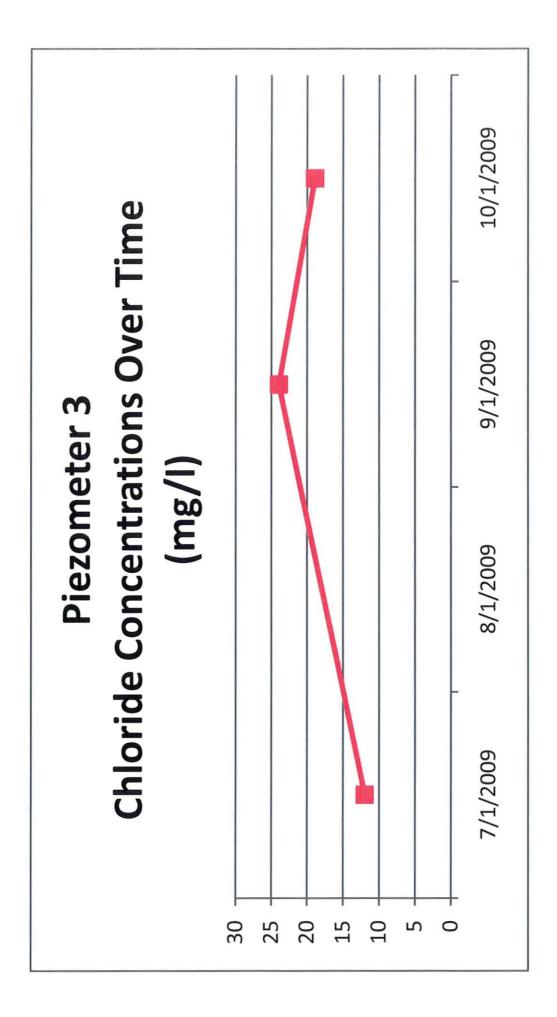


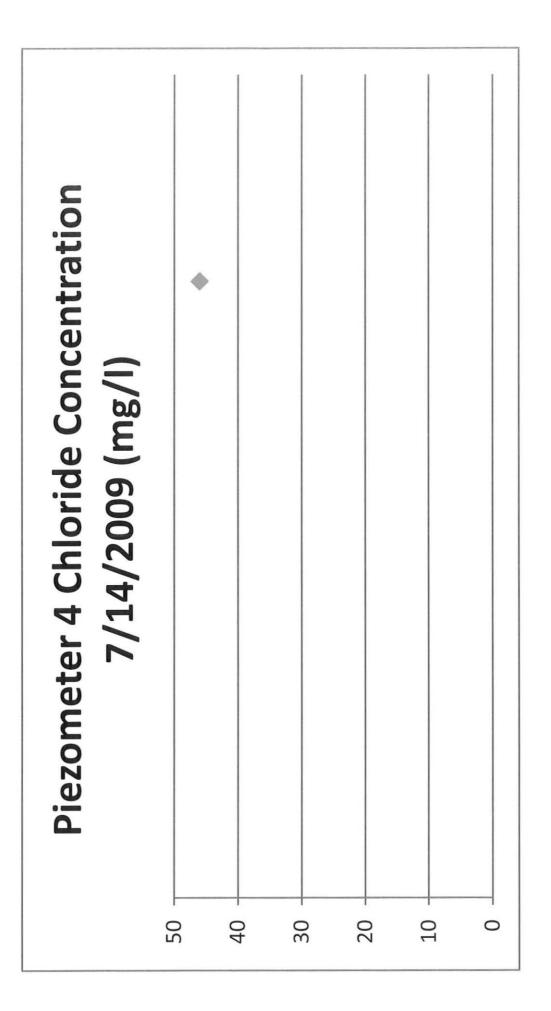


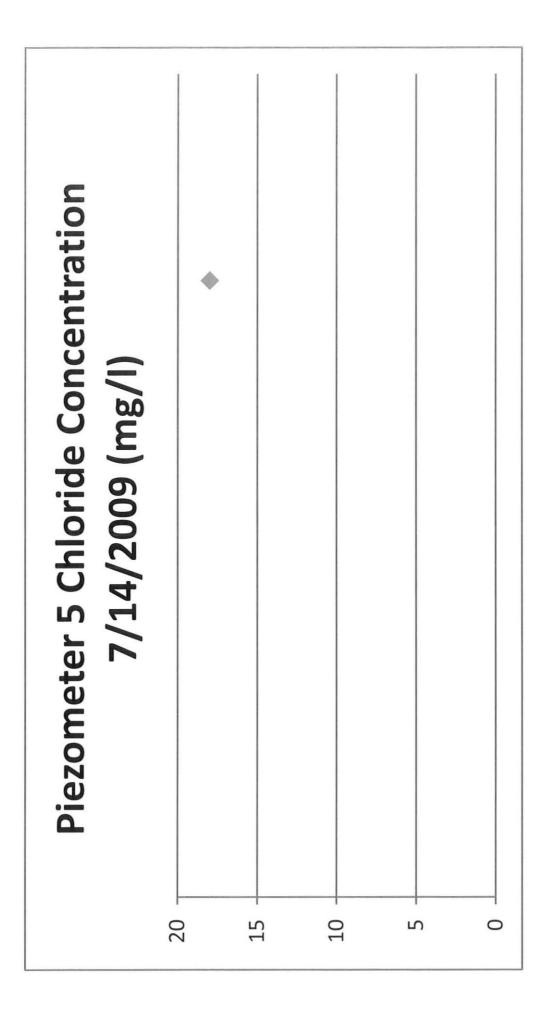


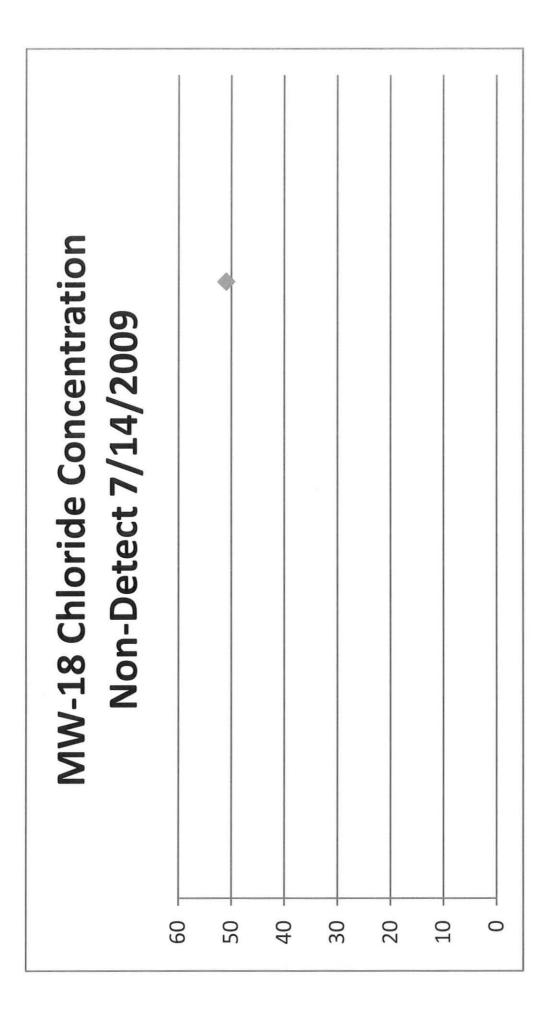


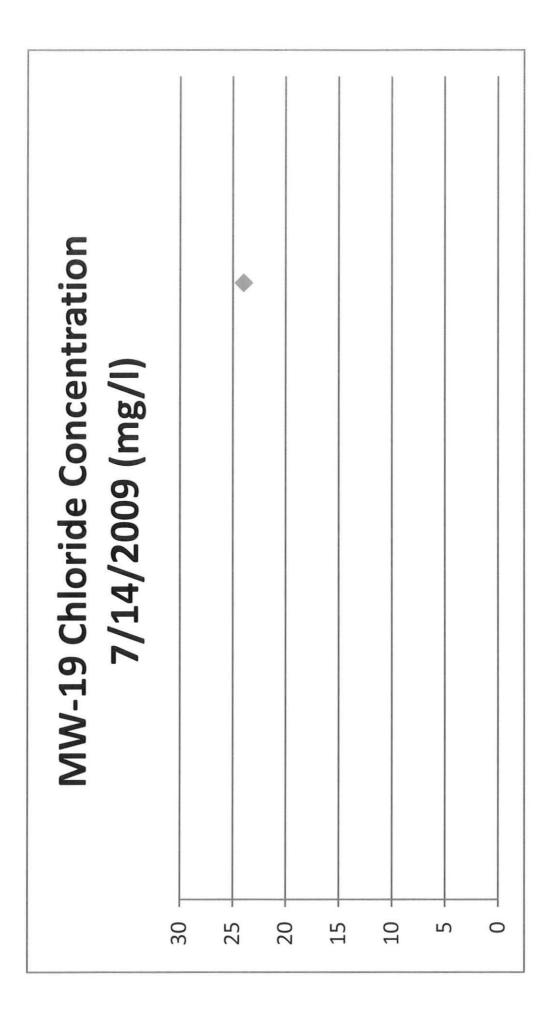


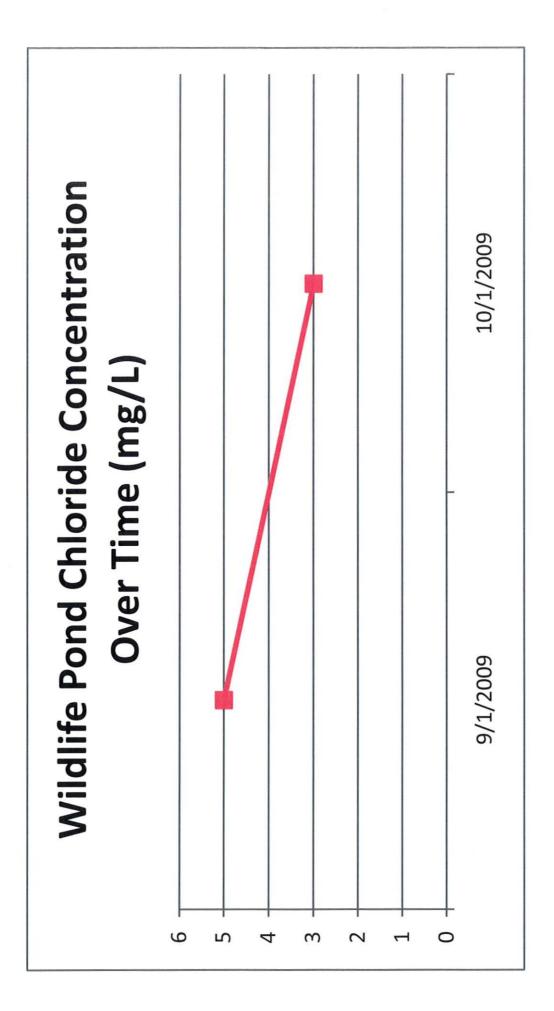












Attachment 5

Site Hydrogeology and Estimation of Groundwater Pore Velocities in the Perched Zone White Mesa Uranium Mill Site near Blanding, Utah (Hydro Geo Chem, 2009)

SITE HYDROGEOLOGY AND ESTIMATION OF GROUNDWATER PORE VELOCITIES IN THE PERCHED ZONE WHITE MESA URANIUM MILL SITE NEAR BLANDING, UTAH

Prepared for:

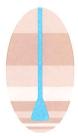
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December 29, 2009



HYDRO GEO CHEM, INC.

Environmental Science & Technology

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1. INTRODUCTION

This report provides a brief description of the hydrogeology of the White Mesa Uranium Mill Site, located south of Blanding, Utah, and focuses on the occurrence and flow of groundwater within the relatively shallow perched groundwater zone at the site. Based on available existing hydrogeologic information from the site, estimates of hydraulic gradients and intergranular rates of groundwater movement (interstitial or pore velocities) are provided. These estimates are then used to calculate average pore velocities for a hypothetical conservative solute (assuming no hydrodynamic dispersion) within 1) an area downgradient of the tailings cells, 2) beneath and immediately upgradient and crossgradient of the tailings cells, and 3) within the northeastern portion of the site.

The results of hydraulic testing of the TWN-series wells, located in the northeastern portion of the site are provided in Appendix A and are used to calculate pore velocities in an area affected by elevated nitrate concentrations. Figure 1 shows the locations of these and other perched zone monitoring wells at the site.

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2. SITE HYDROGEOLOGY

Titan, 1994 provides a detailed description of site hydrogeology based on information available at that time. A brief summary of site hydrogeology that is based primarily on Titan, 1994, but includes the results of more recent site investigations, is provided below.

2.1 Geologic Setting

The White Mesa Uranium Mill site (the "Mill" or the "site") is located within the Blanding Basin of the Colorado Plateau physiographic province. Typical of large portions of the Colorado Plateau province, the rocks underlying the site are relatively undeformed. The average elevation of the site is approximately 5,600 feet above mean sea level (ft amsl).

The site is underlain by unconsolidated alluvium and indurated sedimentary rocks consisting primarily of sandstone and shale. The indurated rocks are relatively flat lying with dips generally less than 3°. The alluvial materials consist mostly of aeolian silts and fine-grained aeolian sands with a thickness varying from a few feet to as much as 25 to 30 feet across the site. The alluvium is underlain by the Dakota Sandstone and Burro Canyon Formation, which are sandstones having a total thickness ranging from approximately 100 to 140 feet. Beneath the Burro Canyon Formation lies the Morrison Formation, consisting, in descending order, of the Brushy Basin Member, the Westwater Canyon Member, the Recapture Member, and the Salt Wash Member. The Brushy Basin and Recapture Members of the Morrison Formation, classified as shales, are very fine-grained and have a very low permeability. The Brushy Basin

Member is primarily composed of bentonitic mudstones, siltstones, and claystones. The Westwater Canyon and Salt Wash Members also have a low average vertical permeability due to the presence of interbedded shales.

Beneath the Morrison Formation lie the Summerville Formation, an argillaceous sandstone with interbedded shales, and the Entrada Sandstone. Beneath the Entrada lies the Navajo Sandstone. The Navajo and Entrada Sandstones constitute the primary aquifer in the area of the site. The Entrada and Navajo Sandstones are separated from the Burro Canyon Formation by approximately 1,000 to 1,100 feet of materials having a low average vertical permeability. Groundwater within this system is under artesian pressure in the vicinity of the site, is of generally good quality, and is used as a secondary source of water at the site.

2.2 Hydrogeologic Setting

The site is located within a region that has a dry to arid continental climate, with an average annual precipitation of approximately 13.3 inches, and an average annual lake evaporation rate of approximately 47.6 inches. Recharge to aquifers occurs primarily along the mountain fronts (for example, the Henry, Abajo, and La Sal Mountains), and along the flanks of folds such as Comb Ridge Monocline.

Although the water quality and productivity of the Navajo/Entrada aquifer are generally good, the depth of the aquifer (approximately 1,200 feet below land surface [ft bls]) makes access difficult. The Navajo/Entrada aquifer is capable of yielding significant quantities of water

to wells (hundreds of gallons per minute [gpm]). Water in wells completed across these units at the site rises approximately 800 feet above the base of the overlying Summerville Formation.

Perched groundwater in the Dakota Sandstone and Burro Canyon Formation is used on a limited basis to the north (upgradient) of the site because it is more easily accessible. Water quality of the Dakota Sandstone and Burro Canyon Formation is generally poor due to high total dissolved solids (TDS) and is used primarily for stock watering and irrigation. The saturated thickness of the perched water zone generally increases to the north of the site, increasing the yield of the perched zone to wells installed north of the site.

2.3 Perched Zone Hydrogeology

Perched groundwater beneath the site occurs primarily within the Burro Canyon Formation. Perched groundwater at the site has a generally low quality due to high total dissolved solids (TDS) in the range of approximately 1,100 to 7,900 milligrams per liter (mg/L), and is used primarily for stock watering and irrigation in the areas upgradient (north) of the site. Perched water is supported within the Burro Canyon Formation by the underlying, fine-grained Brushy Basin Member. Figure 2 is a contour map showing the approximate elevation of the contact of the Burro Canyon Formation with the Brushy Basin Member, which essentially forms the base of the perched water zone at the site. Wells and piezometers shown in Figures 1 and 2 consist of surveyed perched zone monitoring wells and piezometers that include temporary perched zone monitoring wells (TW4-and TWN-series wells). The TW4-series wells are associated with an area of elevated perched zone chloroform concentrations located east and northeast (cross-gradient to upgradient) of the tailings cells. The TWN-series wells are associated with areas of elevated nitrate and chloride in the northeastern portion of the site, upgradient of the tailings cells. Contact elevations between the Burro Canyon Formation and Brushy Basin Member are based on perched monitoring well drilling and geophysical logs and surveyed land surface elevations. As indicated, the Burro Canyon/Brushy Basin contact (although irregular because it represents an erosional surface) generally dips to the south/southwest beneath the site.

Figures 3 through 6 are perched groundwater elevation contour maps for the years 1990, 1994, 2002, and 2009, respectively. Based on the contoured water levels, groundwater within the perched zone flows generally south to southwest beneath the site. Beneath the tailings cells, perched groundwater flow is generally southwest to south-southwest. Perched groundwater flow will be discussed in more detail in Section 2.3.2.

2.3.1 Lithologic and Hydraulic Properties

Although the Dakota Sandstone and Burro Canyon Formations are often described as a single unit due to their similarity, previous investigators at the site have distinguished between them. The Dakota Sandstone is a relatively-hard to hard, generally fine-to-medium grained sandstone cemented by kaolinite clays. The Dakota Sandstone locally contains discontinuous interbeds of siltstone, shale, and conglomeratic materials. Porosity is primarily intergranular. The underlying Burro Canyon Formation hosts most of the perched groundwater at the site. The Burro Canyon Formation is similar to the Dakota Sandstone but is generally more poorly sorted,

contains more conglomeratic materials, and becomes argillaceous near its contact with the underlying Brushy Basin Member. The permeabilities of the Dakota Sandstone and Burro Canyon Formation at the site are generally low.

No significant joints or fractures within the Dakota Sandstone or Burro Canyon Formation have been documented in any wells or borings installed across the site (Knight Piésold, 1998). Any fractures observed in cores collected from site borings are typically cemented, showing no open space.

2.3.1.1 Dakota

Based on samples collected during installation of wells MW-16 (no longer used) and MW-17, located immediately downgradient of the tailings cells, porosities of the Dakota Sandstone range from 13.4% to 26%, averaging 20%, and water saturations range from 3.7% to 27.2%, averaging 13.5%. The average volumetric water content is approximately 3%. The hydraulic conductivity of the Dakota Sandstone based on packer tests in borings installed at the site ranges from approximately 2.7 x 10^{-6} centimeters per second (cm/s) to 9.1 x 10^{-4} cm/s, with a geometric average of 3.9 x 10^{-5} cm/s.

2.3.1.2 Burro Canyon

The average porosity of the Burro Canyon Formation is similar to that of the Dakota Sandstone. Based on samples collected from the Burro Canyon Formation at MW-16 (no longer

Site Hydrogeology & Est. GW Travel Times H:\718000\hydrpt09b\report\hydr122909 Final.doc December 29, 2009 used), located immediately downgradient of tailings cell #3, porosity ranges from 2% to 29.1%, averaging 18.3%, and water saturations of unsaturated materials range from 0.6% to 77.2%, averaging 23.4%. Titan, 1994, reported that the hydraulic conductivity of the Burro Canyon Formation ranges from 1.9×10^{-7} to 1.6×10^{-3} cm/s, with a geometric mean of 1.1×10^{-5} cm/s, based on the results of 12 pumping/recovery tests performed in monitoring wells and 30 packer tests performed in borings prior to 1994.

Hydraulic testing of wells MW-01, MW-03, MW-05, MW-17, MW-18, MW-19, MW-20, and MW-22 during July, 2002, wells MW-23, MW-25, MW-27, MW-28, MW-29, MW-30, MW-31, MW-32, TW4-20, TW4-21, and TW4-22 during June, 2005, wells TW4-23, TW4-24, TW4-25 during November, 2007, and TWN-series wells in October, 2009 (Figure 1), yielded average perched zone hydraulic conductivities ranging from approximately 2 x 10^{-7} cm/s to 0.01 cm/s. Except for the values of 0.01 cm/s at TWN-16, the range of conductivities was similar to the range reported by previous investigators at the site (Hydro Geo Chem, Inc [HGC], 2002; HGC, 2005; HGC, 2007b). Downgradient (south to southwest) of the tailings cells, average perched zone conductivities based on tests at MW-3, MW-5, MW-17, MW-20, MW-22, and MW-25 ranged from approximately 4 x 10^{-7} to 1 x 10^{-4} cm/s Permeability estimates from these tests were based on pumping/recovery and slug tests analyzed using several different methodologies.

25 temporary perched zone monitoring wells (the TW4-series wells shown in Figure 1) have been installed at the site to investigate elevated concentrations of chloroform initially discovered at well MW-4 in 1999. The chloroform likely originated from two former leach

fields, one located north of TW4-18, and the other near TW4-19, that received both laboratory and lavatory wastes in the early years of Mill operation. Some of the coarser-grained and conglomeratic zones encountered within the perched zone during installation of these wells are believed to be partly continuous or at least associated with a relatively thin, relatively continuous zone of higher permeability (International Uranium [USA] Corporation [IUSA] and HGC, 2001). The higher permeability zone defined by these wells is generally located east to northeast of the tailings cells at the site, and is hydraulically cross-gradient to upgradient of the tailings cells with respect to perched groundwater flow.

Based on analyses of pumping tests at MW-4 and drilling logs from nearby temporary wells, the hydraulic conductivity of this relatively thin coarser-grained zone was estimated to be as high as 2.5 x 10⁻³ cm/s. Relatively high conductivities measured at MW-11, located on the southeastern margin of the downgradient edge of tailings cell #3, and at MW-14, located on the downgradient edge of tailings cell #4, of 1.4 x 10⁻³ cm/s and 7.5 x 10⁻⁴ cm/s, respectively (UMETCO, 1993), may indicate that this zone extends beneath the southeastern margin of the cells. However, this zone of higher permeability within the perched water zone does not appear to exist downgradient (south-southwest) of the tailings cells. At depths beneath the perched water table, the zone is not evident in lithologic logs of temporary wells TW4-4 and TW4-6 (located east [cross-gradient] of cell #3, as shown in Figure 5), nor is it evident in wells MW-3, MW-5, MW-12, MW-15, MW-16, MW-17, MW-20, MW-21, or MW-22, located south to southwest (downgradient) of the tailings cells, based on the lithologic logs or hydraulic testing of the wells. The apparent absence of the zone south of TW4-4 and south-southwest of the tailings cells indicates that it "pinches out" (HGC, 2005).

To test the potential existence and continuity of this higher permeability zone, and to refine hydraulic parameter estimates, long term pumping of MW-4 and TW4-19 began in April 2003. MW-26 (TW4-15) was added to the pumping network in August 2003, and TW4-20 was added in August, 2005. These wells were selected for pumping because they were 1) located in areas of the perched zone having relatively high transmissivity, and could therefore sustain relatively high pumping rates, and 2) because the wells were also located in perched water having relatively high chloroform concentrations, which resulted in significant rates of chloroform mass removal. As such, the pumping has constituted an interim action to mitigate chloroform in the perched zone (HGC, 2004).

Analysis of drawdown data collected from wells that responded measurably to pumping between the start of pumping (April 2003) and November 2003, indicated average hydraulic conductivities ranging from 4 x 10^{-5} to 5 x 10^{-4} cm/s in the area east to northeast of the tailings cells, assuming the perched zone is unconfined, and from 5 x 10^{-5} to 1 x 10^{-3} cm/s if the perched zone is considered semi-confined (HGC, 2004). Figure 7 shows the approximate area where detectable drawdowns were measured during the 7 months of pumping. This area is interpreted to coincide roughly with the zone of higher permeability. Wells located outside this zone that did not respond measurably to pumping are interpreted to be completed in lower permeability materials.

2.3.2 Perched Groundwater Flow

Perched groundwater flow at the site has historically been to the south/southwest. As presented in Section 2.3, Figures 3 through 6 are perched groundwater elevation contour maps for the years 1990, 1994, 2002, and 2009, respectively. The 1990, 1994, and 2002 maps were hand contoured because of sparse data. As groundwater elevations indicate, the perched groundwater gradient changes from generally southwesterly in the western portion of the site, to generally southerly in the eastern portion of the site. The most significant changes between the 2002 and 2009 water levels result from pumping of wells MW-4, TW4-19, TW4-20, and MW-26. These wells are pumped to reduce chloroform mass in the perched zone east and northeast of the tailings cells.

In general, perched groundwater elevations have not changed significantly at most of the MW-series site monitoring wells since installation, except in the vicinity of the wildlife ponds and the pumping wells. For example, relatively large increases in water levels occurred between 1994 and 2002 at MW-4 and MW-19, located in the east and northeast portions of the site, as shown by comparing Figures 4 and 5. These water level increases in the northeastern and eastern portions of the site are likely the result of seepage from wildlife ponds located near the piezometers shown in Figure 5, which were installed in 2001 for the purpose of investigating these changes. The increase in water levels in the northeastern portion of the site has resulted in a local steepening of groundwater gradients over portions of the site. Conversely, pumping of wells MW-4, TW4-19, TW4-20, and MW-26 has depressed the perched water table locally and reduced average hydraulic gradients to the south and southwest of these wells. Perched zone

hydraulic gradients currently range from a maximum of approximately 0.05 ft/ft east of tailings cell #2 to approximately 0.01 ft/ft downgradient of cell #3, between cell #3 and MW-20.

Perched water discharges in springs and seeps along Westwater Creek Canyon and Cottonwood Canyon to the west-southwest of the site, and along Corral Canyon to the east of the site, where the Burro Canyon Formation outcrops. The discharge point located most directly downgradient of the tailings cells is Ruin Spring. This feature is located approximately 10,000 feet south-southwest of the tailings cells at the site and is depicted on the USGS 7.5-minute quad sheet for Black Mesa (Figure 8).

2.3.3 Saturated Thickness

The saturated thickness of the perched zone as of the 3rd quarter of 2009 ranges from approximately 93 ft in the northeastern portion of the site to less than 6 ft in the southwest portion of the site (Figure 9), and depths to water range from approximately 15 ft in the northeastern portion of the site (adjacent to the wildlife ponds) to approximately 114 ft at the southwest margin of tailings cell #3 (Figure 10). The relatively large saturated thicknesses in the northeastern portion of the site are likely related to seepage from wildlife ponds located near the piezometers shown in Figure 10.

Although sustainable yields of as much as 4 gpm have been achieved in wells intercepting the larger saturated thicknesses and higher permeability zones in the northeast portion of the site, perched zone well yields are typically low (<0.5 gpm) due to the generally

low permeability of the perched zone. Sufficient productivity can generally be obtained only in areas where the saturated thickness is greater, which is the primary reason that the perched zone has been used on a limited basis as a water supply to the north (upgradient) of the site, but not downgradient of the site.

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3. PERCHED GROUNDWATER PORE VELOCITIES

Average rates of movement of a conservative solute in perched groundwater (equivalent to interstitial or pore velocities) have been calculated for the areas of the perched zone 1) downgradient of the tailings cells, 2) beneath and immediately upgradient and crossgradient of the tailings cells, and 3) within the northeastern portion of the site (HGC, 2005, and Appendix A).

3.1.1 Downgradient of the Tailings cells

As discussed in Section 2.3.2, the nearest discharge point for perched water downgradient of the tailings cells is Ruin Spring. The average hydraulic gradient between the downgradient edge of tailings cell #3 and Ruin Spring is approximately 0.013 ft/ft assuming the following:

- 1) The surveyed elevation of Ruin Spring, based on the USGS topographic map for Black Mesa, is approximately 5,380 ft amsl.
- 2) The distance between the downgradient edge of tailings cell #3 and Ruin Spring is approximately 10,000 ft.
- 3) The average groundwater elevation at the downgradient edge of tailings cell #3 is approximately 5,511 ft amsl.

The calculated rate of movement downgradient of the tailings cells was based on 1) an effective porosity of 0.18, 2) an average hydraulic gradient of 0.013 ft/ft, and 3) geometric averages of hydraulic conductivities estimated from hydraulic tests at wells located at the downgradient edge of the cells and south and southwest of the cells. The geometric averages were based on slug tests performed at MW-3, MW-5, MW-17, MW-20, MW-22, and MW-25

(HGC, 2002; HGC, 2005), and pump tests performed by Peel Environmental (UMETCO, 1993) at MW-11, MW-12, MW-14, and MW-15, as summarized in Table 1. Two averages were calculated; one using conductivities estimated from HGC slug test data analyzed using the Bouwer-Rice solution (Bouwer and Rice, 1976) and the other using conductivities estimated from the same data using the KGS solution (Hyder, 1994), as summarized in Table 2. Included in each average were the results of the pump tests reported in UMETCO, 1993, for MW-11, MW-12, MW-14, and MW-15. The geometric averages thus calculated were 2.3 x 10^{-5} and 4.3 x 10^{-5} cm/s. Assuming the average conductivity ranges from 2.3 x 10^{-5} to 4.3 x 10^{-5} cm/s (0.064 ft/day to 0.120 ft/day), the calculated average rate of movement ranges from 0.0047 ft/day to 0.0087 ft/day (or 1.7 ft/year to 3.2 ft/year).

3.1.2 The Vicinity of the Tailings cells

Perched zone pore velocities beneath and immediately upgradient of the tailings cells were calculated in HGC, 2005, based on data from wells MW-23, MW-25, MW-27, MW-28, MW-29, MW-30, MW-31, MW-32, TW4-20, TW4-21, and TW4-22 (Table 3). Estimated hydraulic conductivities range from approximately 2×10^{-7} to 1×10^{-4} cm/s and yield a geometric average of approximately 3×10^{-5} cm/s or 31 ft/yr. Using hydraulic gradients in the vicinity of each well, the estimated conductivity at each well, and an effective porosity of 0.18, the estimated pore velocities ranged from 49.5 ft/year at TW4-21, to 0.010 ft/year at MW-23, and have a geometric average of approximately 4.5 ft/year. Hydraulic gradients in the vicinity of

velocities. The largest changes have occurred in wells located near pumping wells due to periodic changes in pumping rates.

East of the tailings cells, within the area of the chloroform plume (Figure 7), perched zone pore velocities are calculated using hydraulic conductivities reported in HGC, 2004, as summarized in Tables 4 and 5. Wells TW4-5, TW4-9, and TW4-1 are on a line subparallel to the hydraulic gradient in that area. Using the (arithmetic) average hydraulic conductivity of 321 ft/yr for these wells (assuming unconfined conditions) a hydraulic gradient of 0.029 ft/ft, and an effective porosity of 0.18, the estimated pore velocity is 52 ft/yr. If semi-confined conditions are assumed (and that flow is primarily through only coarser-grained zones defined by drilling logs as discussed in HGC, 2004), an average hydraulic conductivity of 663 ft/yr is calculated, and the pore velocity is estimated as 110 ft/yr. The arithmetic average conductivity was used because the range for these three wells is within an order of magnitude.

3.1.3 The Northeastern Portion of the Site

Perched zone pore velocities in the northeastern portion of the site are provided in Table 6 and Appendix A. The geometric average hydraulic conductivity of the TWN-series hydraulic tests is approximately 5.3×10^{-5} cm/s or 54 ft/yr. Using hydraulic gradients in the vicinity of each TWN-series well, the estimated conductivity at each well, and an effective porosity of 0.18, the calculated pore velocities range from 0.04 feet per year (ft/yr) at TWN-7 to 762 ft/yr at TWN-16, with a geometric average of approximately 7 ft/yr. The calculated pore velocity at TWN-16 is the highest of any perched zone well at the site due to the relatively high

conductivity of 0.01 cm/s estimated for the well. This suggests the presence of a relatively thin high permeability zone (or set of such zones) analogous to that inferred to exist east of the tailings cells near MW-4. Although none of the nearby wells appear to intercept such a zone, suggesting that it is likely not continuous additional data might reveal the continuity of such a zone.

Appendix A also provides a discussion of nitrate distribution with respect to permeability and perched zone pore velocities in the northeastern portion of the site. Areas of elevated perched zone nitrate (> 5 mg/L) that exist northeast of and proximal to the Mill are referred to as Area 1 and Area 2 respectively (Figure 11). Average perched zone pore velocities along hypothetical pathlines oriented with the long axes of these areas of elevated nitrate concentrations are calculated as approximately 0.55 ft/yr to 7 ft/yr for Area 1 and 23 ft/yr for Area 2 using geometric averages of hydraulic conductivity estimates along the pathlines (Appendix A). These velocities are insufficient to transport nitrate from the upgradient to the downgradient portions of the two areas within the approximate 30 year operational time of the Mill, suggesting that 1) actual rates are faster than calculated using the geometric averages of the estimated hydraulic conductivities, 2) each nitrate area has resulted from more than one localized seepage area and/or one or more diffuse, distributed seepage areas located upgradient of the tailings cells, or 3) the nitrate distribution results from a combination of these factors. With regard to 2) above, more than one seepage area may have received water from the same source resulting in similar seepage chemistry at more than one areal location. Furthermore, some seepage areas may have existed prior to Mill construction, and contributed nitrate for decades prior to the existence of any source areas related to Mill operation. Another complicating factor

is that hydraulic gradients have changed over time over portions of the site. For example, hydraulic gradients have changed as a result of seepage from the wildlife ponds, and would be expected to have changed in response to any other sources of seepage present prior to Mill construction and operation.

The higher the pore velocities, the fewer localized seepage areas are needed to distribute the nitrate detected in both Area 1 and Area 2. Higher pore velocities would result in spreading of nitrate from each potential source location over a larger area. Past and present pore velocities may be high enough to support minimal contributing seepage locations if 1) greater weight were given to the highest conductivity estimates when calculating the averages or 2) flow is primarily through one or more relatively thin, relatively continuous higher permeability zones similar to that inferred to exist in the vicinity of MW-4, located east of the tailings cells within an area of elevated chloroform (HGC, 2007a). Because the estimated hydraulic conductivities in Table 6 are averages over the entire saturated thicknesses at the estimation points, the conductivity of a relatively thin horizon or horizons through which most of the flow was occurring would be underestimated as would the effective pore velocity.

The presence of higher permeability horizons within both Area 1 and Area 2 (by analogy with the area near MW-4) would allow greater spreading of perched zone nitrate within the 30 year operational time history of the Mill. Fewer localized seepage areas could then be called upon to yield the observed nitrate distributions. The high hydraulic conductivity estimated at TWN-16 indicates the possible existence of such a horizon within Area 1. Such a zone does not appear to be penetrated by other TWN-series wells near and within Area 1, suggesting that any

higher permeability zone penetrated by TWN-16 is not continuous over Area 1. However, additional data might reveal the presence of a zone analogous to that near MW-4 that could have transported nitrate over longer distances.

4. SUMMARY

Perched groundwater at the site is hosted primarily by the Burro Canyon Formation, which consists of a relatively hard to hard, fine- to medium-grained sandstone containing siltstone, shale and conglomeratic materials. The Burro Canyon Formation is separated from the underlying regional Navajo/Entrada aquifer by approximately 1000 ft of Morrison Formation and Summerville Formation materials having a low average vertical permeability. The Brushy Basin Member of the Morrison Formation is a shale that immediately underlies the Burro Canyon Formation and forms the base of the perched water zone at the site. Based on hydraulic tests at perched zone monitoring wells, the hydraulic conductivity of the perched zone ranges from approximately 2×10^{-7} to 0.01 cm/s.

Perched water flow is generally from northeast to southwest across the site. Beneath and downgradient of the tailings cells, on the west side of the site, perched water flow is south-southwest. On the eastern side of the site perched water flow is more southerly. Perched water generally has a low quality, with total dissolved solids ranging from approximately 1,100 to 7,900 mg/L, and is used primarily for stock watering and irrigation north (upgradient) of the site.

Depths to perched water range from approximately 15 ft near the wildlife ponds in the northeastern portion of the site to approximately 114 ft at the southwestern margin of the tailings cells. Saturated thicknesses range from approximately 93 ft near the wildlife ponds to less than 6 ft in the southwest portion of the site, downgradient of the tailings cells. Although sustainable yields of as much as 4 gpm have been achieved in wells penetrating higher transmissivity zones,

well yields are typically low (< 0.5 gpm) due to the generally low permeability of the perched zone.

In general, the highest permeabilities and well yields are in the area of the site immediately northeast and east (upgradient to crossgradient) of the tailings cells. A relatively continuous, higher permeability zone has been inferred to exist in this portion of the site which is associated with an area of elevated chloroform concentrations that most likely originated from two former leach fields that received both laboratory and lavatory wastes in the early years of Mill operation. Hydraulic tests at wells located in this area indicate hydraulic conductivities in the range of 10^{-3} to 10^{-4} cm/s. Using data from TW4-5, TW4-9, and TW4-1 (which form a north-south line approximately parallel to perched water flow east of the tailings cells) pore velocities are estimated to range from approximately 52 to 110 ft/yr in this area.

Hydraulic conductivities in the northeastern portion of the site, upgradient of the tailings cells (within elevated nitrate Area 1), are generally in the intermediate range of values estimated for the site, although the highest conductivity estimated for the site (approximately 0.01 cm/s), and one of the lowest conductivities estimated for the site (approximately 4 x 10^{-7} cm/s) occur in this area. Hydraulic tests of TWN-series wells yield a geometric average of approximately 5.3 x 10^{-5} cm/s or 54 ft/yr. Calculated pore velocities range from approximately 0.04 to 762 ft/yr and have a geometric average pore velocity of approximately 7 ft/yr.

Permeabilities beneath and immediately upgradient of the tailings cells are generally within the intermediate to low range of values estimated for the site. Hydraulic conductivity estimates for wells MW-23, MW-25, MW-27, MW-28, MW-29, MW-30, MW-31, MW-32, TW4-20, TW4-21, and TW4-22 range from approximately 2 x 10^{-7} to 2 x 10^{-4} cm/s and yield a geometric average of approximately 3 x 10^{-5} cm/s or 31 ft/yr. Estimated pore velocities ranged from 0.010 ft/yr to 49.5 ft/yr and have a geometric average of approximately 4.5 ft/year.

Permeabilities downgradient of the tailings cells are generally low. Combined with shallow hydraulic gradients, average calculated pore velocities downgradient of the tailings cells are among the lowest on site. Hydraulic tests at wells located at the downgradient edge of the cells, and south and southwest of the cells (MW-3, MW-5, MW-11, MW-12, MW-14, MW-15, MW-17, MW-20, MW-22, and MW-25), yielded geometric average hydraulic conductivities of 2.3×10^{-5} and 4.3×10^{-5} cm/s (23 ft/yr and 44 ft/yr, respectively) depending on the testing and analytical method. Assuming the average conductivity ranges from 2.3×10^{-5} to 4.3×10^{-5} cm/s, the calculated average pore velocity ranges from 1.7 ft/year to 3.2 ft/year.

With regard to nitrate distribution (as discussed in Appendix A), within Area 1, a geometric average pore velocity along the indicated pathline of as high as 7 ft/yr is calculated, and in the western portion of Area 2, a geometric average pore velocity along the indicated pathline of 23 ft/yr is calculated (Figure 11). These velocities are insufficient to transport nitrate from the upgradient to the downgradient portions of either area within the approximate 30 year operational time of the Mill, suggesting that 1) actual pore velocities are higher than calculated using the geometric averages of the estimated hydraulic conductivities, 2) each nitrate area has resulted from more than one localized seepage areas and/or one or more diffuse, distributed seepage areas located upgradient of the tailings cells, or 3) the nitrate distribution results from a

combination of these factors. With regard to item 2) above, more than one seepage area may have received water from the same source resulting in similar seepage chemistry at more than one areal location. Furthermore, some seepage areas may have existed prior to Mill construction, and contributed nitrate for decades prior to the existence of any seepage areas related to Mill operation.

The higher the pore velocities, the fewer localized seepage areas are needed to distribute the nitrate detected in both Area 1 and Area 2. Higher pore velocities would result in spreading of nitrate from each potential source location over a larger area. Past and present pore velocities may be high enough to support minimal contributing seepage locations if 1) greater weight were given to the highest conductivity estimates when calculating the averages or 2) flow is primarily through one or more relatively thin, relatively continuous higher permeability zones similar to that inferred to exist in the vicinity of MW-4, located east of the tailings cells within an area of elevated chloroform (HGC, 2007a). Because the estimated hydraulic conductivities in Table 6 are averages over the entire saturated thicknesses at the estimation points, the conductivity of a relatively thin horizon or horizons through which most of the flow was occurring would be underestimated as would the effective pore velocity.

The presence of higher permeability horizons within both Area 1 and Area 2 (by analogy with the area near MW-4) would allow greater spreading of perched zone nitrate within the 30 year operational time history of the Mill. Fewer localized seepage areas could then be called upon to yield the observed nitrate distributions. The high hydraulic conductivity estimated at TWN-16 indicates the possible existence of such a horizon within Area 1. Such a zone does not

appear to be penetrated by other TWN-series wells near and within Area 1, suggesting that any higher permeability zone penetrated by TWN-16 is not continuous over Area 1. However, additional data might reveal the presence of a zone analogous to that near MW-4 that could have transported nitrate over longer distances.

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6. LIMITATIONS STATEMENT

The opinions and recommendations 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 for the particular purpose that 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.

Site Hydrogeology & Est. GW Travel Times H:\718000\hydrpt09b\report\hydr122909 Final.doc December 29, 2009 **TABLES**

TABLE 1Peel Hydraulic Test Results1

Well	Hydraulic Conductivity (cm/s)
MW-11	1.4 x 10 ⁻³
MW-12	2.2 x 10 ⁻⁵
MW-14	7.5 x 10 ⁻⁴
MW-15	1.9 x 10 ⁻⁵

Notes:

cm/s = centimeters per second ¹ From UMETCO, 1993

TABLE 2

Results of July	v 2002 and June	e 2005 Hydraulic Tests ²
	,	

[Permeability in Centimeters Per Second			
Well	KGS	Bouwer-Rice		
MW-3	4.0 x 10 ⁻⁷	1.5 x 10 ⁻⁵		
MW-5	3.5 x 10 ⁻⁶	2.4 x 10 ⁻⁵		
MW-17	2.6 x 10 ⁻⁵	2.7 x 10 ⁻⁵		
MW-20		9.3 x 10 ⁻⁶		
MW-22	1.0 x 10 ⁻⁶	7.9 x 10 ⁻⁶		
MW-25	1.1 x 10 ⁻⁴	7.4 x 10 ⁻⁵		

Geometric Average of above test results with $Peel^3$ test results for MW-11, MW-12, MW-14, and MW-15.

	2.3 x 10 ⁻⁵	4.3 x 10 ⁻⁵
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²From HGC, 2002; HGC, 2005 ³From UMETCO, 1993

TABLE 3

Estimated Hydraulic Conductivities and Perched Zone Pore Velocities

Well	Hydraulic C	onductivity ^a	Hydraulic Gradient	Pore Velocity ^b	
wen	(cm/s)	(ft/yr)	(ft/ft)	(ft/yr)	
MW-23	2.2 x 10 ⁻⁷	0.22	0.008	0.010	
MW-25	1.1 x 10 ⁻⁴	112	0.023	14.3	
MW-27	7.2 x 10 ⁻⁵	74	0.022	9.0	
MW-28	1.8 x 10 ⁻⁶	1.8	0.029	0.29	
MW-29	1.1 x 10 ⁻⁴	112	0.013	8.1	
MW-30	8.1 x 10 ⁻⁵	83	0.027	12.4	
MW-31	7.1 x 10 ⁻⁵	73	0.024	9.7	
MW-32	2.9 x 10 ⁻⁵	29	0.021	3.38	
TW4-20	5.6 x 10 ⁻⁵	57	0.037	11.7	
TW4-21	1.9 x 10 ^{-4 c}	194	0.046	49.5	
TW4-22	1.2 x 10 ⁻⁴	123	0.029	19.8	

Notes:

^a Average of estimates; value for MW-23 based on second test at MW-23.

^b Assumes effective porosity of 0.18

^c Estimates from Bouwer-Rice method not included in average

cm/s = Centimeters per second

ft/ft = Feet per foot

ft/yr = Feet per year

TABLE 4 Estimated Perched Zone Hydraulic Properties Based on Analysis of Observation Wells Near MW-4

Observation Well	Theis Solution (Confined or Unconfined)	Transmissivity (ft ² /day)	Storage Coefficient	Water Bearing Zone Thickness (feet)	Average Hydraulic Conductivity (ft/day)	Average Hydraulic Conductivity (cm/sec)
TW4-1	Unconfined	8.9	0.023	39	0.23	8.2x10 ⁻⁵
1 00 4-1	Confined	8.4	0.023	24	0.35	1.3x10 ⁻⁴
TW4-2	Unconfined	4.6	0.0065	39	0.12	4.3x10 ⁻⁵
1 00 4-2	Confined	3.8	0.0063	24	0.16	5.7x10 ⁻⁵
TW4-7	Unconfined	4.7	0.011	39	0.12	4.3x10 ⁻⁵
	Confined	3.3	0.011	24	0.14	5.0x10 ⁻⁵
TW4-8	Unconfined	4.5	0.010	39	0.12	4.3x10 ⁻⁵
1 1 1 4-0	Confined	3.9	0.010	24	0.16	5.7x10 ⁻⁵
MW-4A	Unconfined	5.8	0.019	39	0.15	5.4x10 ⁻⁵
IVI VV - 4A	Confined	3.5	0.019	24	0.15	5.4x10 ⁻⁵
MW-4A (early time)	Unconfined	12.4	0.0029	39	0.32	1.1x10 ⁻⁴
	Confined	9.1	0.0031	24	0.38	1.4x10 ⁻⁴

Notes:

cm/sec = Centimeters per second ft/day = Feet per day

 $ft^2/day = Feet squared per day$

TABLE 5 Estimated Perched Zone Hydraulic Properties Based on Analysis of Observation Wells Near TW4-19

Observation Well	Theis Solution (Confined or Unconfined)	Transmissivity (ft ² /day)	Storage Coefficient	Water Bearing Zone Thickness (feet)	Average Hydraulic Conductivity (ft/day)	Average Hydraulic Conductivity (cm/sec)
TW4-5	Unconfined	89	0.0043	67	1.3	4.6x10 ⁻⁴
1004-5	Confined	87	0.0043	31	2.8	1.0x10 ⁻³
TW4-9	Unconfined	72	0.0043	67	1.1	3.9x10 ⁻⁴
1 1 1 4-9	Confined	71	0.0043	31	2.3	8.2x10 ⁻⁴
TW4-10	Unconfined	48	0.0077	67	0.72	2.6x10 ⁻⁴
	Confined	46	0.0076	31	1.5	5.4x10 ⁻⁴
TW4-15	Unconfined	15	0.0037	67	0.22	7.9x10 ⁻⁵
1004-15	Confined	12	0.0037	31	0.39	1.4x10 ⁻⁴
TW4-16	Unconfined	19	0.0036	67	0.28	1.0x10 ⁻⁴
1 1 1 4 - 10	Confined	18	0.0035	31	0.58	2.1x10 ⁻⁴
TW4-18	Unconfined	76	0.0046	67	1.1	3.9x10 ⁻⁴
	Confined	74	0.0046	31	2.4	8.6x10 ⁻⁴
TW4-19	Unconfined	44	0.12	67	0.66	2.4x10 ⁻⁴
	Confined	39	0.12	31	1.3	4.6x10 ⁻⁴

Notes:

cm/sec = Centimeters per second

ft/day = Feet per day

 $ft^2/day = Feet squared per day$

Well	Hydraulic Conductivity ^a		Hydraulic Conductivity ^a Pathline	Head Change	Hydraulic Gradient	Pore Velocity
wen	(cm/s)	(ft/yr)	(ft)	(ft)	ft/ft	ft/yr
TWN-1	1.70E-04	1.74E+02	220	13	5.91E-02	57.0
TWN-2	1.87E-05	1.91E+01	230	17	7.39E-02	7.85
TWN-3	8.77E-06	8.96E+00	300	13	4.33E-02	2.16
TWN-4	8.94E-04	9.14E+02	1050	10	9.52E-03	48.3
TWN-5	4.47E-04	4.57E+02	290	15	5.17E-02	131
TWN-6	1.74E-04	1.78E+02	440	10	2.27E-02	22.5
TWN-7	4.08E-07	4.17E-01	660	10	1.52E-02	0.04
TWN-8	1.13E-04	1.16E+02	550	13	2.36E-02	15.2
TWN-9	2.93E-05	2.99E+01	825	17	2.06E-02	3.42
TWN-10	3.07E-05	3.14E+01	660	5	7.58E-03	1.32
TWN-11	1.08E-04	1.11E+02	880	14	1.59E-02	9.8
TWN-12	7.87E-05	8.04E+01	550	22	4.00E-02	17.9
TWN-13	3.69E-06	3.77E+00	1050	4	3.81E-03	0.08
TWN-14	3.18E-06	3.25E+00	880	13	1.48E-02	0.27
TWN-15	3.68E-05	3.76E+01	990	14	1.41E-02	2.96
TWN-16	0.010336	1.06E+04	770	10	1.30E-02	762
TWN-17	4.96E-06	5.06E+00	1200	10	8.33E-03	0.23
TWN-18	1.70E-03	1.74E+03	300	10	3.33E-02	322
TWN-19	2.25E-05	2.30E+01	550	22	4.00E-02	23.2

 TABLE 6

 Estimated Perched Zone Hydraulic Properties and Pore Velocities for TWN-Series Wells

Notes:

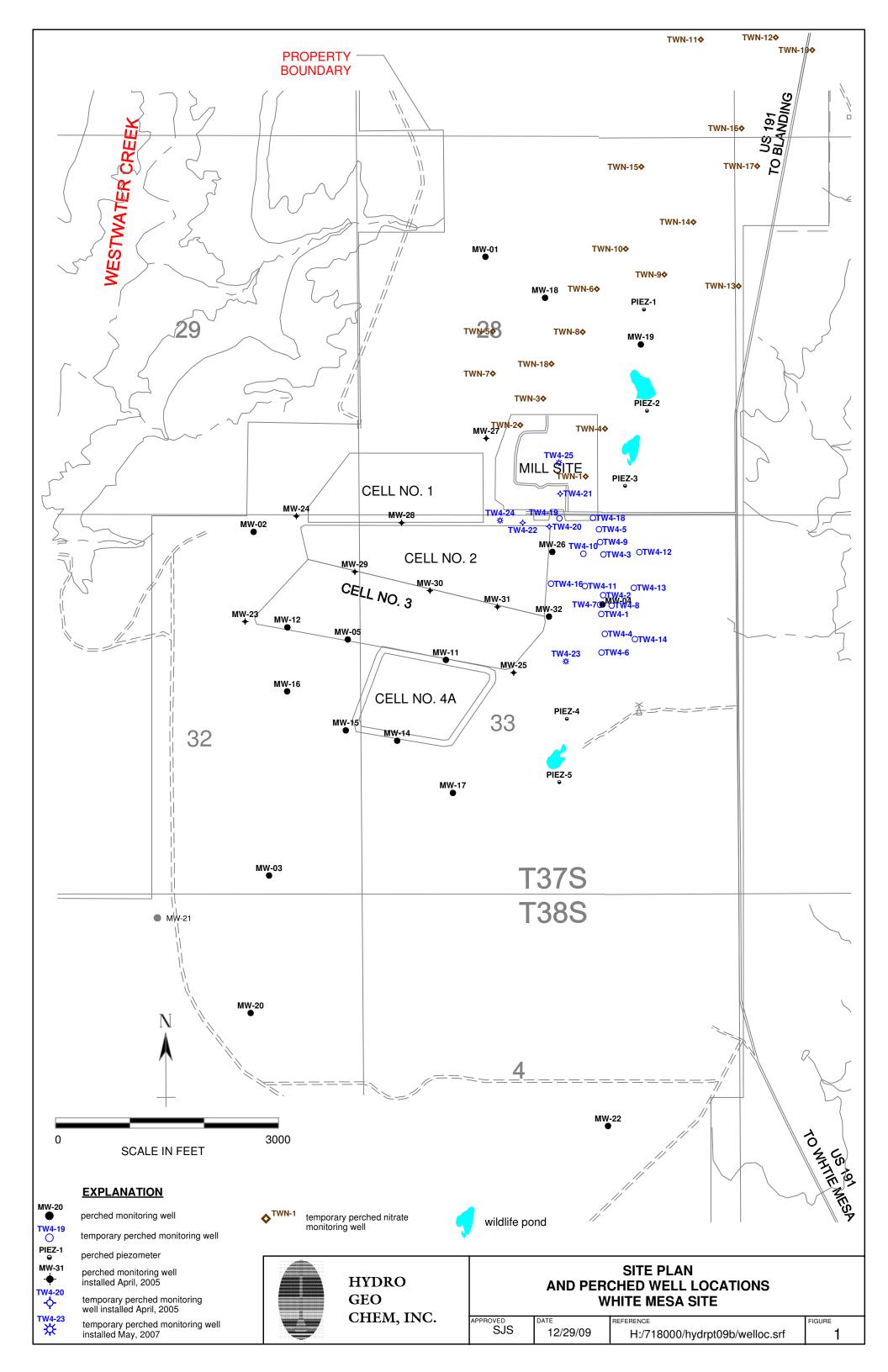
^a Average of KGS and Bouwer-Rice estimates. Assumes effective porosity of 0.18

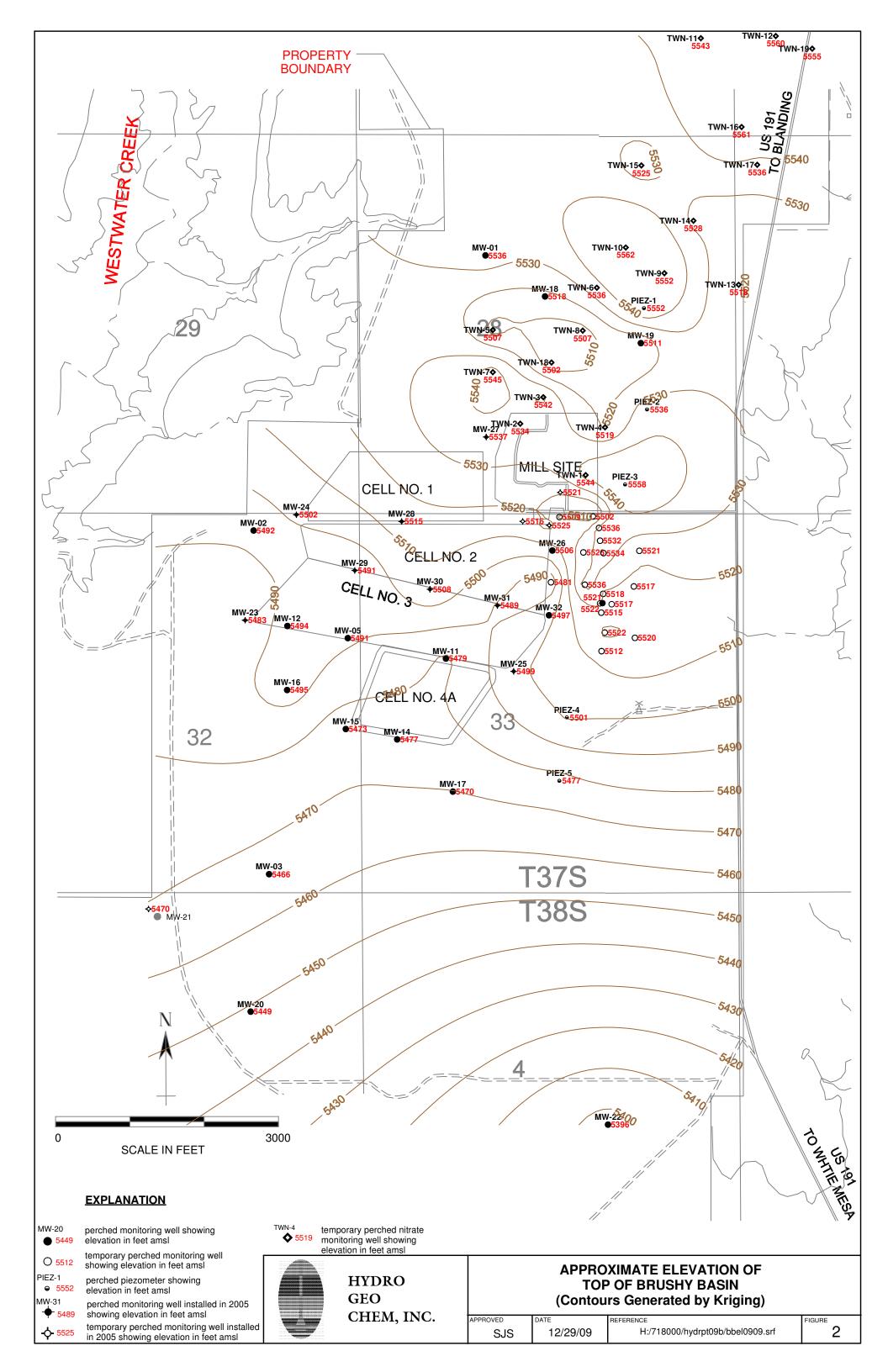
cm/s = Centimeters per second

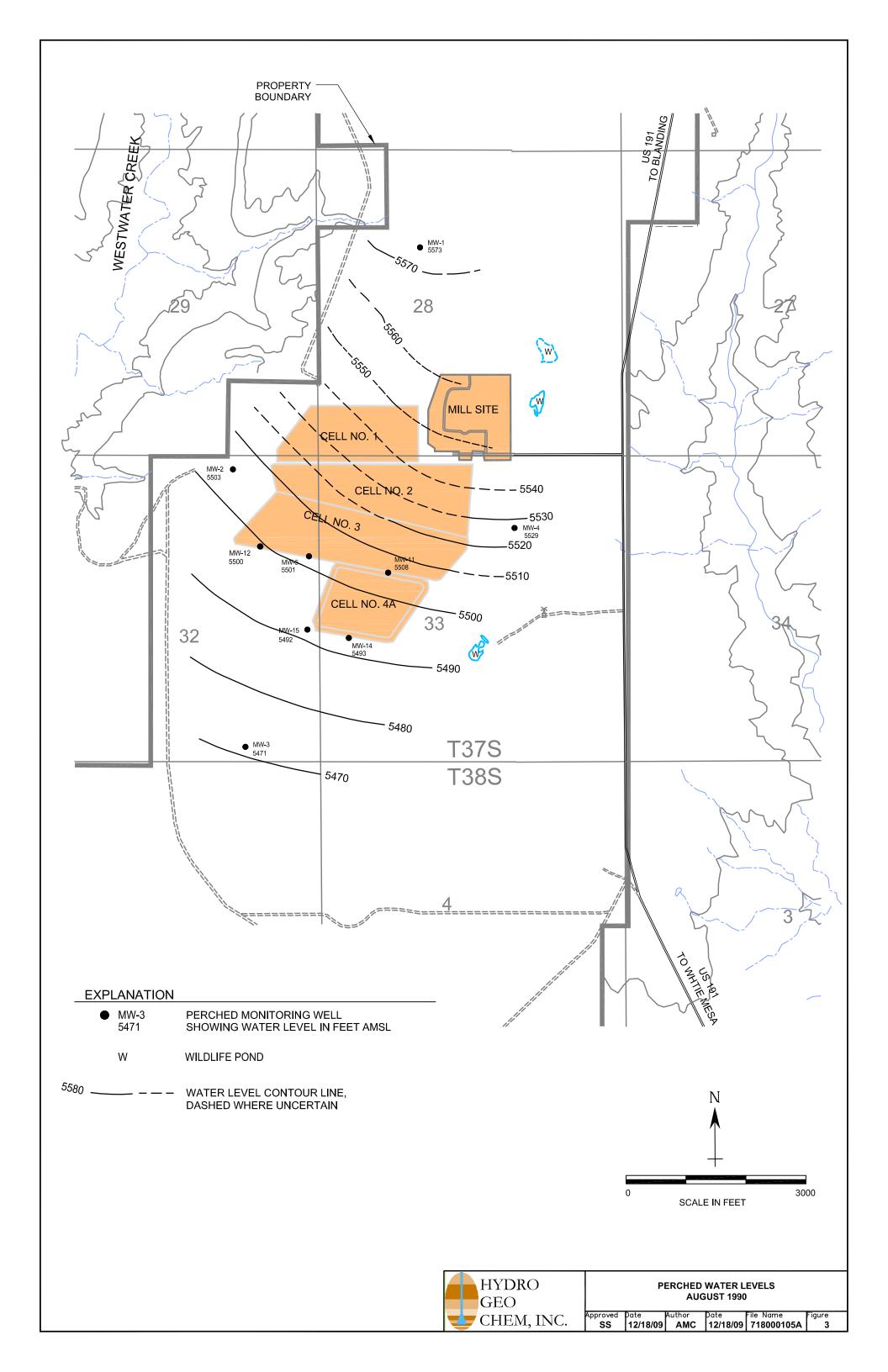
ft/ft = Feet per foot

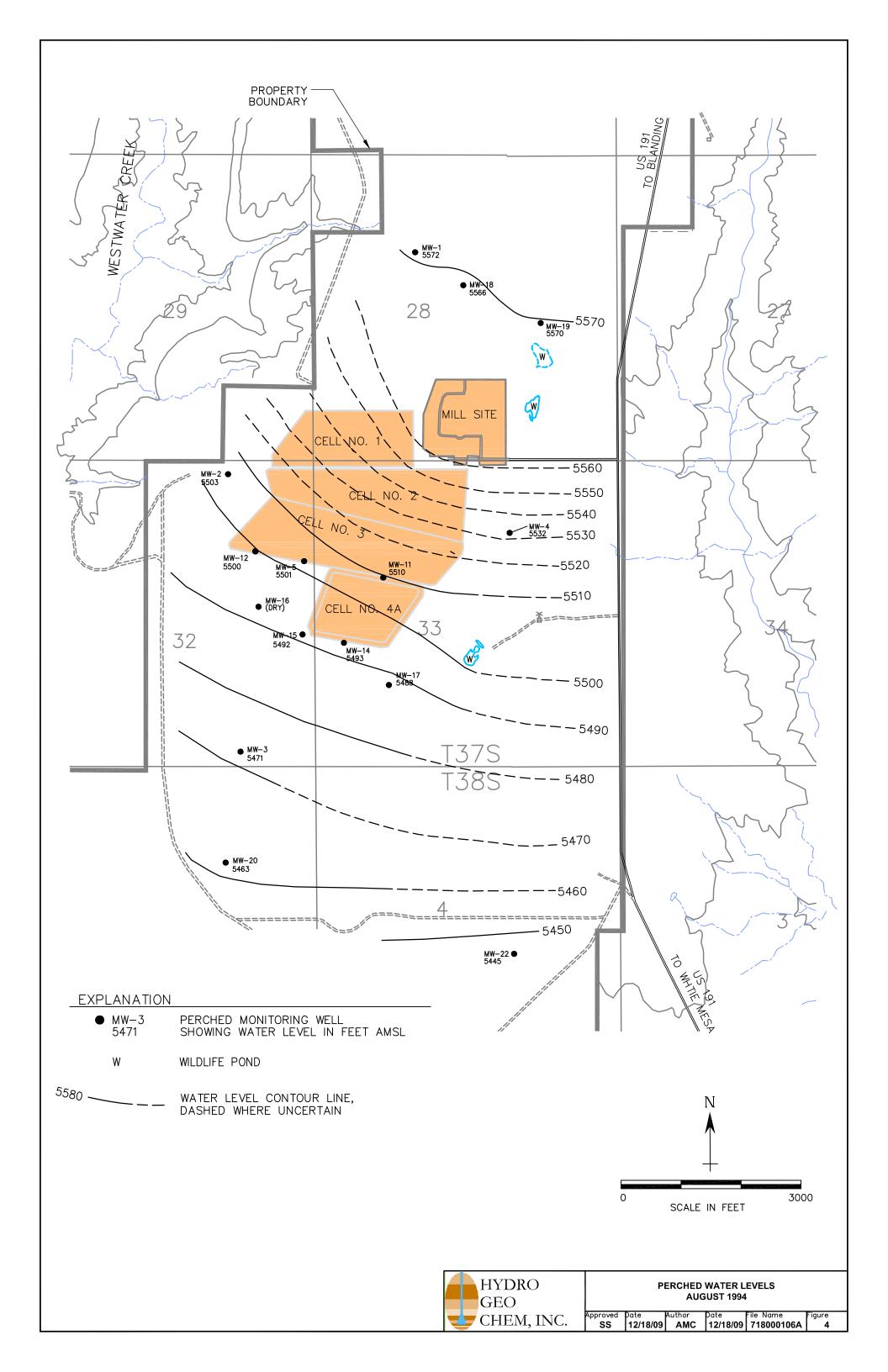
ft/yr = Feet per year

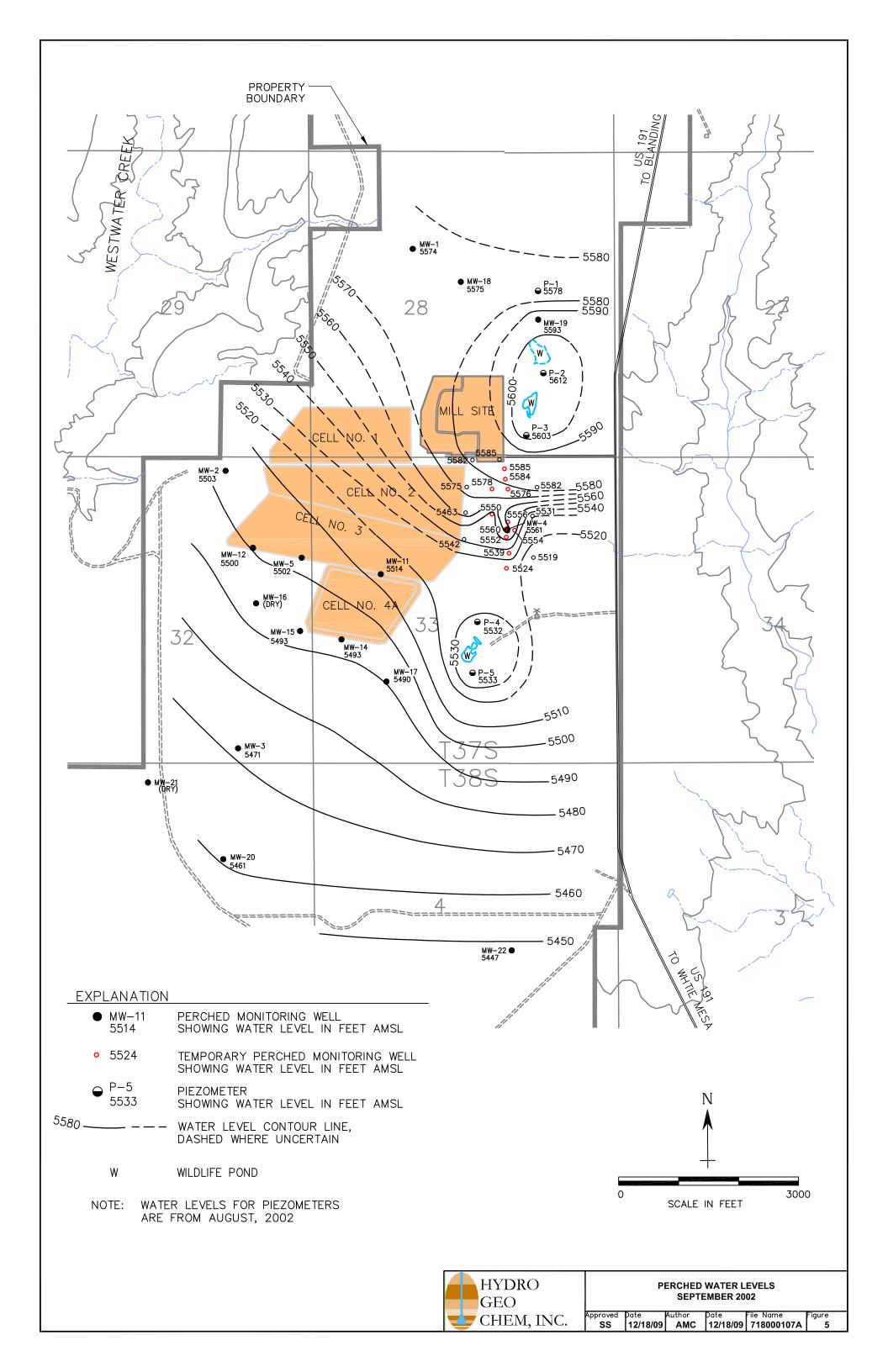
FIGURES

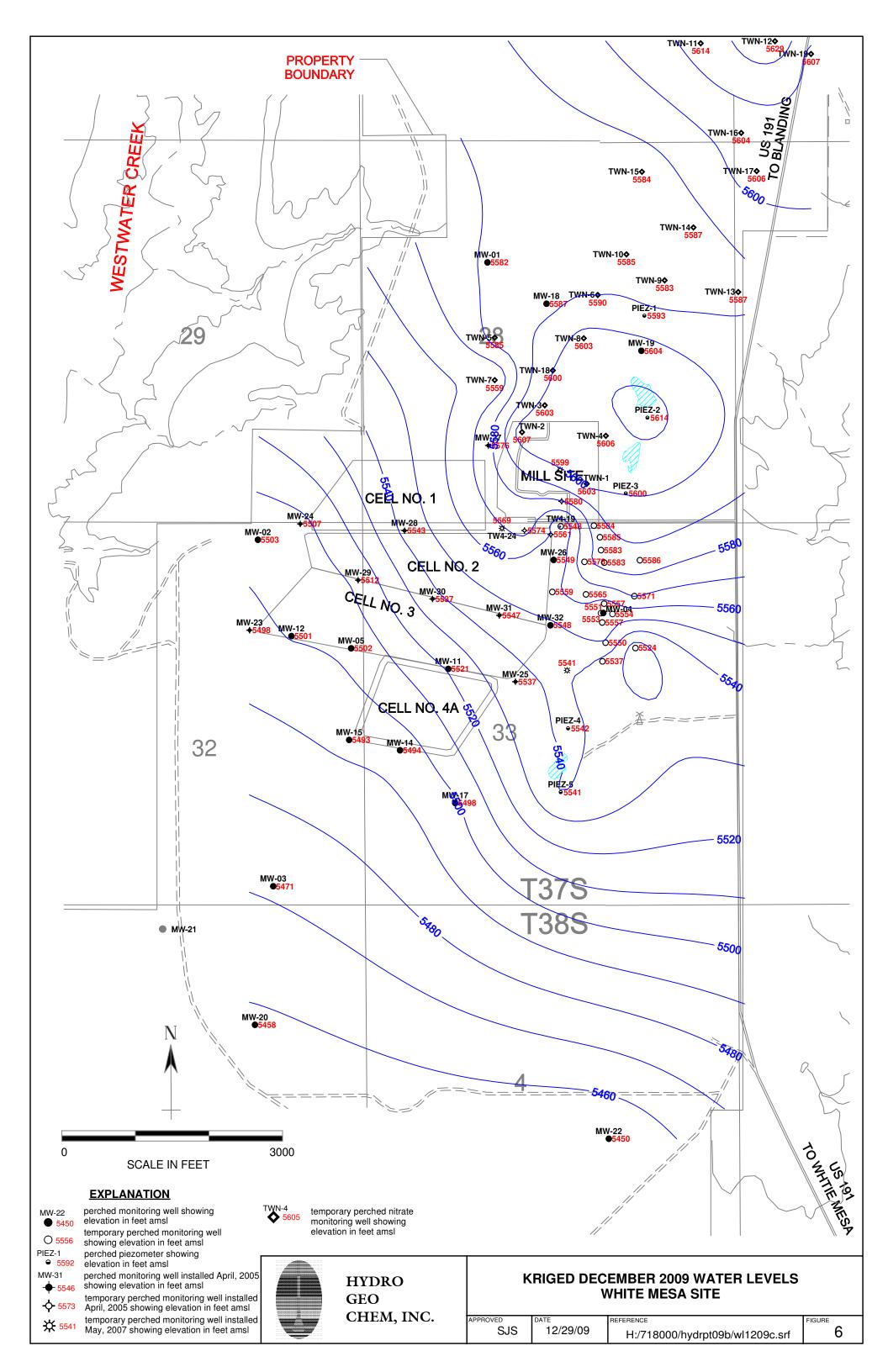


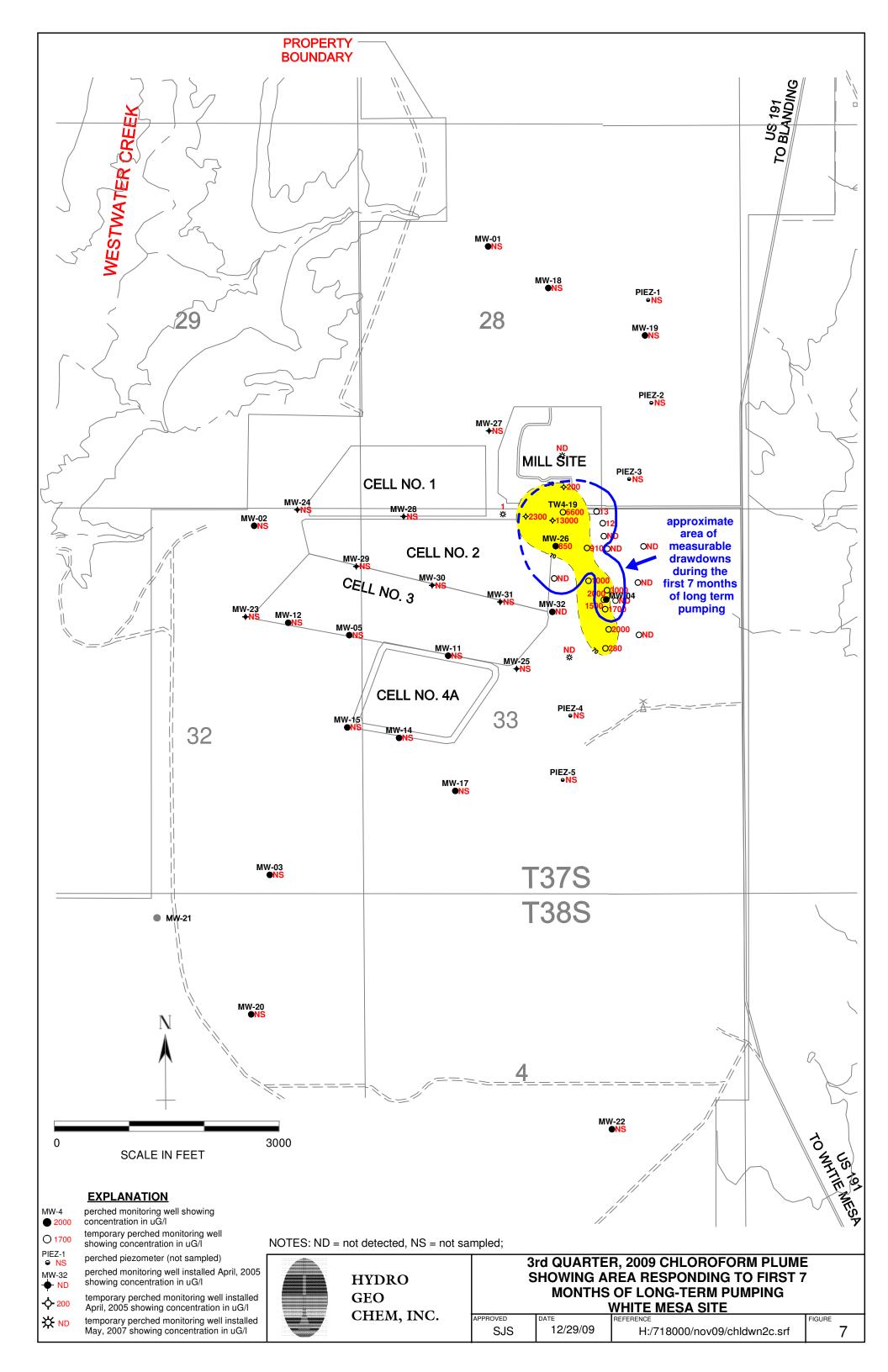


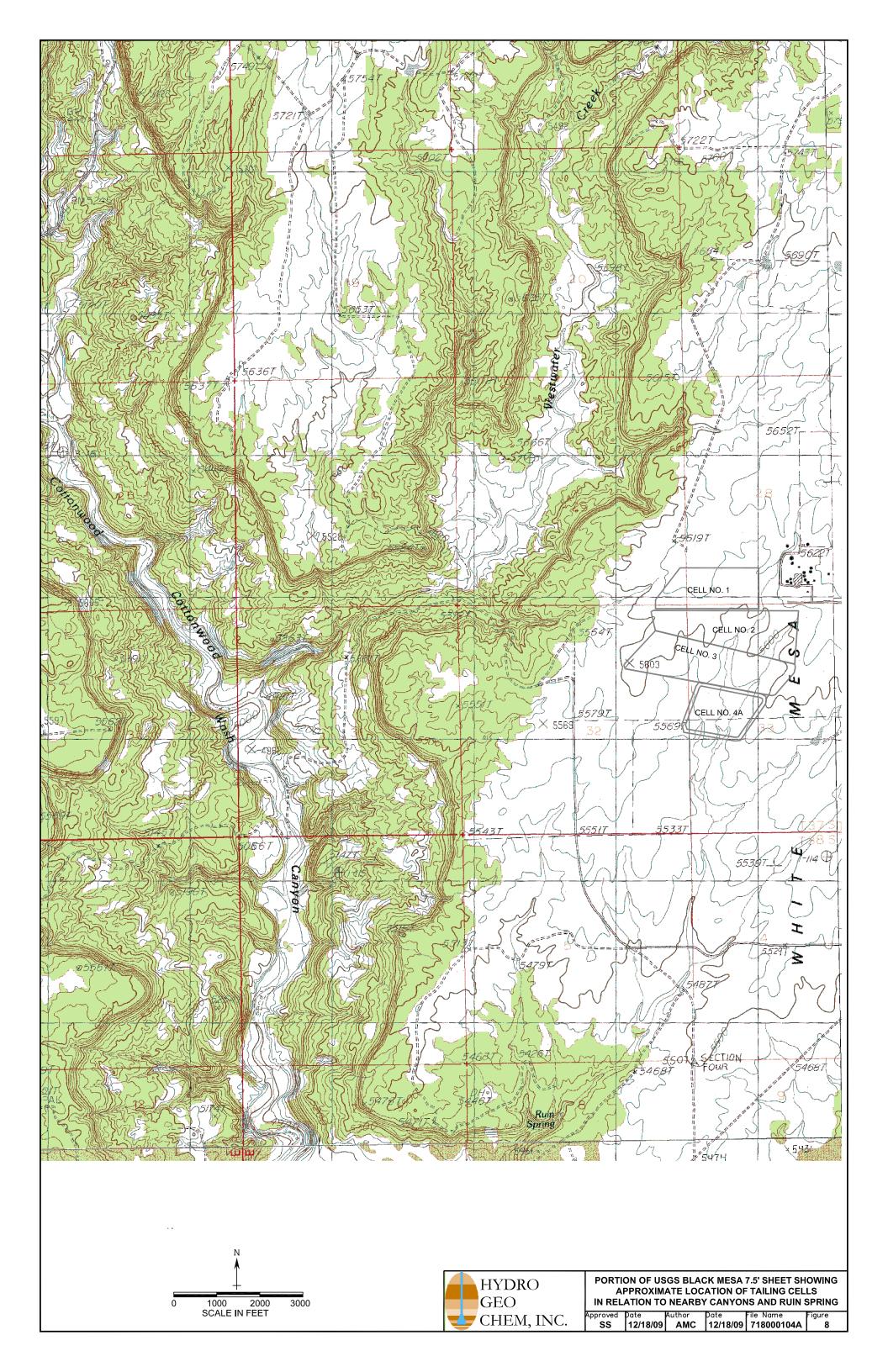


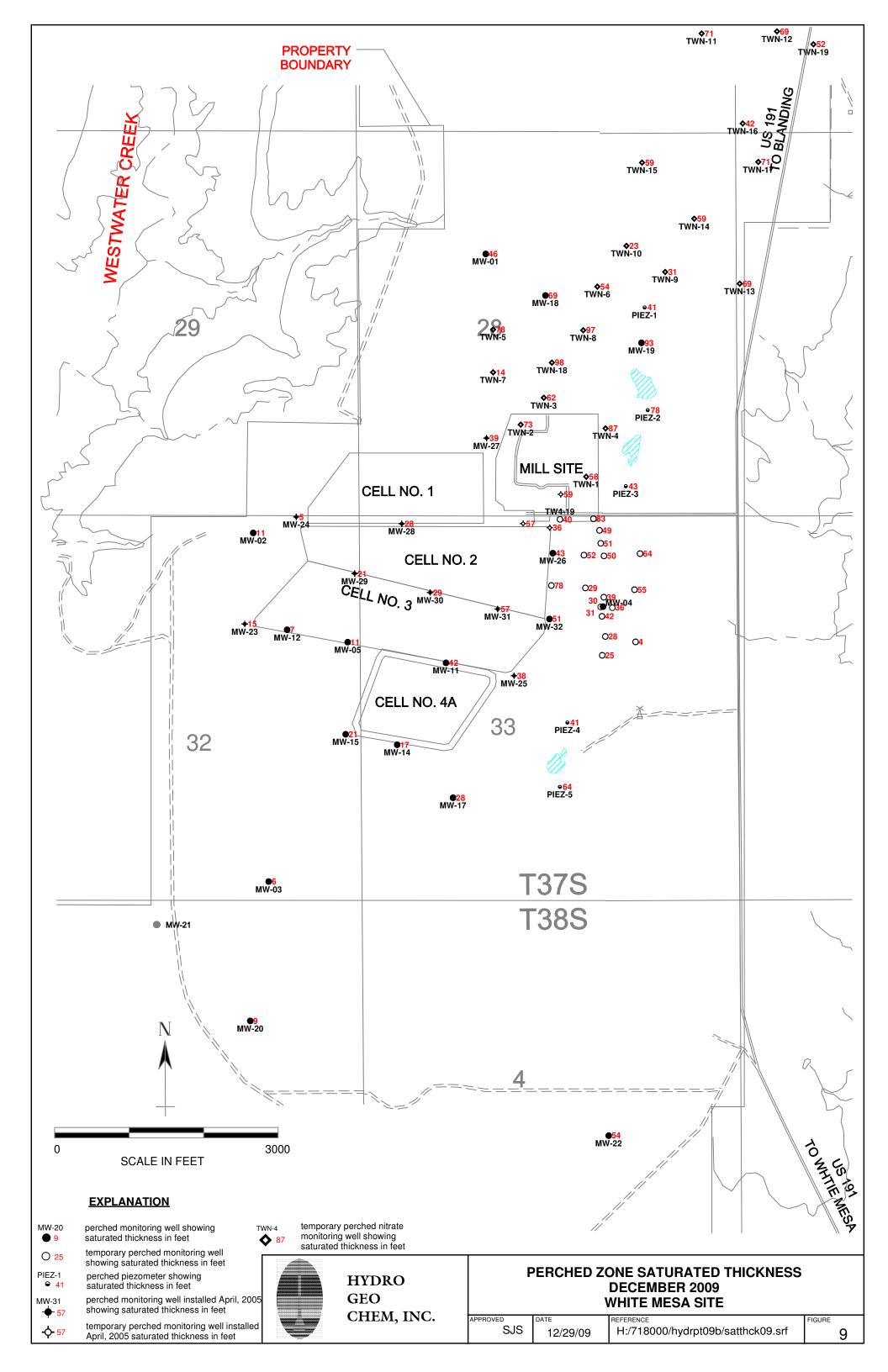


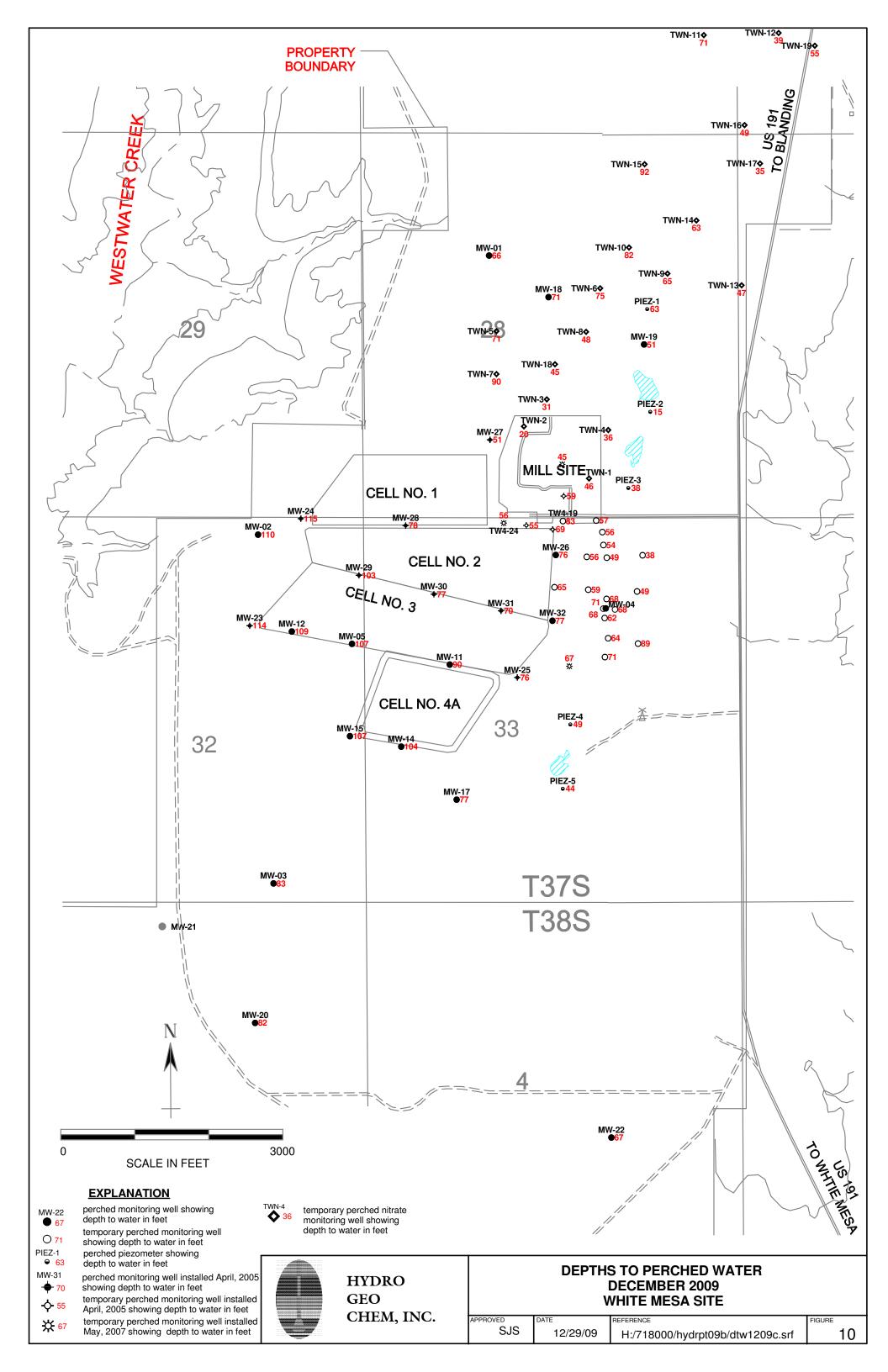


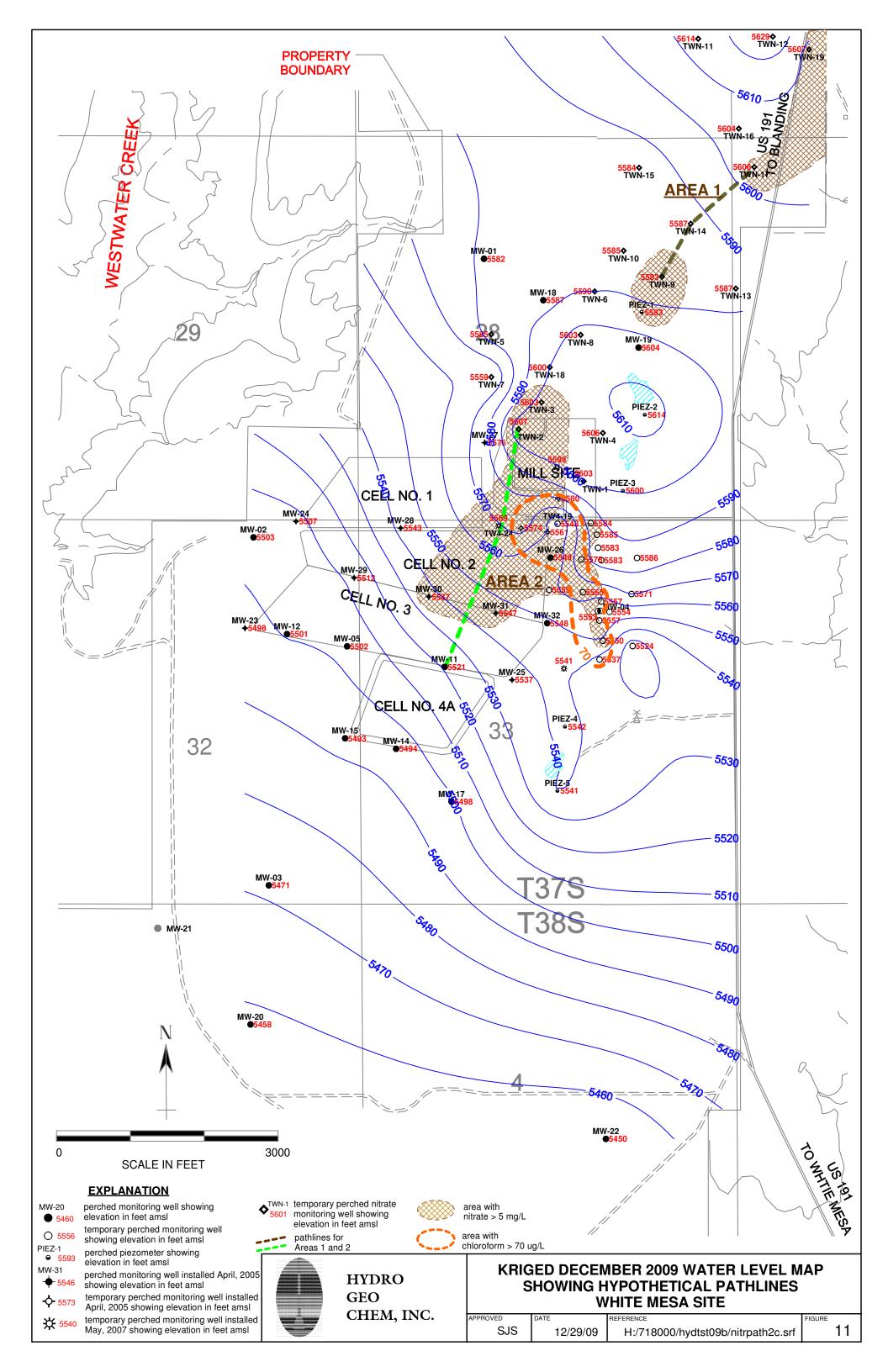












APPENDIX A

PERCHED NITRATE MONITORING WELL HYDRAULIC TESTS WHITE MESA URANIUM MILL OCTOBER 2009

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PERCHED NITRATE MONITORING WELL HYDRAULIC TESTS WHITE MESA URANIUM MILL OCTOBER 2009

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December 29, 2009

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1. INTRODUCTION

This report describes the hydraulic testing of 19 new temporary perched zone groundwater monitoring wells at the White Mesa Uranium Mill (the "Mill" or the "site"). The wells, designated TWN-1 through TWN-19 as shown in Figure A.1, were installed to better define the distribution of nitrate and chloride in the perched groundwater. All wells were completed in nominal 6 ¾ inch diameter boreholes using flush-thread, 4-inch diameter PVC casing and factory slotted screen. Wells TWN-11 through TWN-19 were the last round of TWN-series wells to be installed and development of these wells was completed during the week prior to the testing. Wells TWN-1 through TWN-10 were tested first to allow more time for water levels in the newest wells (TWN-11 through TWN-19) to stabilize.

Hydraulic testing consisted of slug tests conducted between October 19 and October 26, 2009. Test data were analyzed to estimate perched zone hydraulic properties in the vicinity of each new well. Slug testing and analysis procedures were similar to those used in previous testing at the site during July 2002 and June, 2005 as described in Hydro Geo Chem, Inc. (HGC), 2002, and HGC, 2005.

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2. HYDRAULIC TESTING

HGC personnel conducted hydraulic tests between October 19 and October 26, 2009. The hydraulic tests consisted of slug tests performed in the same manner as described in HGC, 2002, and HGC, 2005. Hydraulic tests were performed at all TWN-series perched well installations and at existing well MW-24. The test results at MW-24 are described in a separate document. The purpose of the tests was to estimate hydraulic parameters (primarily hydraulic conductivity) in the vicinity of each new well. The same slugs and electric water level meter were used in both the current testing event and the June 2005 testing event. The submersible 0-30 pounds per square inch absolute (psia) Level Troll 500TM pressure transducers and data loggers used in the current tests were similar to those used in previous tests.

2.1 Data Collection

Two slugs consisting of sealed, pea-gravel-filled, schedule-80 PVC pipe, one approximately 3 feet long, and one approximately 4 feet long, as described in HGC, 2002, were used for the tests. The 3-foot slug had a larger diameter and displaced approximately 0.75 gallons of water. The 4-foot slug had a smaller diameter and displaced approximately 0.47 gallons. Typically, the 3-foot, 0.75-gallon displacement slug was used. If a test using the 3-foot slug was slow due to low permeability conditions, a concurrent test could be started in the next well using the 4-foot, 0.47-gallon slug. Two Level-Troll[™] data loggers were available to allow two wells to be tested simultaneously.

In all cases, water level data were collected automatically using a Level-Troll[™] data logger and by hand using the electric water level meter. Automatically logged data were collected at 5-second intervals except at TWN-16, where a 1-second interval was used. Hand-collected data were obtained more frequently in the first few minutes of each test when water levels were changing rapidly, then more slowly as the rate of water level change diminished.

Prior to each test, the static water level in each well was measured by hand using the electric water level meter. The data logger was then lowered to a depth of approximately 8 to 10 feet below the static water level, and background pressure readings were collected for approximately 30 to 60 minutes prior to beginning a test. The purpose of collecting the background data was to allow correction of test data for any trends in water levels measured at the wells. Typically, 30 minutes of background readings were collected for TWN-1 through TWN-10, and 1 hour of background readings for TWN-11 through TWN-19. The longer interval was used for wells TWN-11 through TWN-19 because these were the most recently installed wells and there was a higher likelihood that water levels in these wells had not yet stabilized after installation and development. Wells TWN-1 through TWN-10 were also tested first to give the more recently installed wells more time to stabilize.

Once background data were collected, the slug and electric water level meter sensor were then suspended in the well just above the static water level. Each test commenced by lowering the slug to a depth of approximately 2 feet below the static water level over a period of a few seconds and taking water level readings by hand as soon as possible afterwards. Upon completion, equipment pulled from each well was rinsed with clean water prior to its use in the next test. Automatically logged data were checked, backed up on the hard drive of a personal computer, and e-mailed to HGC's Tucson office daily for review and processing.

2.2 Data Analysis

Data were analyzed using AqtesolvTM (HydroSOLVE, 2000), a computer program developed and marketed by HydroSOLVE, Inc. In preparing the automatically logged data for analysis, the total number of records was reduced. In general, all data collected in the first 50 seconds were retained, then every 2nd, then 3rd, then 4th, etc. record was retained for analysis. For example, if the first 10 records were retained (50 seconds of data at 5-second intervals), the next records to be retained would be the 12th, the 15th, the 19th, the 24th, etc. In general, the maximum measured rise in water levels was slightly below what would be expected considering the slug volume, the volume in the 4-inch-diameter casing, and the volume in the annular space between the casing and the 6 ¾-inch-diameter bore. Assuming a 30 percent effective porosity for the filter pack, the expected rise in water level is approximately 1 foot per gallon. The maximum expected rise for the 3-foot, 0.75-gallon slug is therefore about 0.75 feet, and for the 4-foot, 0.47-gallon slug, about 0.47 feet. If only the 4-inch diameter casing is considered, a maximum rise of approximately 1.12 ft is expected for the 0.75 gallon slug, and approximately 0.75 ft for the 0.47 gallon slug.

Data were analyzed using two solution methods: the KGS unconfined method (Hyder et al., 1994) and the Bouwer-Rice unconfined method (Bouwer and Rice, 1976). When filter pack

porosities were required by the analytical method, a value of 30 percent was used. The saturated thickness was taken to be the difference between the static water level measured just prior to the test and the depth to the Brushy Basin contact as defined in the drilling logs (Table A.1). In cases where the static water level was below the top of the screened interval, the saturated thickness was also the effective screen length. In cases where the static water level was above the top of the screened interval, the partial penetration of the well was considered in the analysis.

Background data were analyzed for any obvious trends and when detected were used to correct subsequent test readings. Background trends were used to correct data from wells TWN-2, TWN-9, TWN-10, TWN-11, and TWN-12. (Data from TWN-7 were corrected for barometric pressure changes as discussed below.) The method for background correction was to fit a linear or logarithmic function to the background data then use that function to correct the subsequent test readings. In all cases, the corrections were a small fraction of the total displacement created by the slugs. Plots of raw and corrected displacements for these wells are provided in Appendix A.1.

Barometric pressure was recorded throughout each test using a BaroTrollTM pressure transducer and logger. In all cases, except at TWN-7, the test duration was short enough that the impact of changing barometric pressure could be ignored. The overnight test at TWN-7 required a correction for atmospheric pressure changes. Good agreement exists between hydraulic conductivity estimates made by different solution methods after correcting the data. The interpretation at TWN-7 is complicated by the extremely low hydraulic conductivity, the consequent small rate of change in

water levels during the test, and by the possibility that the relationship between changes in water level and changes in barometric pressure was not constant over the test.

The behavior of water levels at TWN-7 in relation to changes in barometric pressure is consistent with the discussion in HGC, 2004. Water level changes in the perched wells are impacted by instantaneous transmission of barometric pressure changes down the well casings and delayed (lagged and attenuated) transmission of pressure changes to the water table at locations remote from the wells. The lag and attenuation at remote locations result from vertically downward propagation of pressure changes through the low permeability vadose materials.

The KGS solution allows estimation of both specific storage and hydraulic conductivity, while the Bouwer-Rice solution allows estimation of only the hydraulic conductivity. The Bouwer-Rice solution is valid only for the straight-line portion of the data that results when the log of displacement is plotted against time, and is insensitive to both storage and the specified initial water level rise. Typically, only the later-time data are interpretable using Bouwer-Rice. The KGS solution generally allows a fit to both early and late time data, and is sensitive to storage and the specified initial water level rise. Both solutions were used for comparison. Automatically logged and hand-collected data were analyzed separately using both solution methods. The hand-collected data, therefore, served as an independent data set and a check on the accuracy of the automatically logged data.

2.3 Results

The results of the analyses are provided in Table A.2 and Appendix A.2. Appendix A.2 contains plots generated by AqtesolveTM that show the quality of fit between measured and simulated results, and reproduce the parameters used in each solution. Estimates of hydraulic conductivity range from 3.6×10^{-7} centimeters per second (cm/s) at TWN-7 to 0.0142 cm/s at TWN-16. The value of 0.0142 cm/s estimated using the KGS solution for the test at TWN-16 is higher than any value previously estimated for the perched zone. Except for the hydraulic conductivity estimate at TWN-16, values are within the range previously measured at the site.

In general, the agreement between hydraulic conductivities estimated from the KGS and Bouwer-Rice solutions is good, and values agree within a factor of 2 except at TWN-4, where the estimates differed by a factor of about 63, and at TWN-16, where the estimates differed by a factor of 2.2.

The agreement between estimates obtained from automatically logged and hand-collected data is also good. In all but three cases, the estimates based on automatically logged and hand-collected data using the KGS solution are within a factor of 2, and in the other three cases are within a factor of 3. Estimates obtained from automatically logged and hand-collected data using the Bouwer-Rice solution are also close: identical or within a factor of 2 in all cases except at TWN-13, where the estimates differ by a factor of 3.

Specific storage estimates of 0.1 obtained at TWN-10 and TWN-13 using KGS are anomalously high. These estimates suggest that these tests were impacted by near-well storage effects not encountered at other wells.

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3. ESTIMATED PERCHED WATER TRAVEL TIMES IN THE NORTHEASTERN PORTION OF THE SITE

Average perched groundwater travel times in the vicinity of the TWN-series wells are estimated based on the hydraulic conductivity estimates obtained from the wells and hydraulic gradients calculated from site water levels. This method is identical to that presented in HGC, 2005. Because the hydraulic conductivity estimates represent values vertically averaged over the measured saturated thicknesses of the wells, the calculated travel times also represent values averaged over the saturated thicknesses.

Except for the high hydraulic conductivity of 0.0142 cm/s estimated for TWN-16 using the KGS solution, hydraulic conductivity estimates from the new wells are within the range previously reported for the site. Perched zone hydraulic conductivities at the site are generally highest in the area northeast and east (upgradient to crossgradient) of Tailings Cell #2.

Figure A.2 is a contour map of December, 2009 perched water level data. This map was generated by gridding the raw data using ordinary linear kriging with a linear variogram. The general direction of perched water flow inferred from the water level contours is to the south-southwest. Flow is complicated immediately northeast of the Mill site by the groundwater mound associated with the wildlife ponds. Perched water flow at many of the new installations located immediately north of the ponds is to the north-northwest, and a broad region of relatively flat hydraulic gradient exists to the northwest of the ponds. The highest measured water level was at TWN-12, the most northern of the newly installed TWN-series wells.

Table A.3 provides the average perched water pore (interstitial) velocities in the vicinities of the new wells based on hydraulic conductivity estimates and hydraulic gradients calculated from water levels shown on Figure A.2. Hydraulic conductivities shown in Table A.3 are averages of KGS and Bouwer-Rice estimates shown in Table A.2. An effective porosity of 18 percent was used in the calculations. The heavy green lines in Figure A.2 indicate the positions and lengths over which the perched zone hydraulic gradients were calculated. The method of calculation is substantially the same as described in HGC, 2005.

As indicated, the calculated pore velocities range from 0.04 feet per year (ft/yr) at TWN-7 to 762 ft/yr at TWN-16. Calculated velocities at TWN-1, TWN-4, TWN-5, TWN-6, TWN-8, TWN-12, TWN-16, TWN-18, and TWN-19 are greater than 10 ft/yr; velocities at TWN-2, TWN-3, TWN-8, TWN-9, TWN-10, TWN-11, and TWN-15 are between 1 and 10 ft/yr; and velocities at TWN-7, TWN-13, TWN-14, and TWN-17 are less than 1 ft/yr.

Figure A.3 is a map posting nitrate concentrations obtained from samples of perched zone wells that shows the approximate areas where nitrate concentrations exceed 5 mg/L. These areas are hereafter referred to as areas of elevated nitrate. Figure A.4 is a water level contour map showing these same areas. The northeastern area of elevated nitrate is referred to as Area 1, and the central area as Area 2...Area 1 consists of two sub-areas, the northernmost associated with TWN-17 and TWN-19, and the other associated with TWN-9 and PIEZ-1. Areas 1 and 2 are separated by a groundwater mound associated with the wildlife ponds. Areas 1 and 2 are generally elongated in the northeast-southwest direction, roughly parallel to the perched hydraulic gradient. The eastern portion

of the central area contains a lobe (or spur) that is elongated in the north-south to south-southeast direction.

Average perched groundwater pore velocities are calculated for two hypothetical pathlines through elevated nitrate Areas 1 and 2. These pathlines are shown in Figure A.4. The northeastern pathline (from TWN-17 to TWN-9) is associated with Area 1 (northeast of the wildlife ponds) and the central pathline (from TWN-2 to MW-11) is associated with Area 2 (west and southwest of the wildlife ponds). These pathlines, although subparallel to the long axes of portions of the two areas, are considered hypothetical because they are not always parallel to the current hydraulic gradient.

The average hydraulic gradient along the Area 1 pathline is approximately 0.012 ft/ft, and along the Area 2 pathline, 0.025 ft/ft. The geometric mean hydraulic conductivity along the Area 1 pathline (based on estimates at TWN-9, TWN-14, and TWN-17) is approximately 8 ft/yr, and along the Area 2 pathline (based on estimates at TWN-2, TW4-24, and MW-11), approximately 165 ft/yr. Assuming a porosity of 18 percent, average pore water velocities of 0.55 ft/yr for the Area 1 pathline and 23 ft/yr for the Area 2 pathline are calculated. A larger velocity of approximately 7 ft/yr is calculated for the Area 1 pathline if the hydraulic conductivity for nearby well TWN-16 is substituted for that of TWN-17 (which yields a geometric mean hydraulic conductivity [based on estimates at TWN-9, TWN-14, and TWN-16] of approximately 100 ft/yr).

4. **DISCUSSION**

Perched water pore (interstitial) velocities in the vicinities of the new wells are calculated (using averages of KGS and Bouwer-Rice hydraulic conductivity estimates) to range from approximately 0.04 ft/yr at TWN-7 to 762 ft/yr at TWN-16. Calculated average velocities along the two hypothetical pathlines shown in Figure A.4 are 0.55 ft/yr to 7 ft/yr for nitrate Area 1 and 23 ft/yr for nitrate Area 2. Calculated velocities are insufficient to move nitrate from the upgradient to the downgradient portions of either area during the approximately 30 years of site operation. This suggests that 1) actual velocities are higher than calculated using the geometric averages of the estimated hydraulic conductivities, 2) each nitrate area has resulted from more than one localized seepage area and/or one or more diffuse, distributed seepage areas located upgradient of the tailings cells, or 3) the nitrate distribution results from a combination of these factors. With regard to item 2) above, more than one seepage area may have received water from the same source resulting in similar seepage chemistry at more than one areal location. Furthermore, some seepage areas may have existed prior to Mill construction, and contributed nitrate for decades prior to the existence of any seepage areas related to Mill operation. Hydraulic gradients have changed as a result of seepage from the wildlife ponds, and would be expected to have changed in response to any other sources of seepage present prior to Mill construction and operation.

The higher the pore velocities, the fewer seepage areas are needed to distribute the nitrate detected in both Area 1 and Area 2. Higher pore velocities would result in spreading of nitrate from each potential source location over a larger area. Past and present pore velocities may be high enough

to support minimal contributing seepage locations if 1) greater weight were given to the highest conductivity estimates when calculating the averages or 2) flow is primarily through one or more relatively thin, relatively continuous higher permeability zones similar to that inferred to exist in the vicinity of MW-4, located east of the tailings cells within an area of elevated chloroform (HGC, 2007). Because the estimated hydraulic conductivities in Table A.2 are averages over the entire saturated thicknesses at the estimation points, the conductivity of a relatively thin horizon or horizons through which most of the flow was occurring would be underestimated as would the effective pore velocity. For example, if nearly all the flow were occurring within a horizon with a thickness that was only 10 percent of the total saturated thickness, then the conductivity of that horizon could be nearly 10 times as high as the average estimated over the entire saturated thickness, and the effective pore velocity nearly 10 times higher than estimated using the vertically averaged conductivity of a relatively thin, relatively continuous higher permeability zone penetrated by MW-4 was estimated to be as much as 5 to 10 times higher than the vertically averaged conductivity estimates (HGC, 2007).

The presence of higher permeability horizons within both Area 1 and Area 2 (by analogy with the area near MW-4) would allow greater spreading of perched zone nitrate within the 30 year operational time history of the Mill. Fewer localized seepage areas could then be called upon to yield the observed nitrate distributions. The high hydraulic conductivity estimated at TWN-16 indicates the possible existence of such a horizon within Area 1. Such a zone does not appear to be penetrated by other TWN-series wells near and within Area 1, suggesting that any higher permeability zone penetrated by TWN-16 is not continuous over Area 1. However, additional data might reveal the presence of a zone analogous to that near MW-4 that could have transported nitrate over longer distances.

5. CONCLUSIONS

Hydraulic conductivity estimates based on slug tests at the new wells range from 3.6 x 10⁻⁷ cm/s at TWN-7 to 0.014 cm/s at TWN-16. The value of 0.014 cm/s, based on the test conducted at TWN-16 and obtained using the KGS solution, is higher than any previously reported value for the perched zone. The average of the KGS and Brouwer-Rice results at TWN-16 was 0.01 cm/s. Except for estimates obtained at TWN-16, the range of hydraulic conductivities estimated for the new wells is within the range of perched zone values previously reported for the site. Perched zone hydraulic conductivities at the site are generally highest in the area northeast to east (upgradient to crossgradient) of Tailings Cell #2.

Perched water pore (interstitial) velocities in the vicinities of the new wells are calculated to range from 0.04 feet per year (ft/yr) at TWN-7 to 762 ft/yr at TWN-16. Calculated velocities at TWN-1, TWN-4, TWN-5, TWN-6, TWN-8, TWN-12, TWN-16, TWN-18, and TWN-19 are greater than 10 ft/yr; velocities at TWN-2, TWN-3, TWN-8, TWN-9, TWN-10, TWN-11, and TWN-15 are between 1 and 10 ft/yr; and velocities at TWN-7, TWN-13, TWN-14, and TWN-17 are less than 1 ft/yr.

Areas of elevated perched zone nitrate that exist northeast of and proximal to the Mill are referred to as Area 1 and Area 2 respectively. Average perched zone pore velocities along hypothetical pathlines oriented with the long axes of these areas of elevated nitrate concentrations are calculated as approximately 0.55 ft/yr to 7 ft/yr for Area 1 and 23 ft/yr for Area 2 using geometric

averages of hydraulic conductivity estimates along the pathlines. These velocities are insufficient to transport nitrate from the upgradient to the downgradient portions of either area within the approximate 30 year operational time of the Mill, suggesting that 1) actual pore velocities are higher than calculated using the geometric averages of the estimated hydraulic conductivities, 2) each nitrate area has resulted from more than one localized seepage area and/or one or more diffuse, distributed seepage areas located upgradient of the tailings cells, or 3) the nitrate distribution results from a combination of these factors. With regard to item 2) above, more than one seepage area may have received water from the same source resulting in similar seepage chemistry at more than one areal location. Furthermore, some seepage areas may have existed prior to Mill construction, and contributed nitrate for decades prior to the existence of any seepage areas related to Mill operation. Hydraulic gradients have changed as a result of seepage from the wildlife ponds, and would be expected to have changed in response to any other sources of seepage present prior to Mill construction and operation.

The presence of higher permeability horizons within both Area 1 and Area 2 (by analogy with the area near MW-4) would allow greater spreading of perched zone nitrate within the 30 year operational time history of the Mill. Fewer localized seepage areas could then be called upon to yield the observed nitrate distributions. The high hydraulic conductivity estimated at TWN-16 indicates the possible existence of such a horizon within Area 1. Such a zone does not appear to be penetrated by other TWN-series wells near and within Area 1, suggesting that any higher permeability zone penetrated by TWN-16 is not continuous over Area 1. However, additional data might reveal the presence of a zone analogous to that near MW-4 that could have transported nitrate over longer distances.

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7. LIMITATIONS

The opinions and recommendations 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, 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 A.1Parameters Used in Hydraulic Test Analyses

Depth to	Depth to	Depth to Top	Depth to Base	Saturated Thickness	
Brushy Basin	Water	of Screen	of Screen	Above Brushy Basin	
(ft)	(ft)	(ft)	(ft)	(ft)	
102	48	55.0	105.0	54.0	
92	18	15.0	95.0	74.0	
92	32	45.0	95.0	60.0	
123	37	45.0	125.0	85.5	
147	70	80.0	150.0	77.0	
127	75	60.0	130.0	52.0	
102	91	25.0	105.0	11.0	
142	62	75.5	145.5	80.0	
94	65	47.0	97.0	29.0	
102	82	55.0	105.0	20.0	
140	72	62.0	142.0	68.0	
107	40	30.0	110.0	67.0	
115	47	46.0	116.0	68.0	
120	63	53.0	123.0	57.0	
150	92	85.0	155.0	58.0	
90	49	43.0	93.0	41.0	
104	35	24.0	104.0	69.0	
142	59	55.0	145.0	83.0	
105	55	56.0	106.0	50.0	
	Brushy Basin (ft) 102 92 92 123 147 127 102 142 94 102 142 94 102 140 107 115 120 150 90 104 104 142	Brushy Basin (ft) Water (ft) 102 48 92 18 92 32 123 37 147 70 127 75 102 91 147 62 94 65 102 82 140 72 107 40 115 47 120 63 150 92 90 49 104 35 142 59	Brushy Basin (ft)Water (ft)of Screen (ft)1024855.0921815.0923245.01233745.01477080.01277560.01029125.01426275.5946547.01028255.01407262.01074030.01154746.01206353.0904943.01043524.01425955.0	Brushy Basin (tt) Water (tt) of Screen (tt) of Screen (tt) 102 48 55.0 105.0 92 18 15.0 95.0 92 32 45.0 95.0 123 37 45.0 125.0 147 70 80.0 150.0 127 75 60.0 130.0 102 91 25.0 105.0 147 70 80.0 150.0 102 91 25.0 105.0 142 62 75.5 145.5 94 65 47.0 97.0 102 82 55.0 105.0 140 72 62.0 142.0 107 40 30.0 110.0 115 47 46.0 116.0 120 63 53.0 123.0 90 49 43.0 93.0 90 49 43.0 93.0 <	

Note:

ft = feet

		Automatically Logged Data			Hand Collected Data			
		K	GS	Bouwer-Rice	K	GS	Bouwer-Rice	
Test	Saturated Thickness	K (cm/s)	Ss (1/ft)	K (cm/s)	K (cm/s)	Ss (1/ft)	K (cm/s)	
TWN-1	54	1.70E-04	2.22E-03	NI	1.97E-04	1.25E-03	1.36E-04	
TWN-2	74	1.49E-05	3.20E-04	2.25E-05	2.04E-05	1.16E-04	2.73E-05	
TWN-3	60	8.56E-06	8.73E-06	8.97E-06	7.75E-06	1.53E-05	8.89E-06	
TWN-4	85	1.76E-03	3.43E-04	2.79E-05	1.25E-03	1.84E-06	NI	
TWN-5	77	4.88E-04	3.88E-07	4.06E-04	4.88E-04	3.88E-07	3.70E-04	
TWN-6	79	1.74E-04	2.22E-03	NI	3.50E-04	2.22E-12	3.36E-04	
TWN-7	11	3.57E-07	2.22E-03	4.59E-07	3.57E-07	2.21E-03	NI	
TWN-8	80	1.51E-04	3.66E-04	7.55E-05	4.73E-04	1.41E-06	2.48E-04	
TWN-9	29	2.99E-05	6.92E-03	2.86E-05	6.02E-05	5.59E-03	7.93E-05	
TWN-10	20	3.83E-05	0.1	2.31E-05	8.71E-05	8.12E-03	1.10E-04	
TWN-11	68	1.18E-04	1.08E-05	9.83E-05	9.34E-05	7.18E-05	9.78E-05	
TWN-12	67	8.05E-05	4.65E-05	7.69E-05	1.28E-04	1.27E-07	7.39E-05	
TWN-13	68	2.62E-06	0.1	4.77E-06	2.09E-06	0.1	6.93E-06	
TWN-14	57	3.61E-06	6.39E-03	2.74E-06	3.98E-06	3.17E-03	7.93E-06	
TWN-15	58	4.75E-05	1.04E-03	2.61E-05	5.86E-05	3.49E-04	6.42E-05	
TWN-16	41	0.0142	8.02E-04	6.47E-03	NI	NI	NI	
TWN-17	69	3.73E-06	0.033	6.18E-06	1.41E-06	0.061	1.96E-06	
TWN-18	83	2.27E-03	2.44E-06	1.14E-03	2.67E-03	2.22E-12	NI	
TWN-19	50	2.69E-05	2.49E-03	1.81E-05	3.83E-05	3.34E-03	NI	

TABLE A.2 Slug Test Results

Notes:

Bouwer-Rice = Unconfined Bouwer-Rice solution method in Aqtesolv™

cm/s = Centimeters per second

ft = Feet

 $K = hydraulic \ conductivity$

KGS = Unconfined KGS solution method in Aqtesolv™

Ss= specific storage

NI= Not interpretable .

Well	Hydraulic Conductivity ^a		Pathline	Head Change	Hydraulic Gradient	Pore Velocity
	(cm/s)	(ft/yr)	(ft)	(ft)	ft/ft	ft/yr
TWN-1	1.70E-04	1.74E+02	220	13	5.91E-02	57.0
TWN-2	1.87E-05	1.91E+01	230	17	7.39E-02	7.85
TWN-3	8.77E-06	8.96E+00	300	13	4.33E-02	2.16
TWN-4	8.94E-04	9.14E+02	1050	10	9.52E-03	48.3
TWN-5	4.47E-04	4.57E+02	290	15	5.17E-02	131
TWN-6	1.74E-04	1.78E+02	440	10	2.27E-02	22.5
TWN-7	4.08E-07	4.17E-01	660	10	1.52E-02	0.04
TWN-8	1.13E-04	1.16E+02	550	13	2.36E-02	15.2
TWN-9	2.93E-05	2.99E+01	825	17	2.06E-02	3.42
TWN-10	3.07E-05	3.14E+01	660	5	7.58E-03	1.32
TWN-11	1.08E-04	1.11E+02	880	14	1.59E-02	9.8
TWN-12	7.87E-05	8.04E+01	550	22	4.00E-02	17.9
TWN-13	3.69E-06	3.77E+00	1050	4	3.81E-03	0.08
TWN-14	3.18E-06	3.25E+00	880	13	1.48E-02	0.27
TWN-15	3.68E-05	3.76E+01	990	14	1.41E-02	2.96
TWN-16	0.010336	1.06E+04	770	10	1.30E-02	762
TWN-17	4.96E-06	5.06E+00	1200	10	8.33E-03	0.23
TWN-18	1.70E-03	1.74E+03	300	10	3.33E-02	322
TWN-19	2.25E-05	2.30E+01	550	22	4.00E-02	23.2

 TABLE A.3

 Estimated Hydraulic Conductivities and Perched Zone Pore Velocities

Notes:

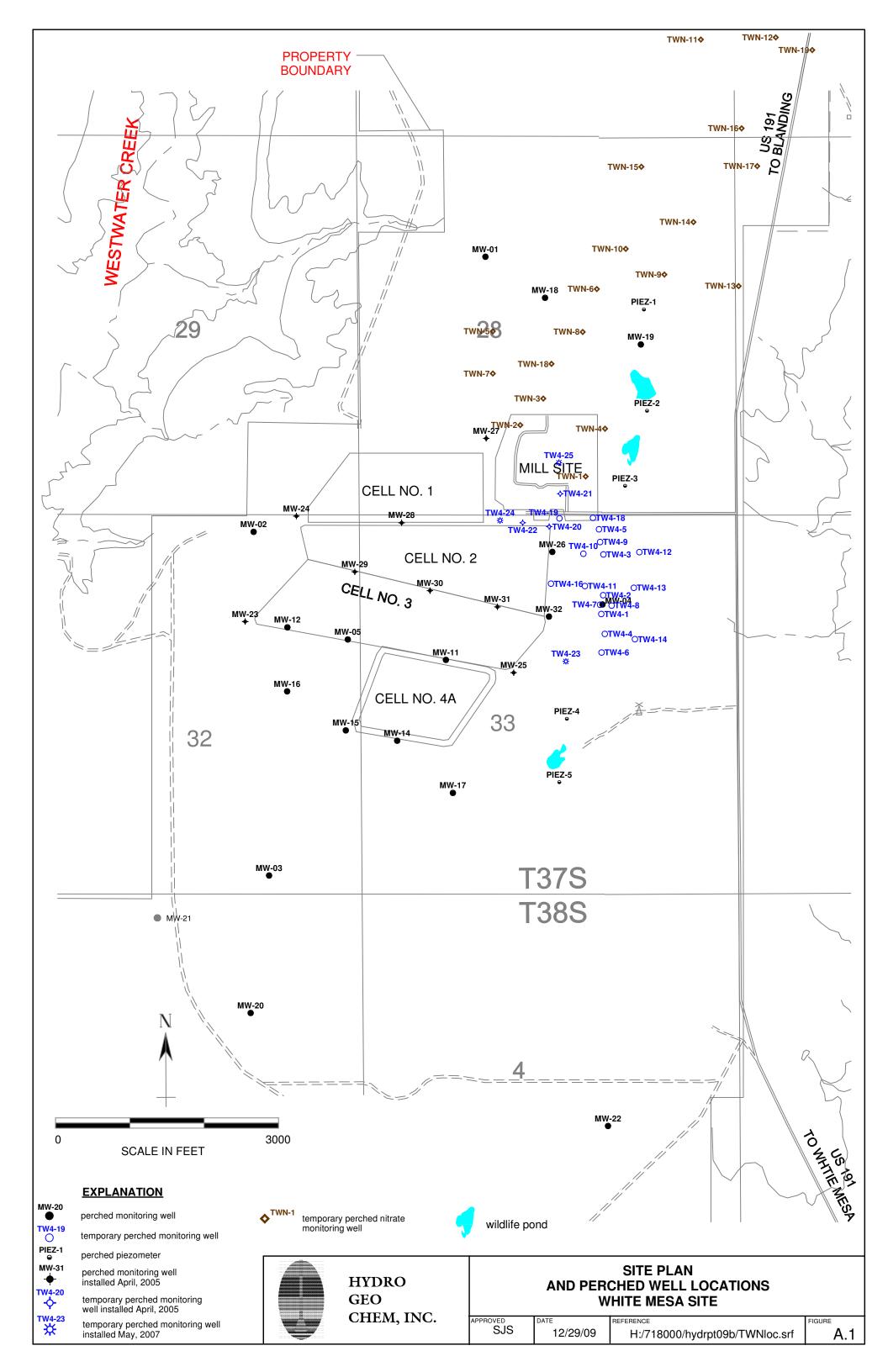
^a Average of KGS and Bouwer-Rice estimates. Assumes effective porosity of 0.18

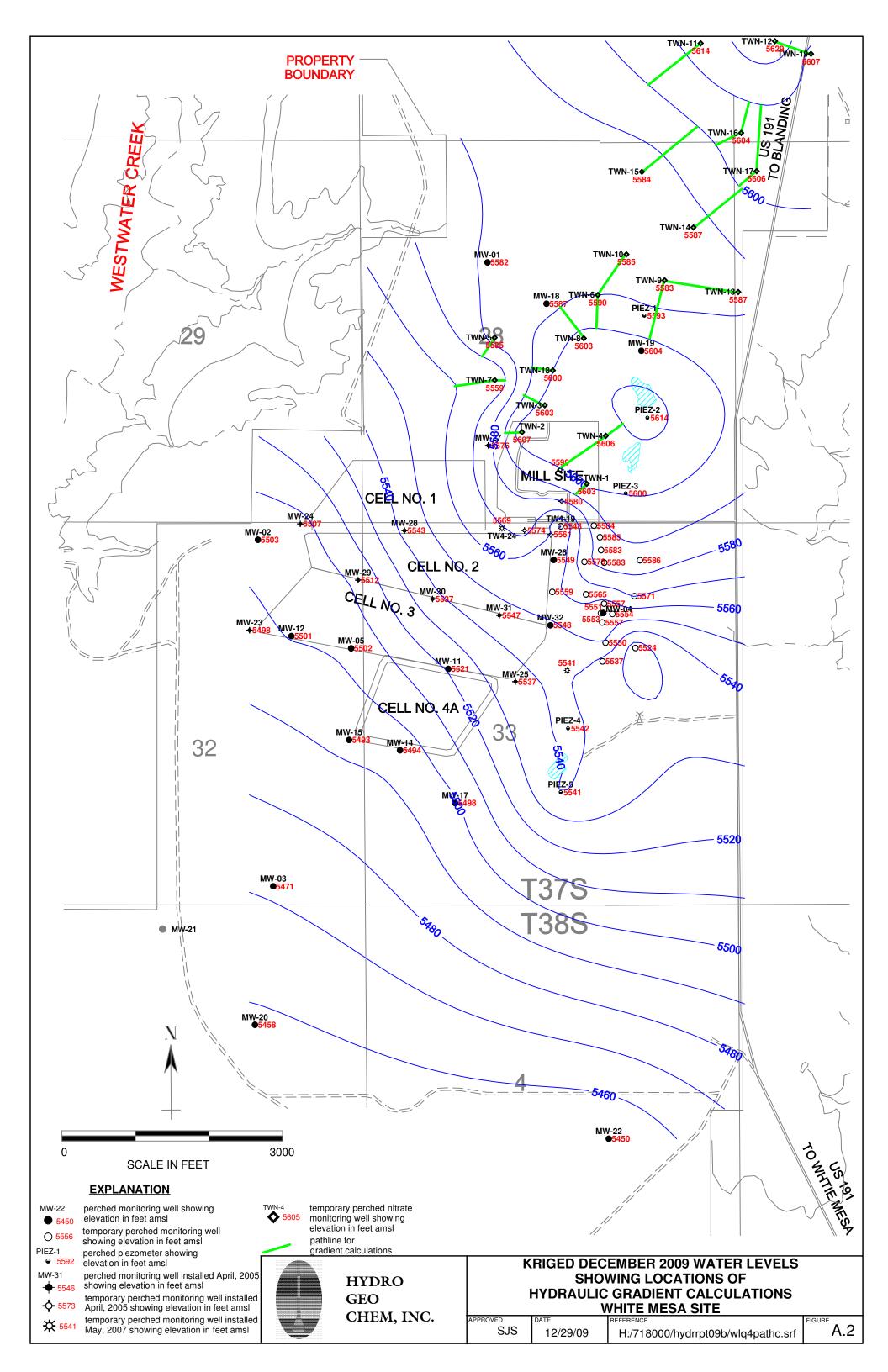
cm/s = Centimeters per second

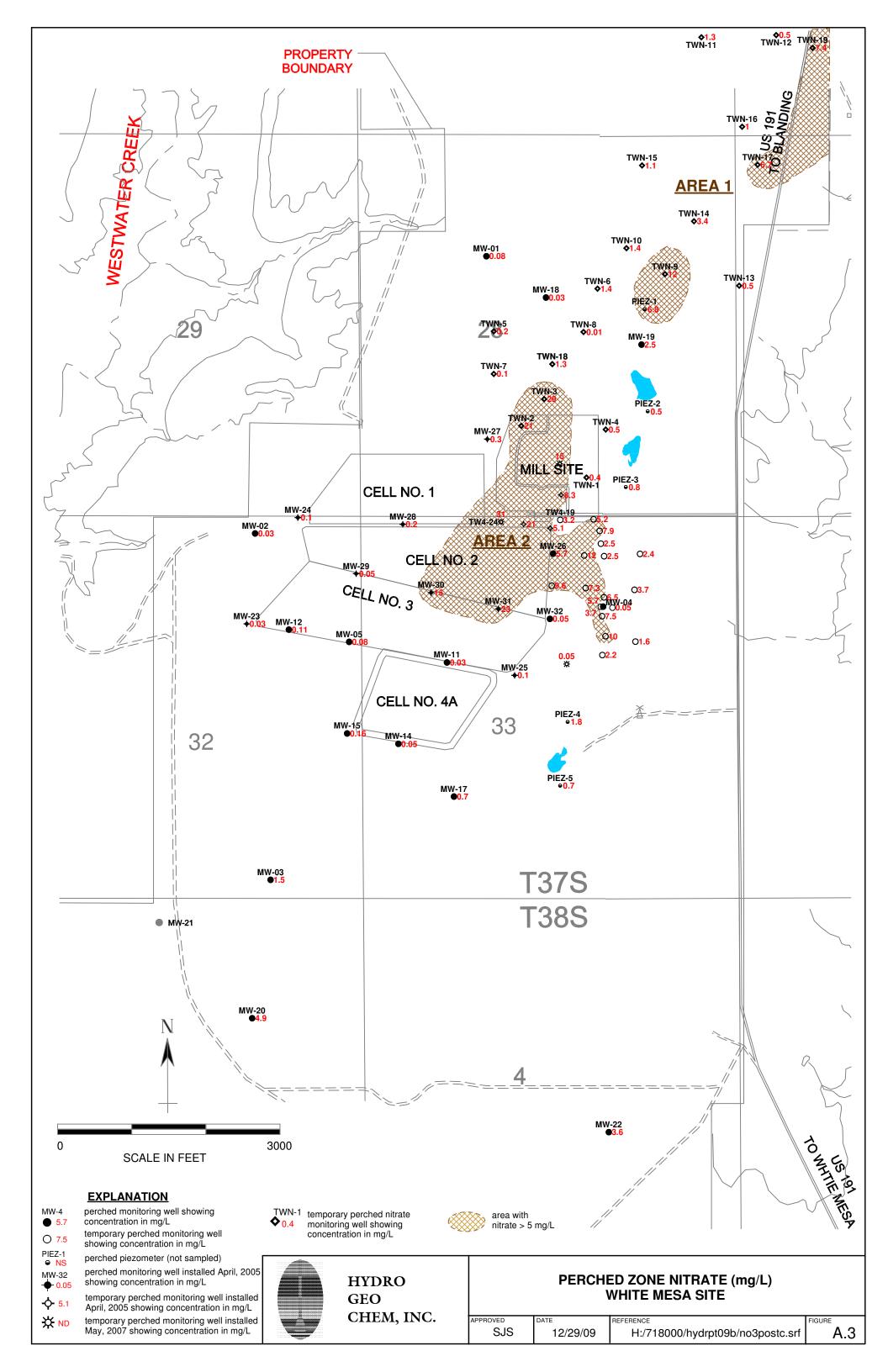
ft/ft = Feet per foot

ft/yr = Feet per year

FIGURES

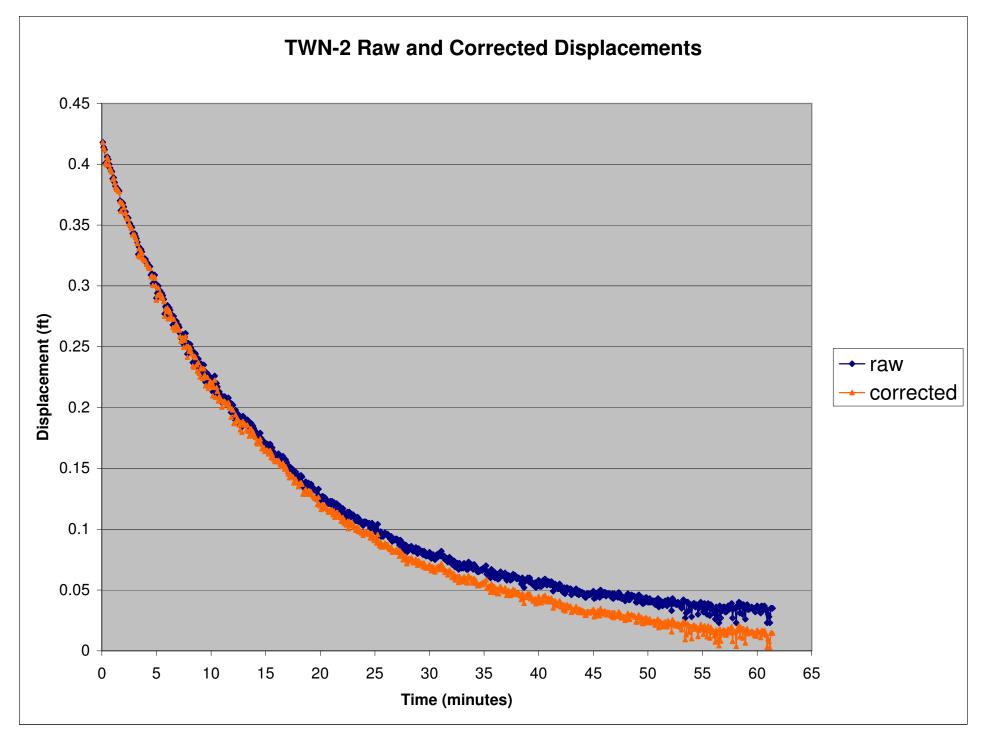


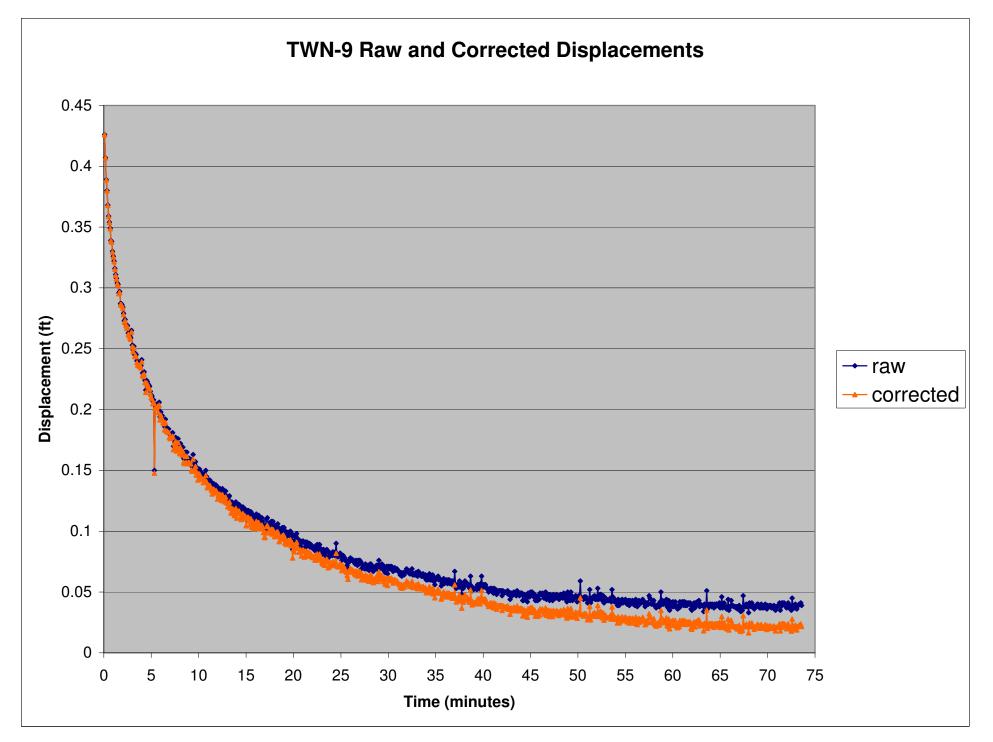


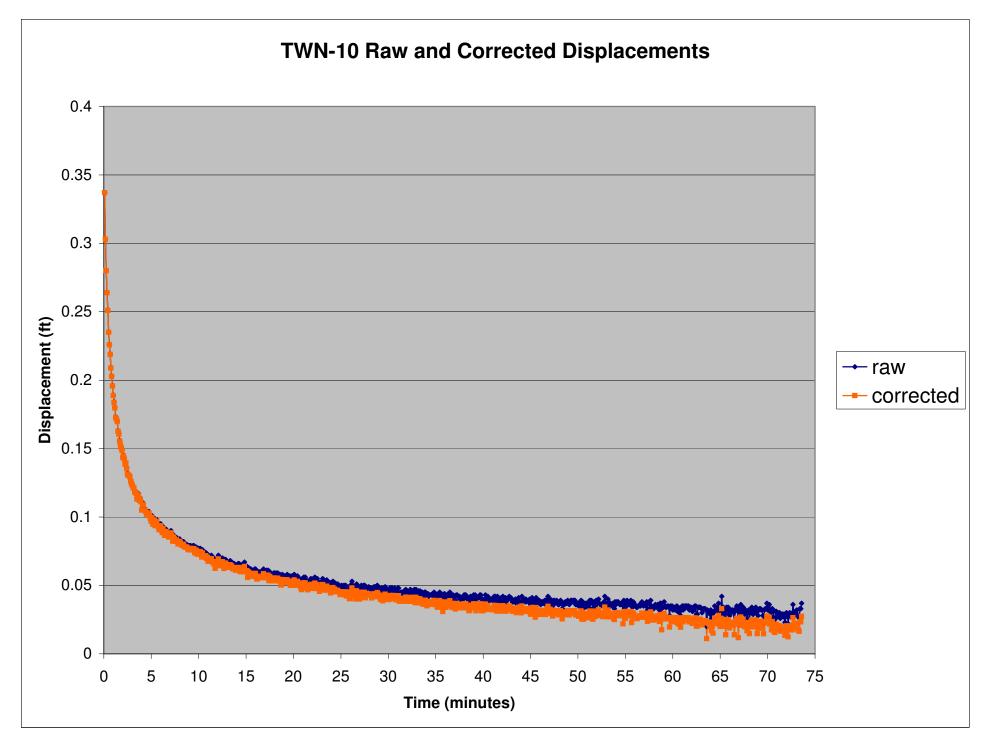


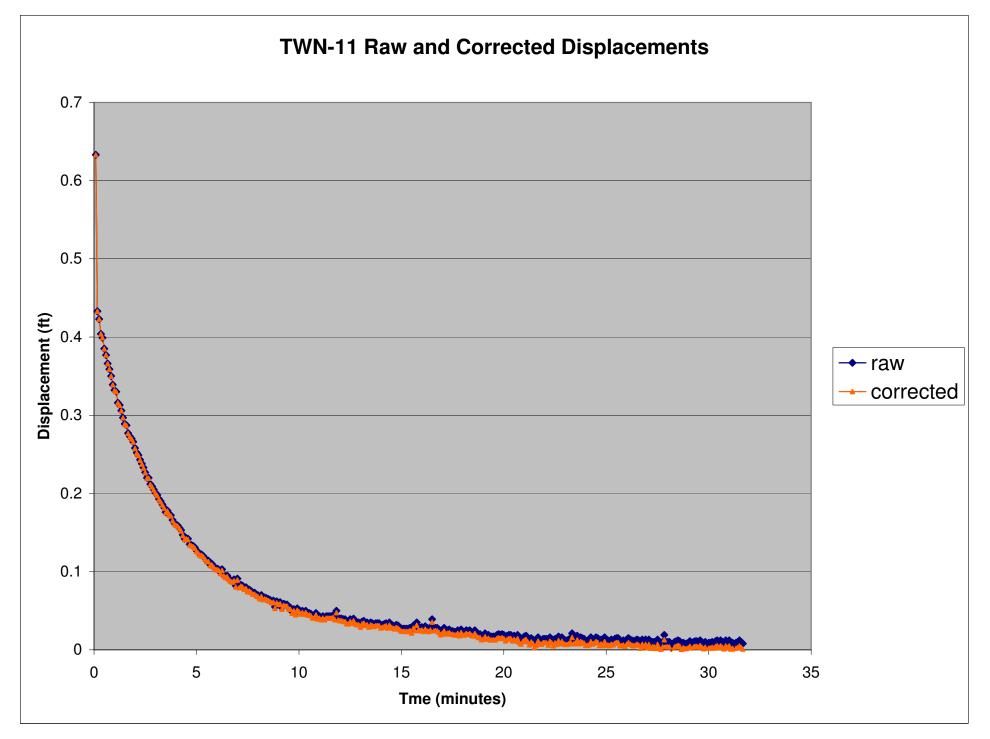
APPENDIX A.1

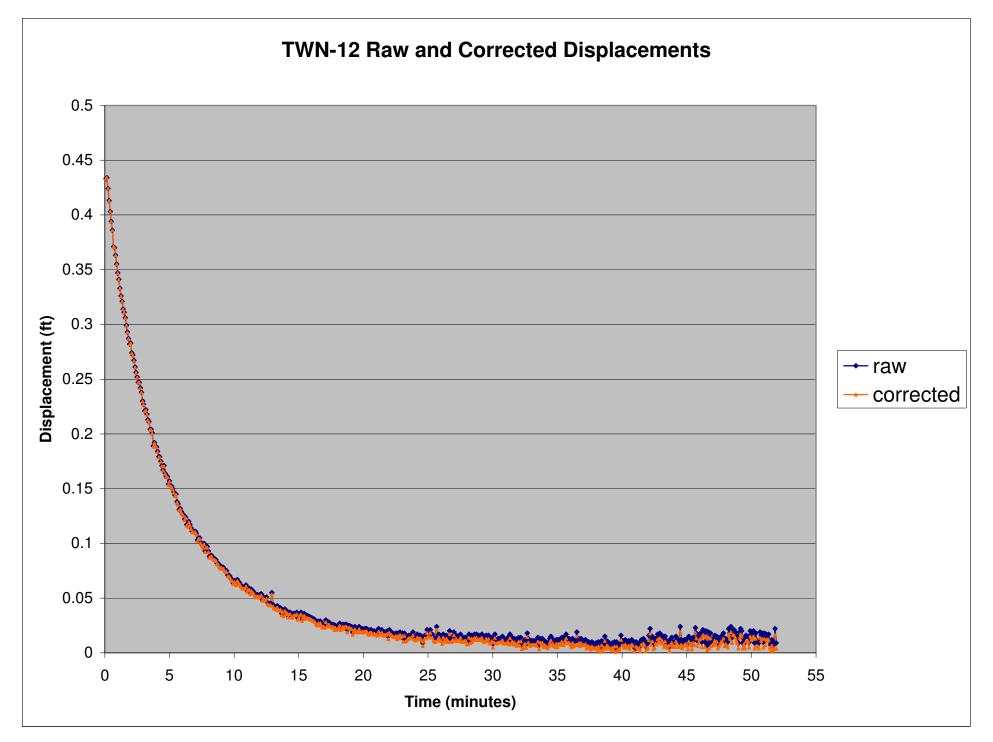
BACKGROUND CORRECTIONS





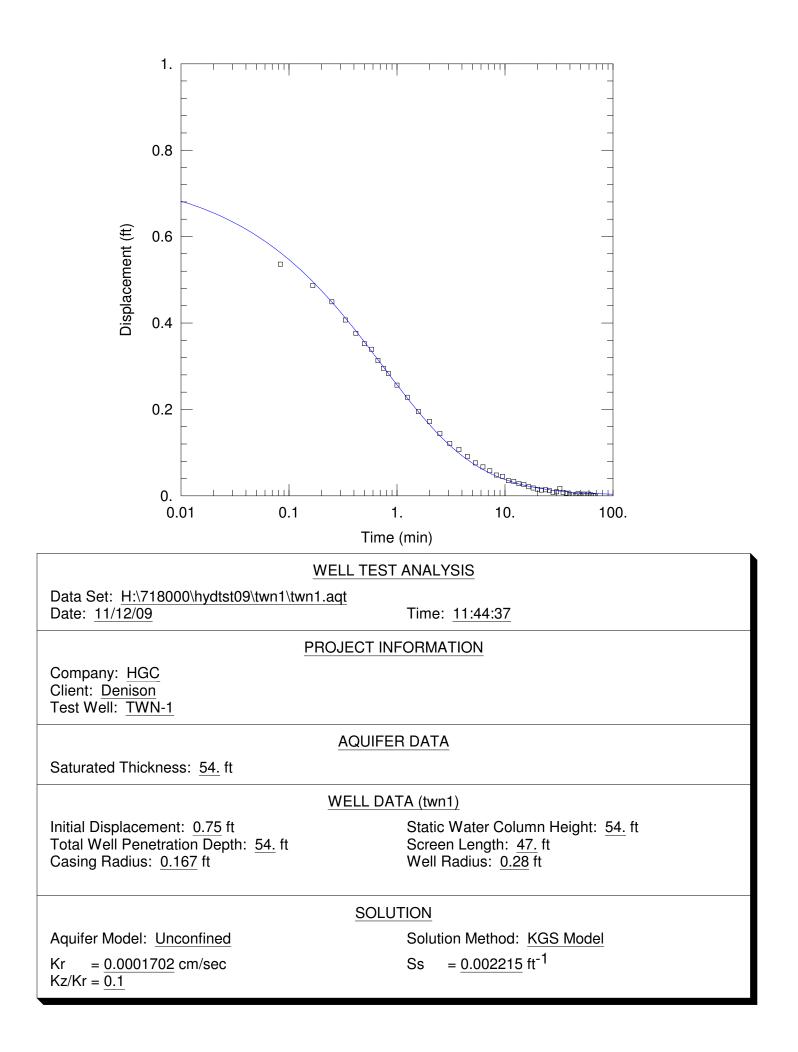


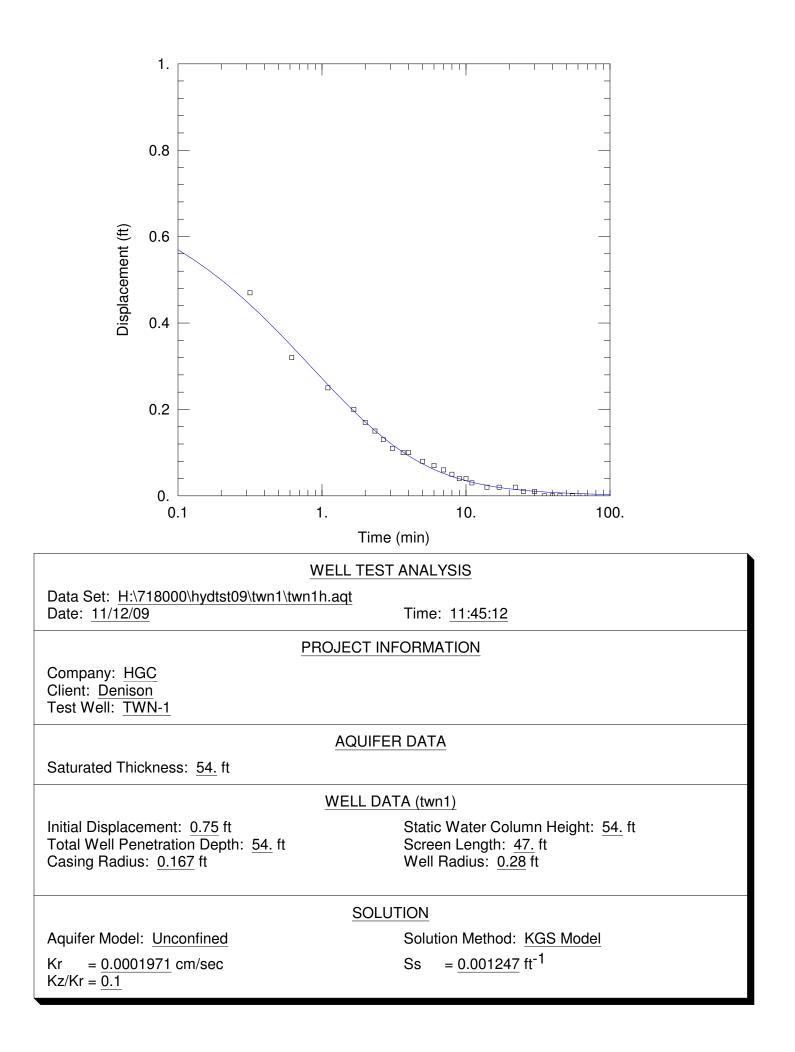


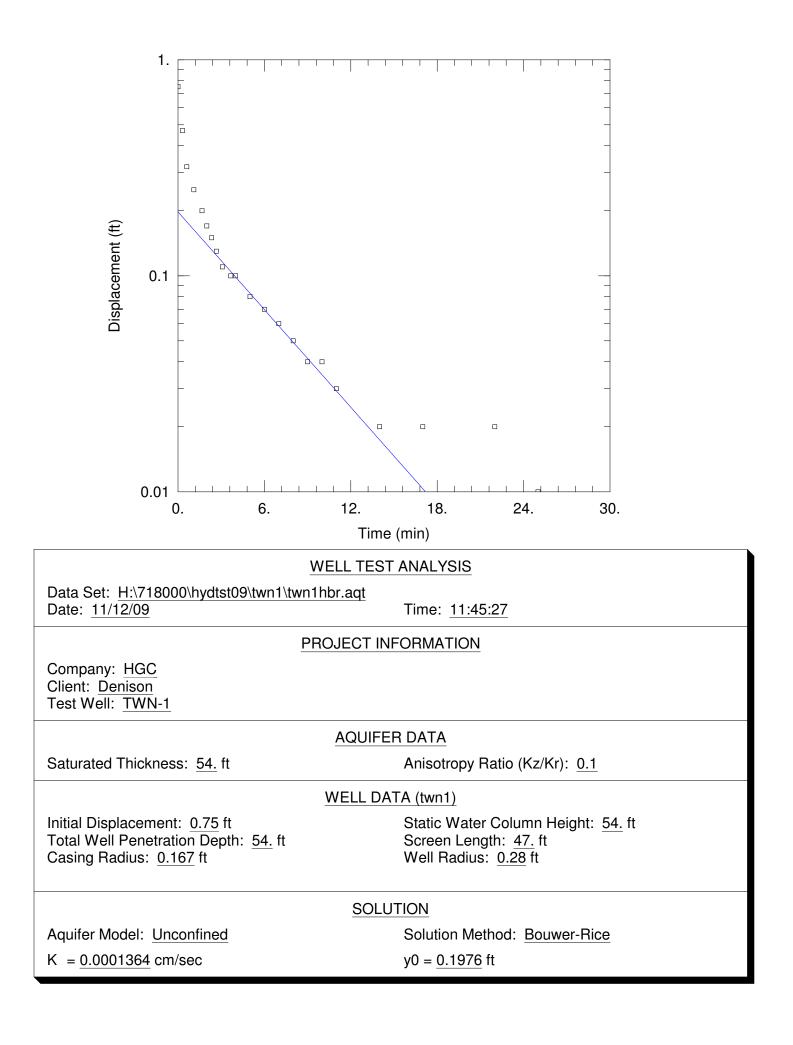


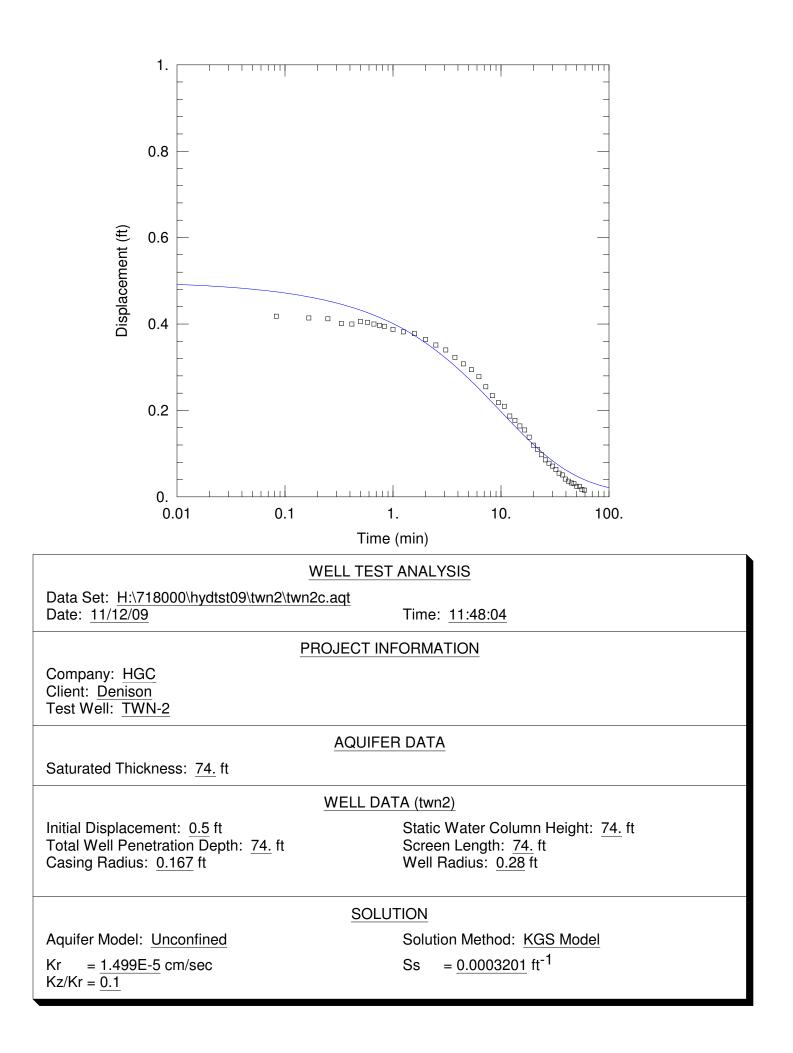
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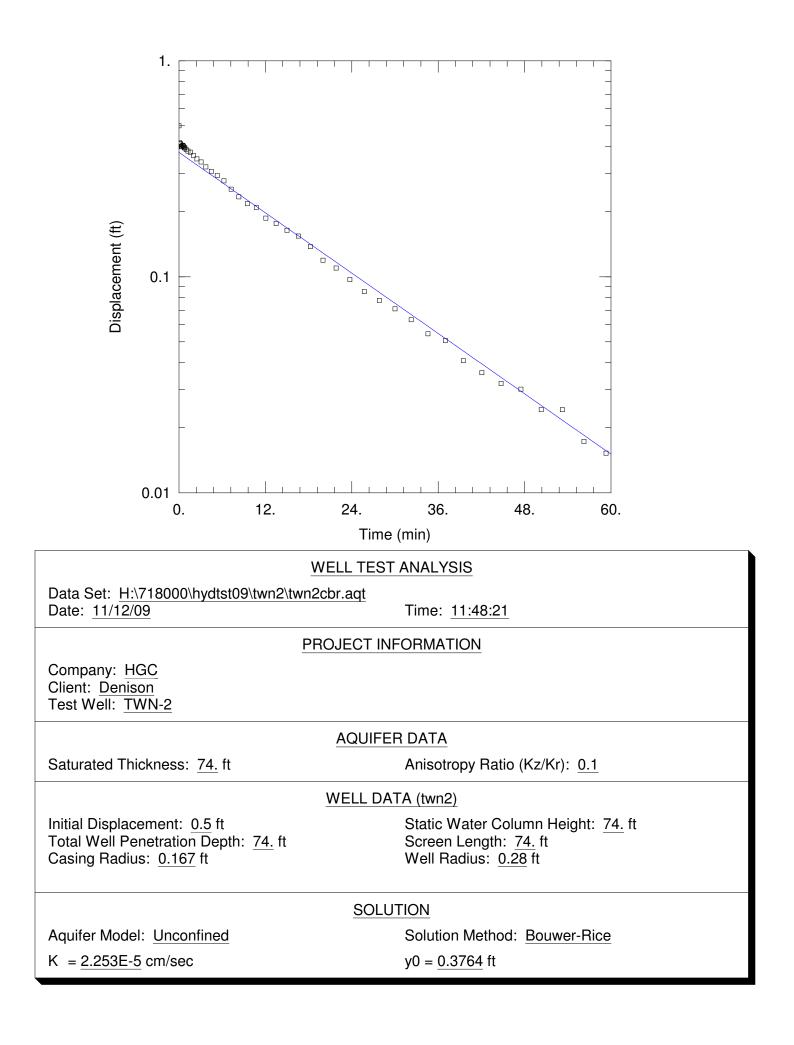
SLUG TEST ANALYSIS PLOTS

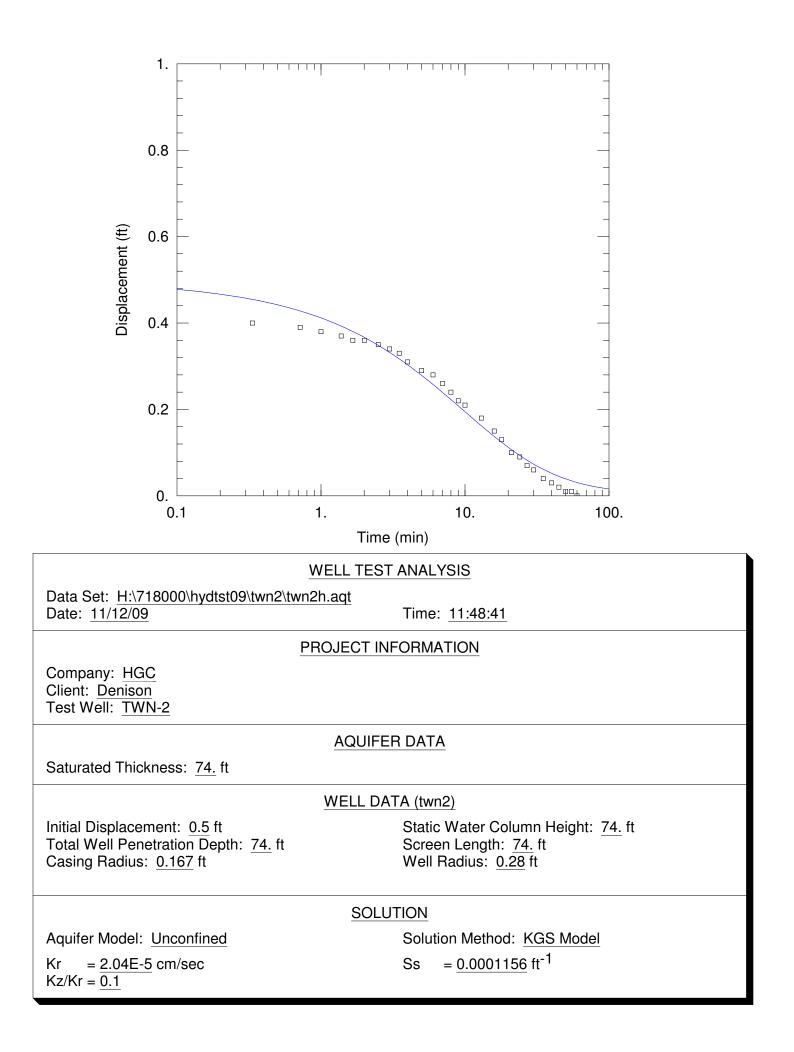


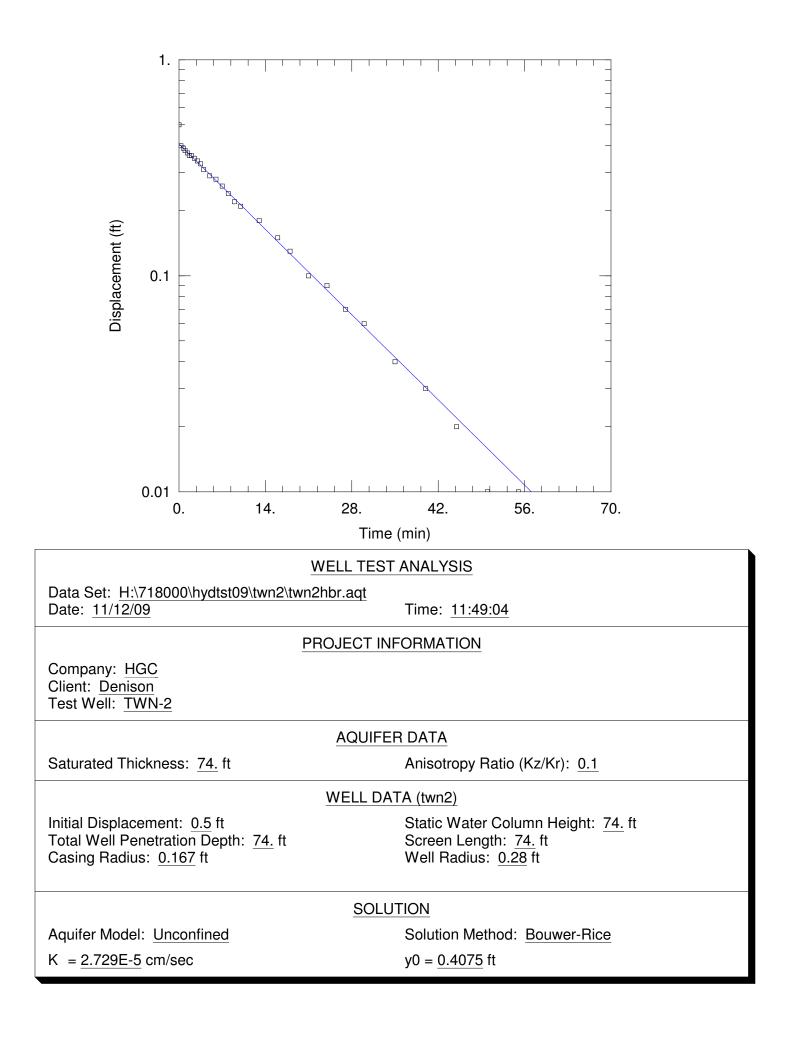


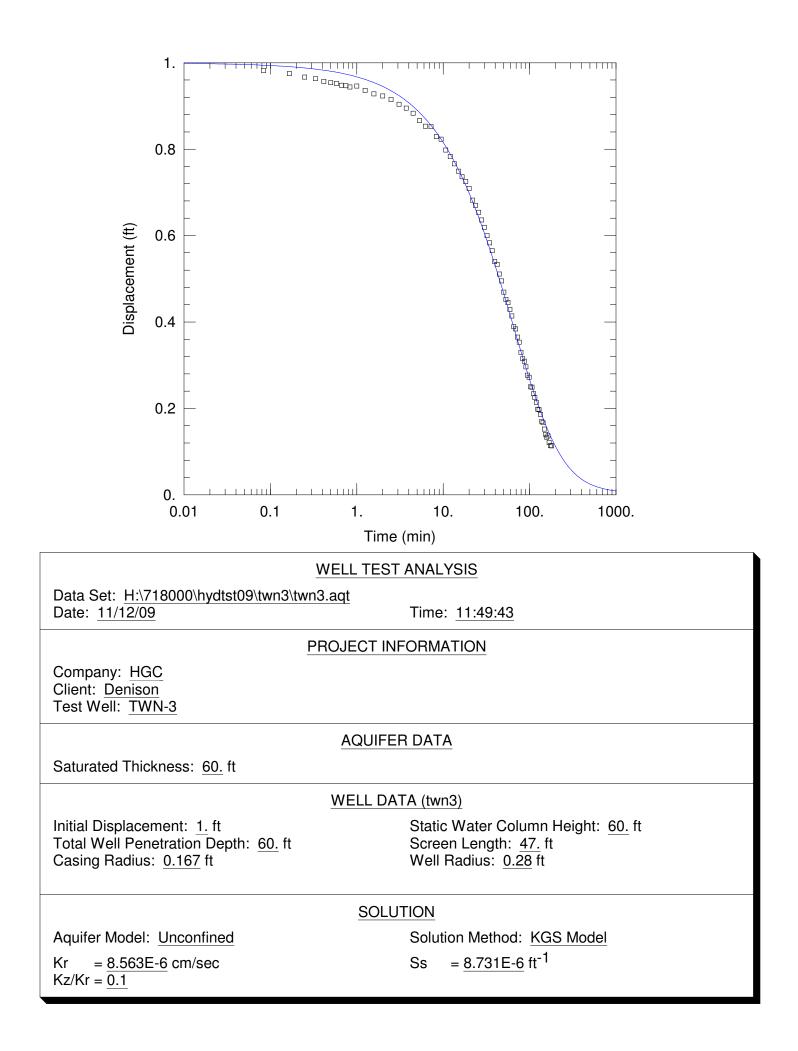


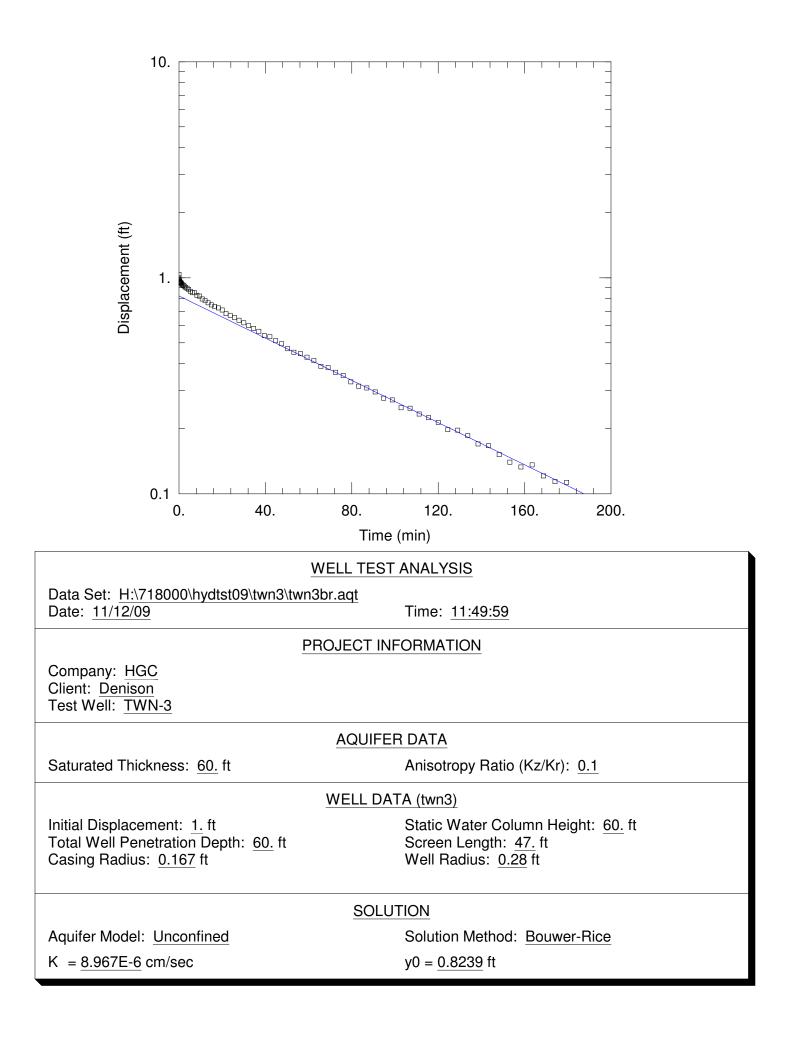


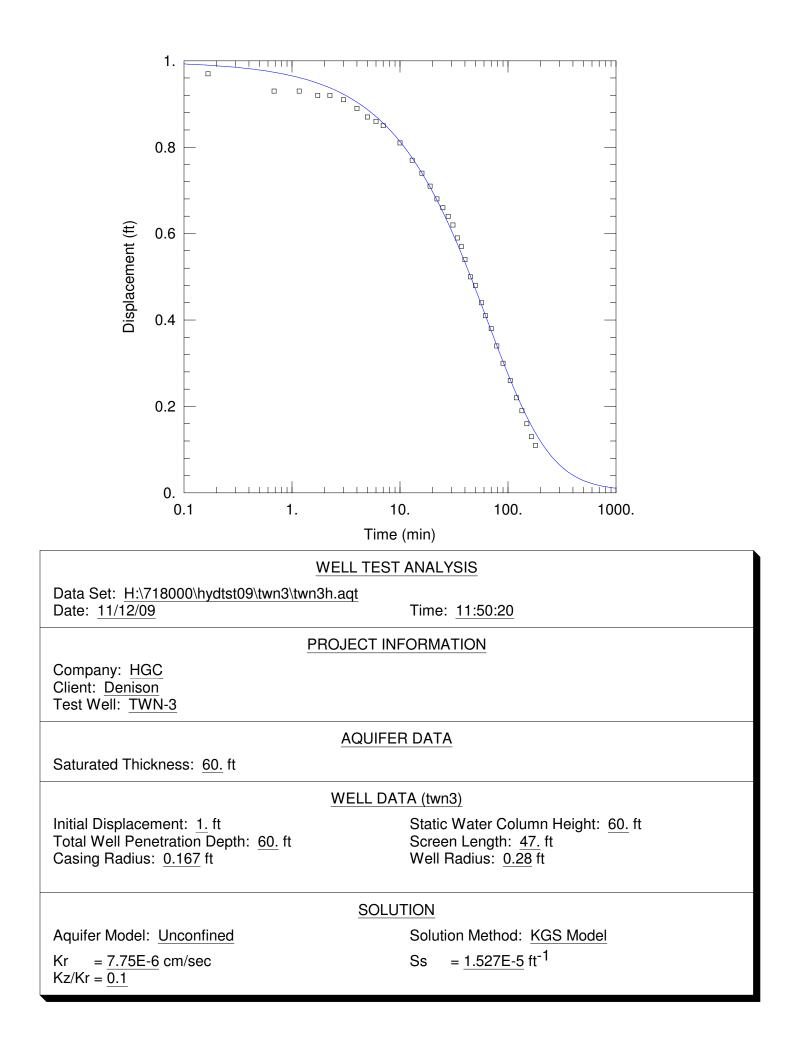


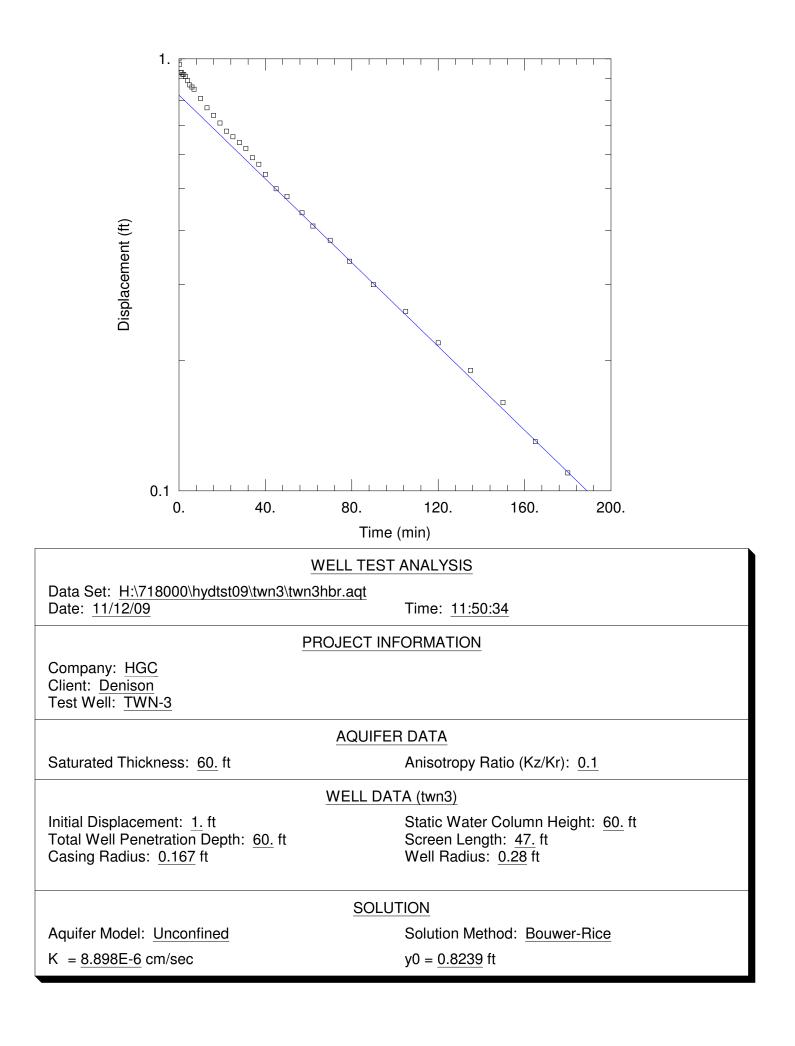


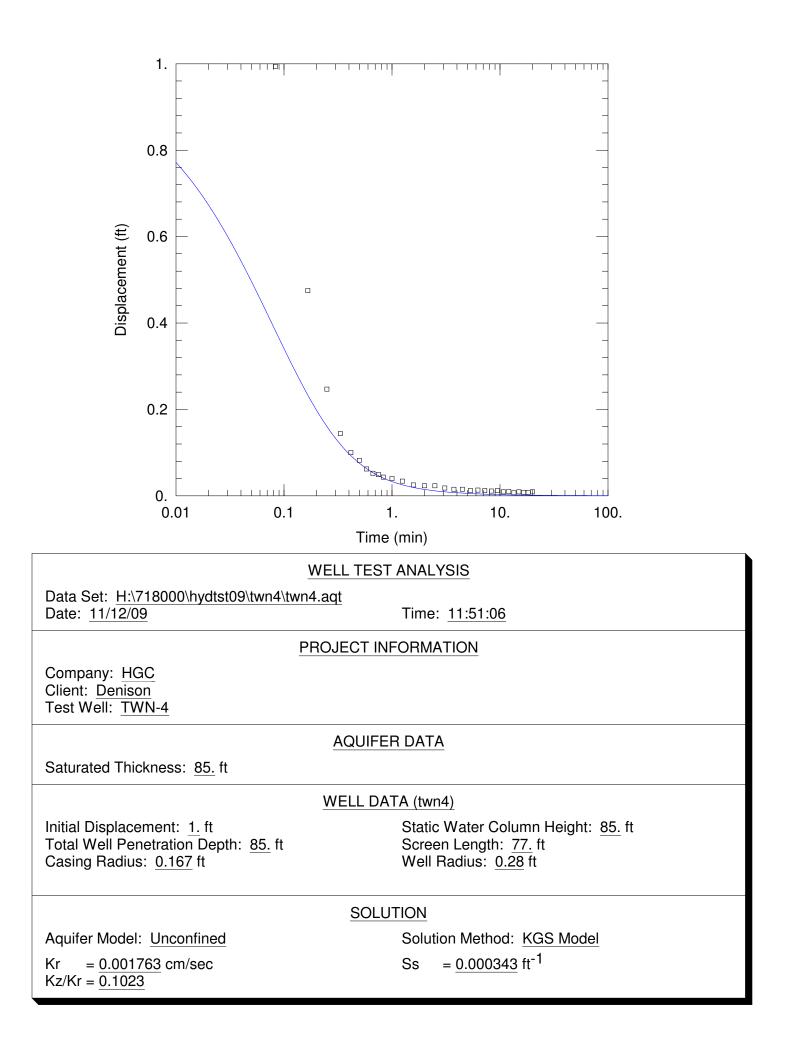


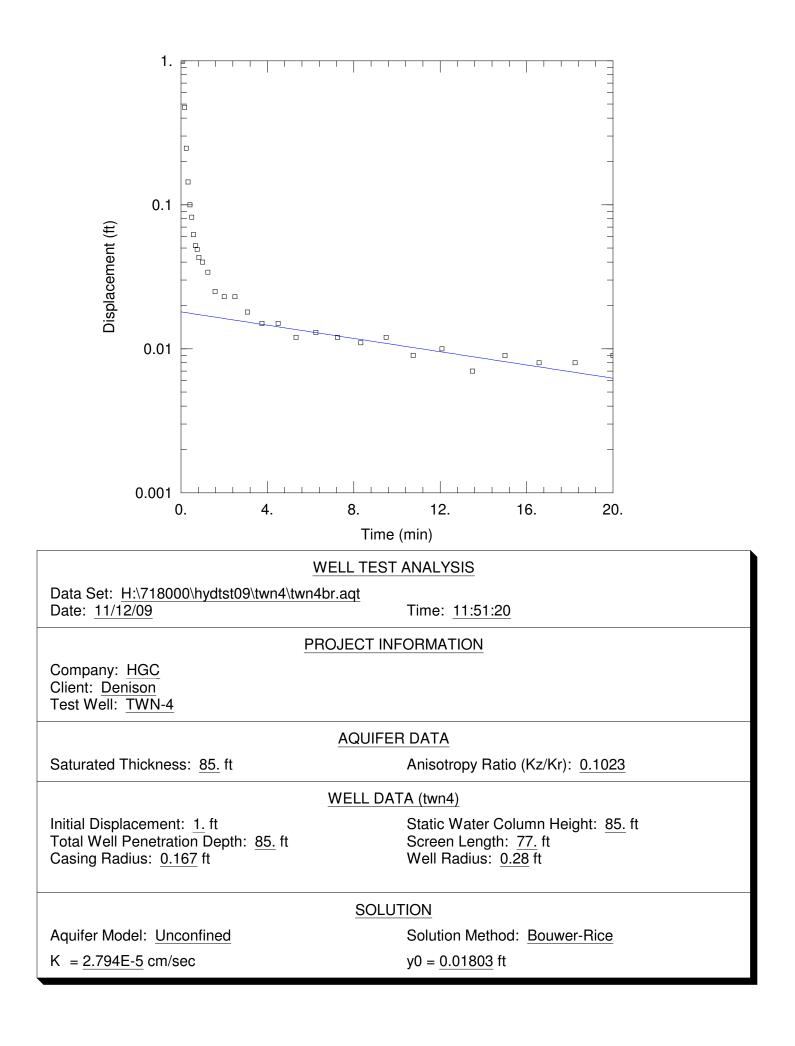


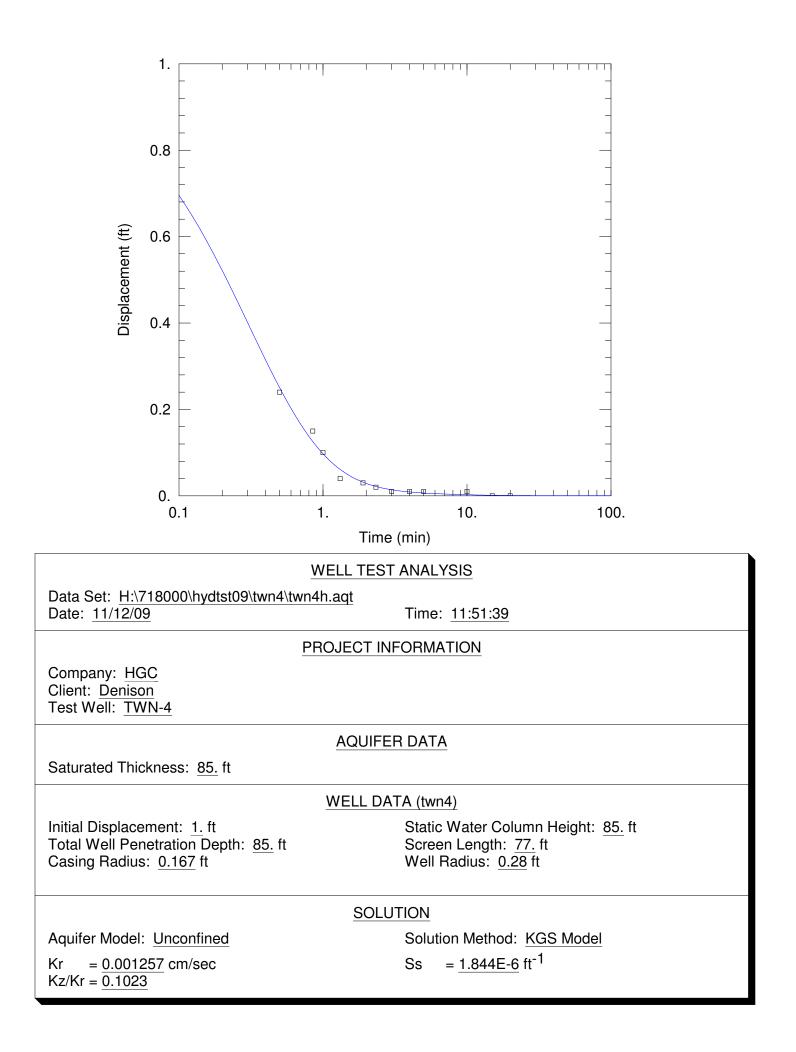


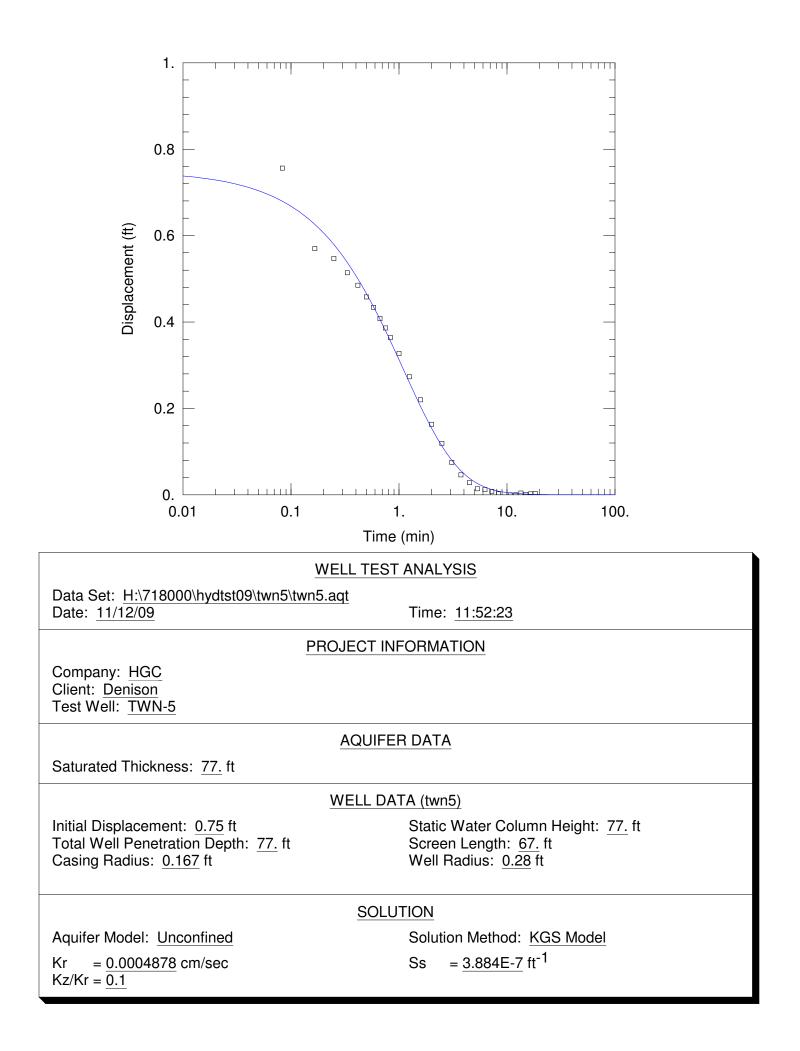


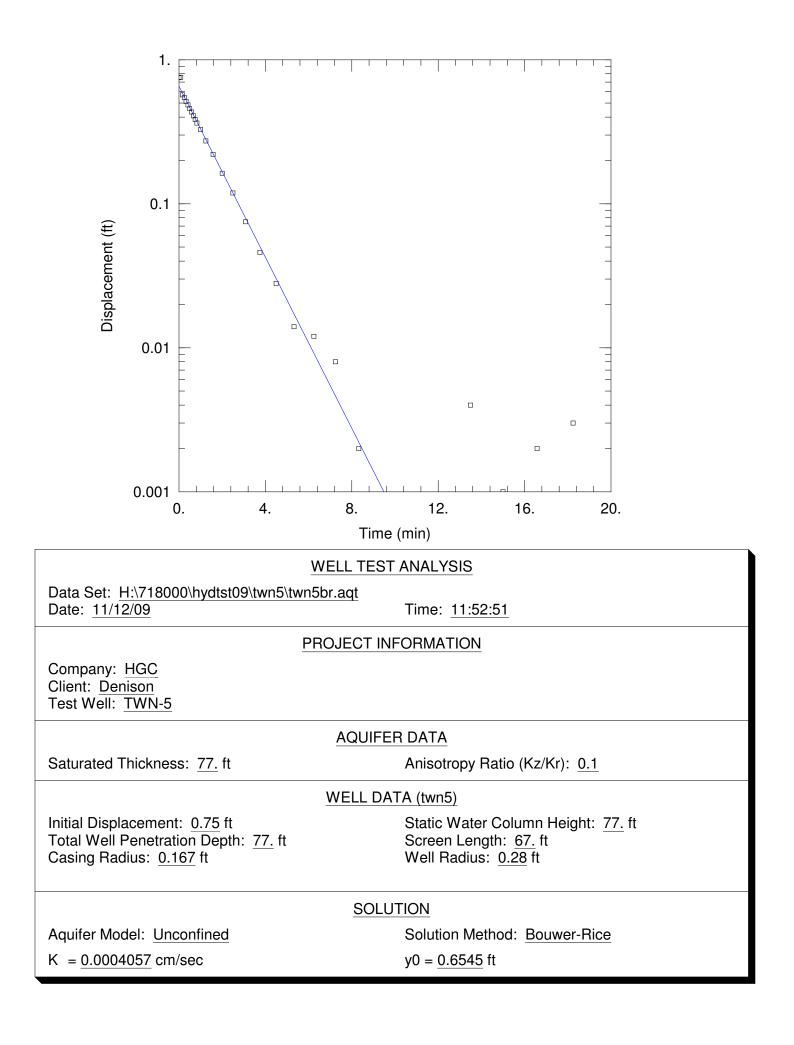


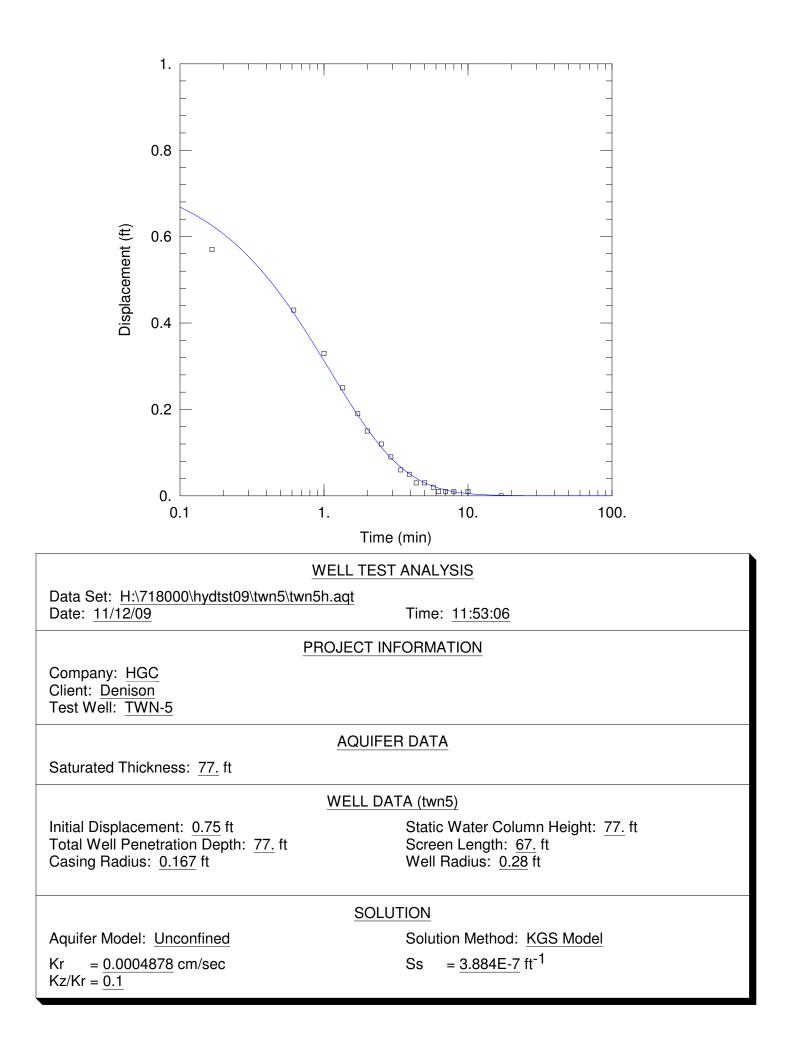


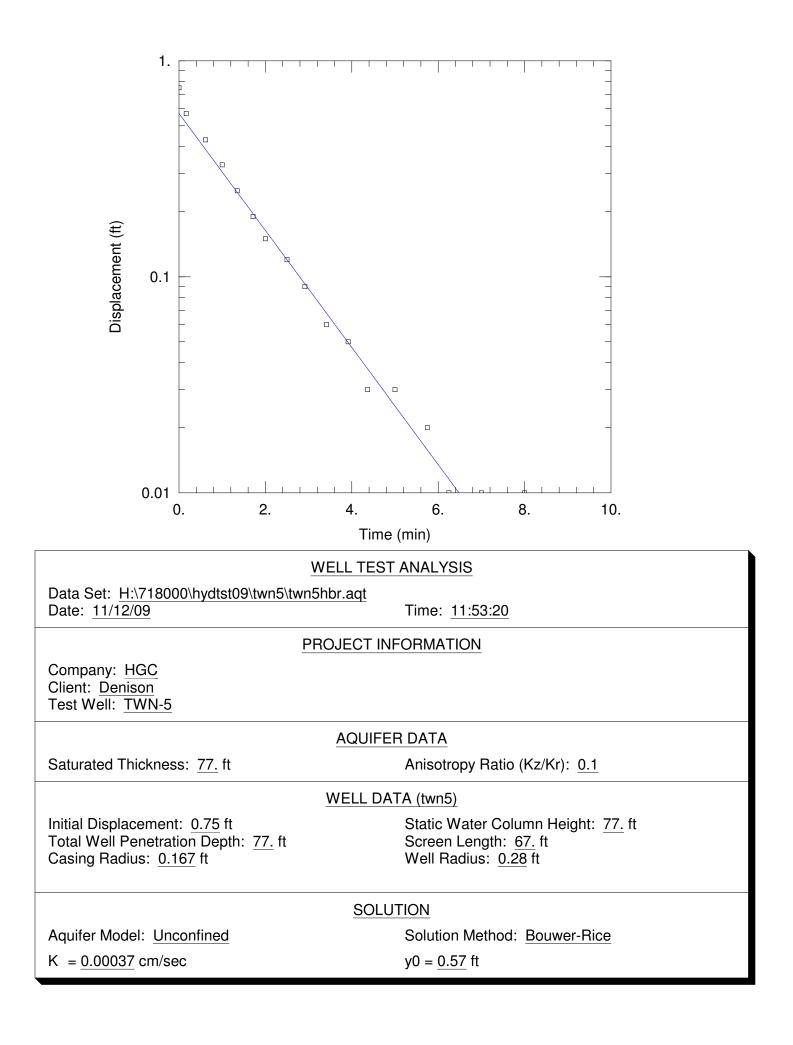


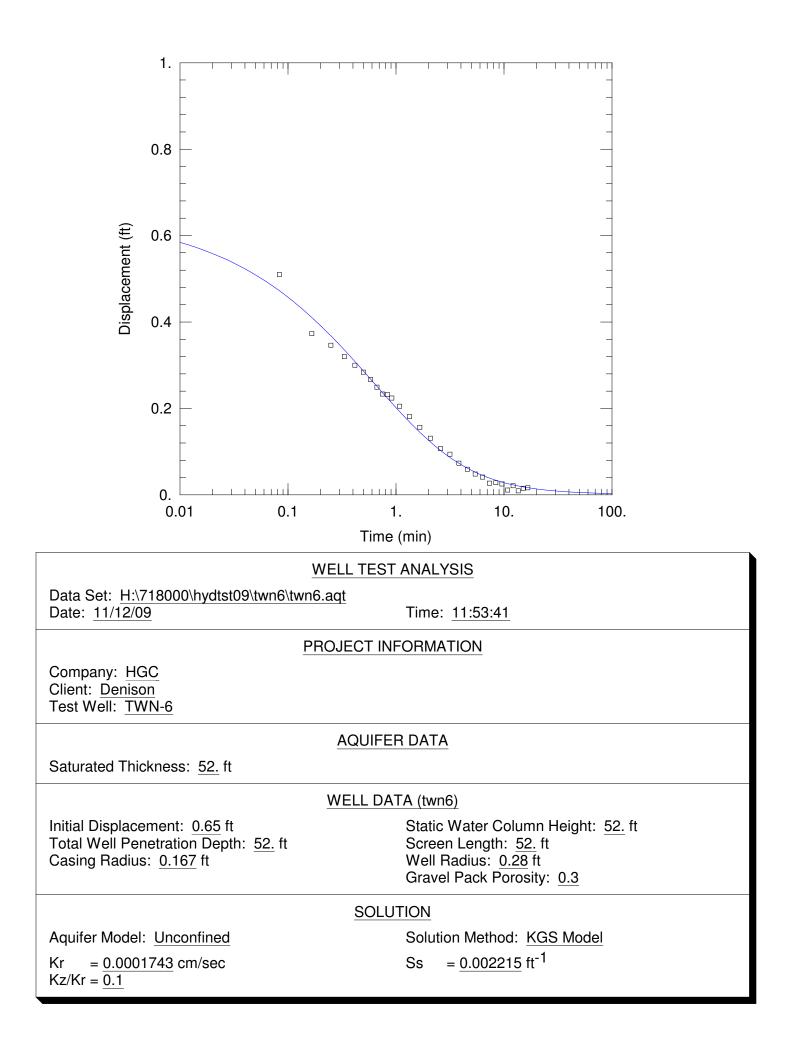


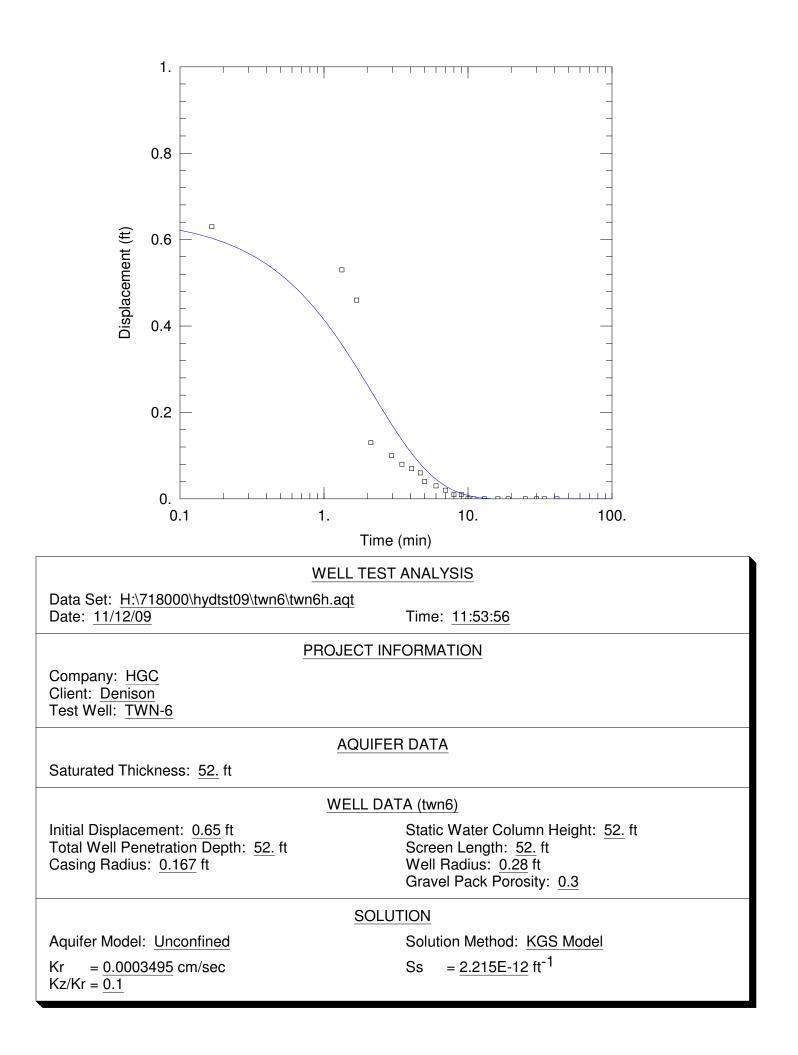


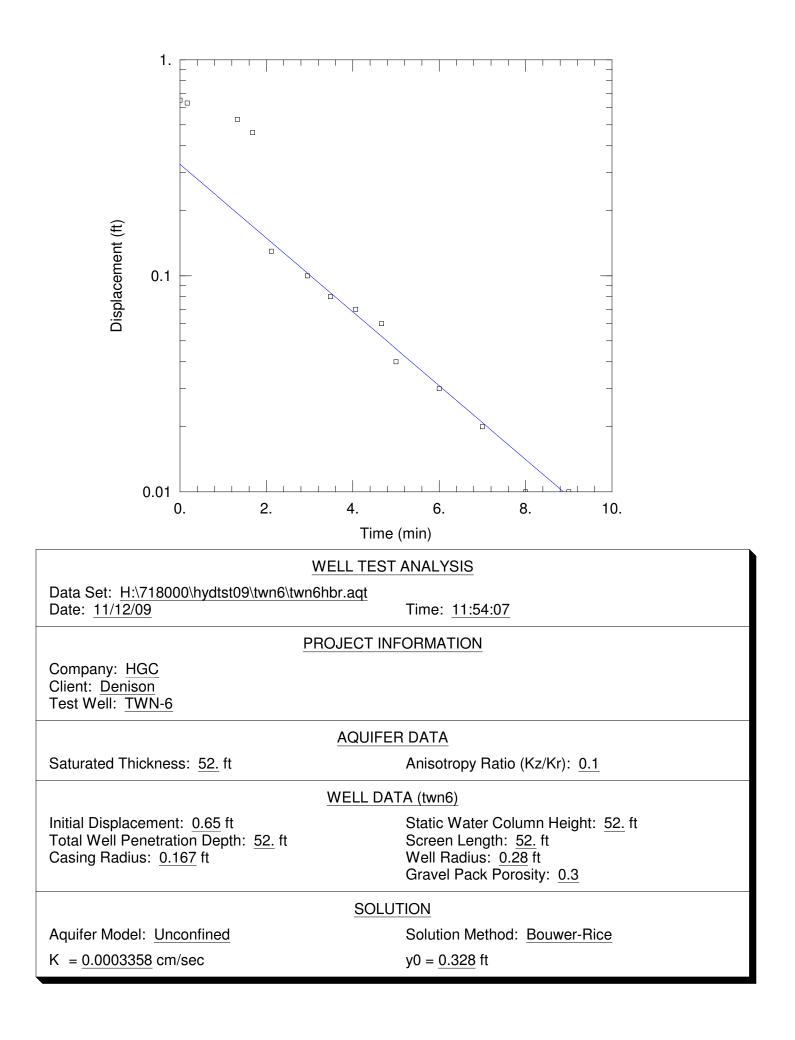


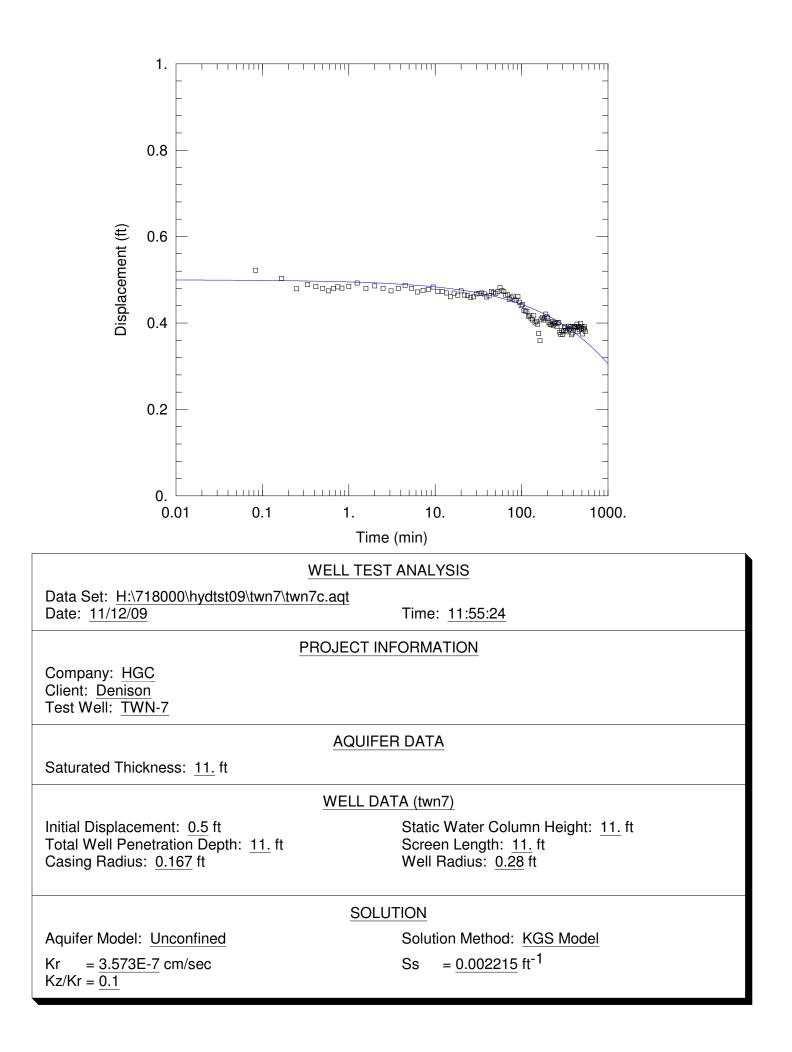


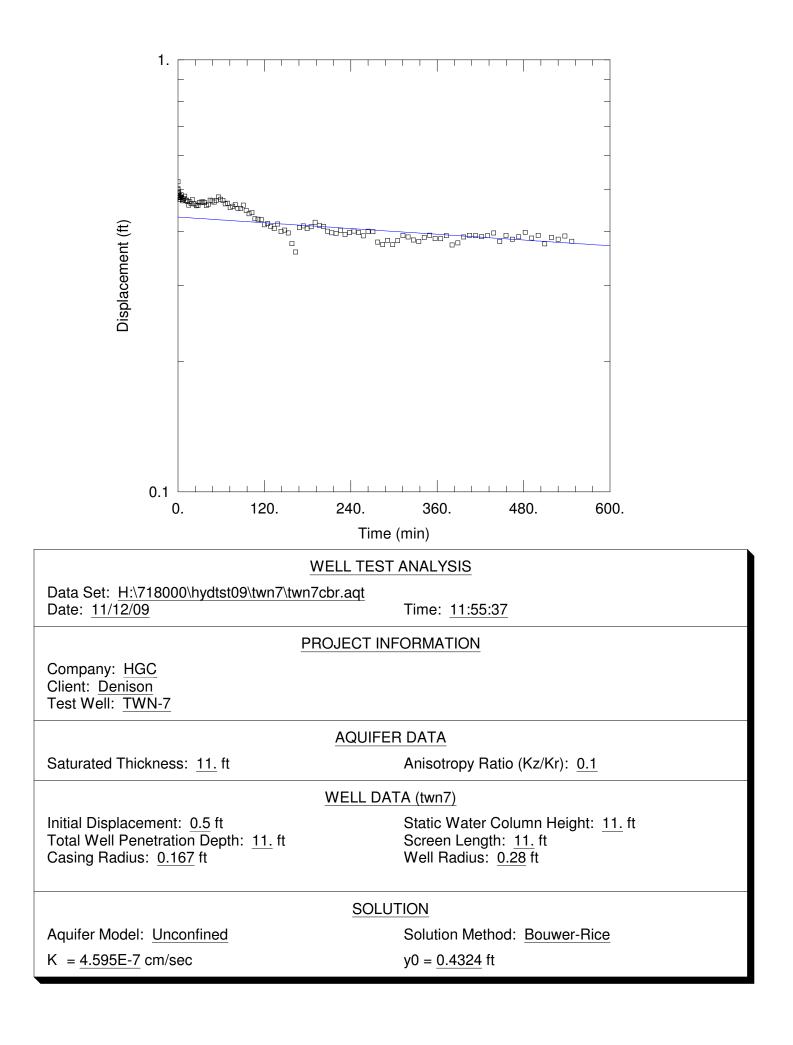


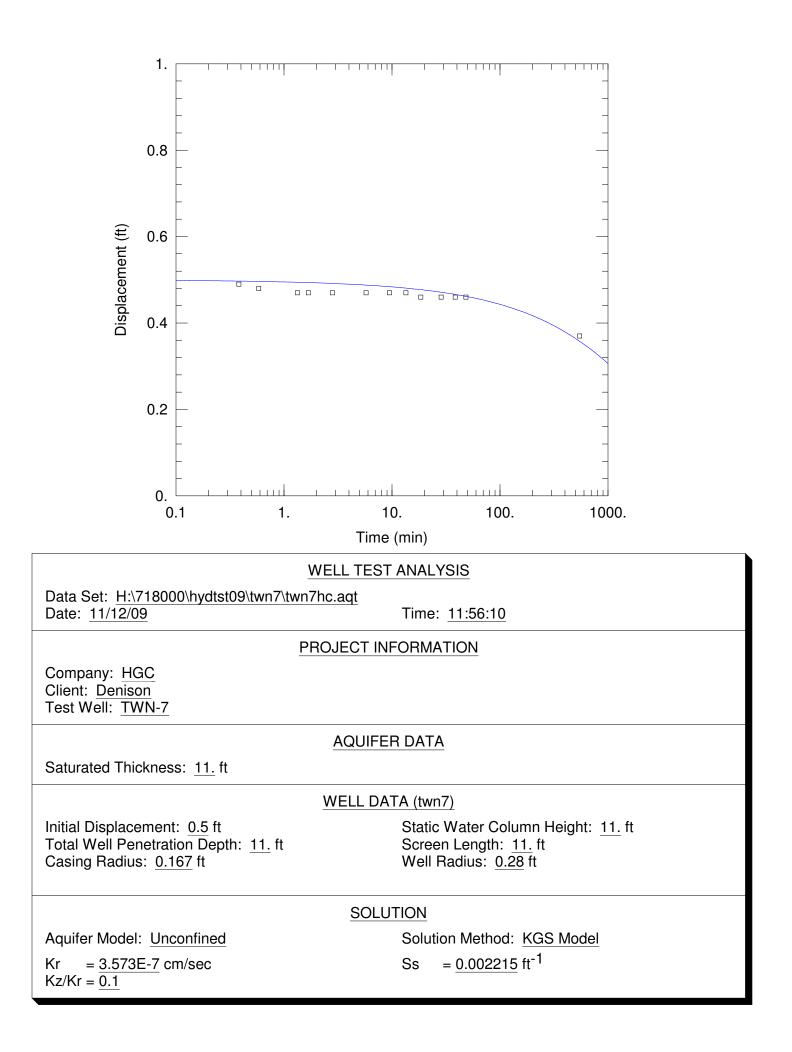


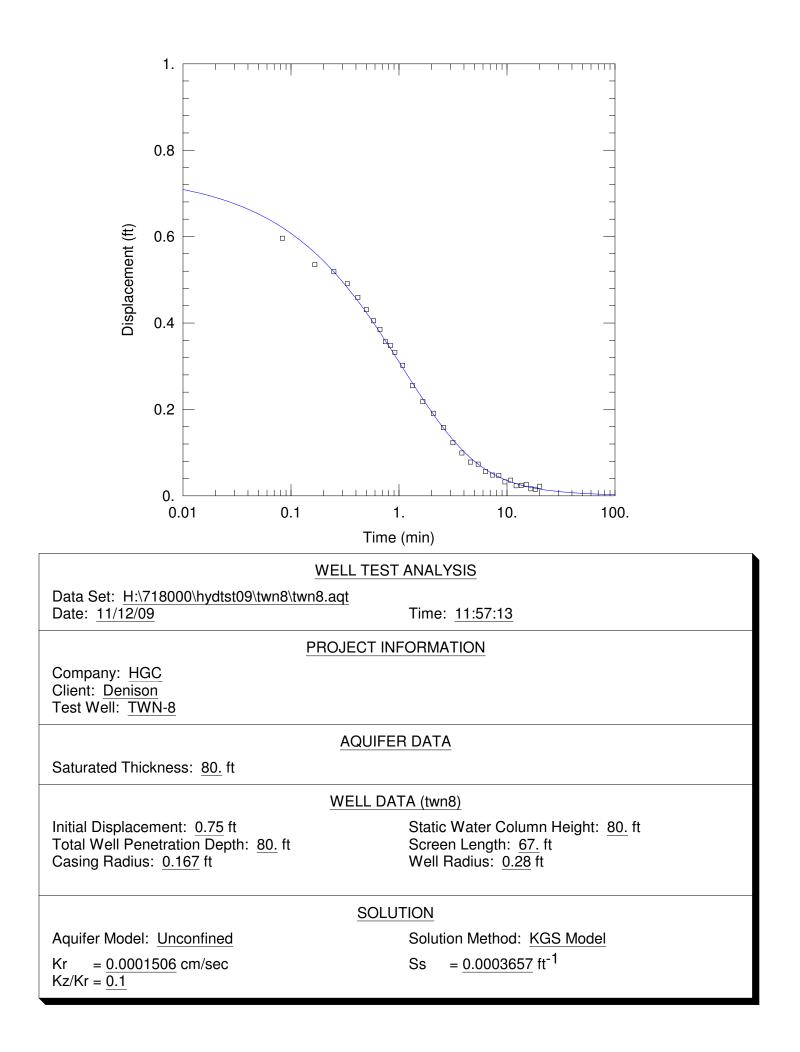


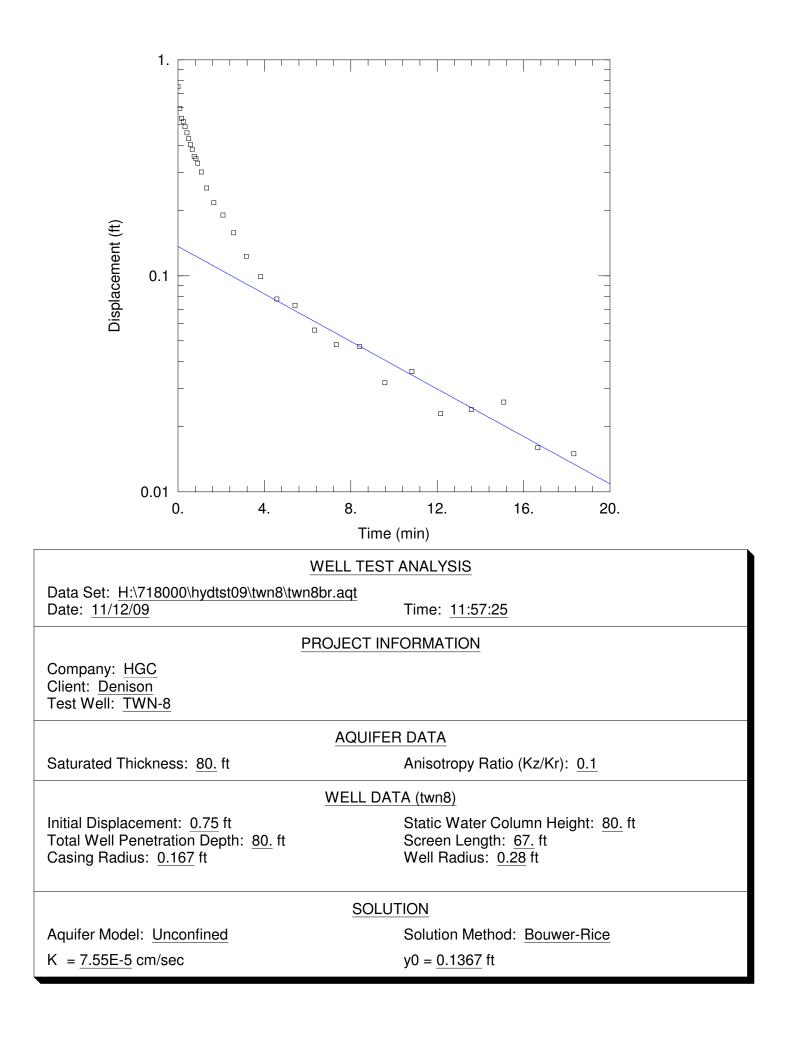


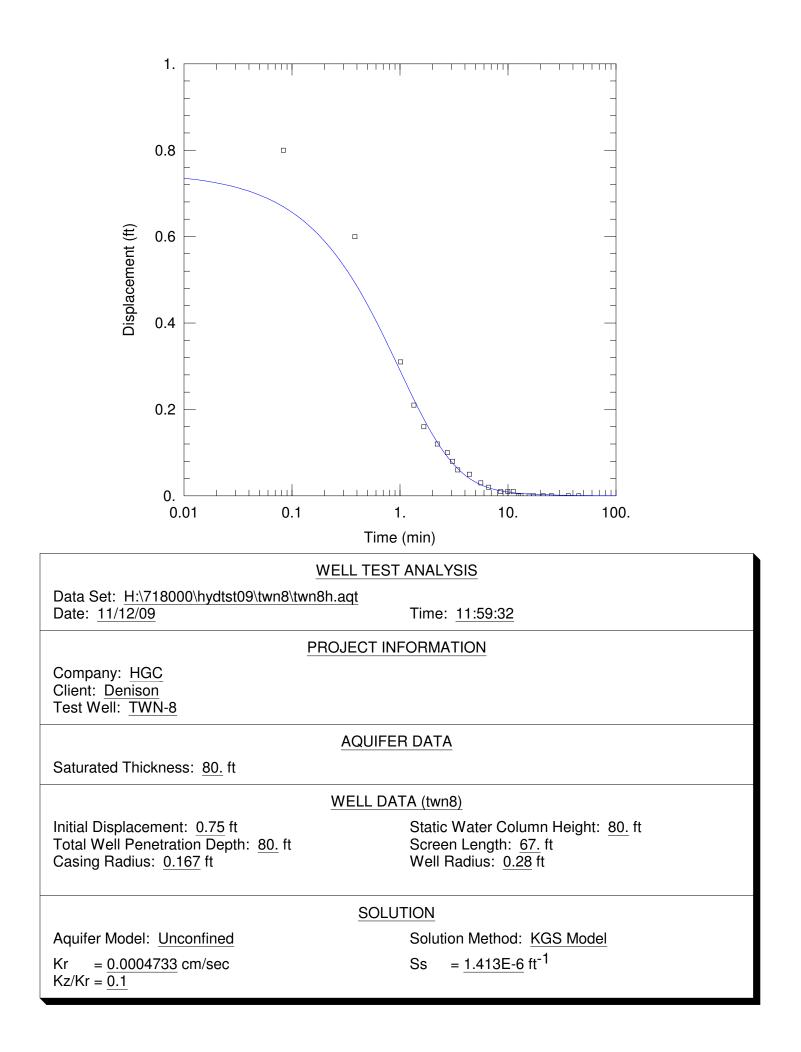


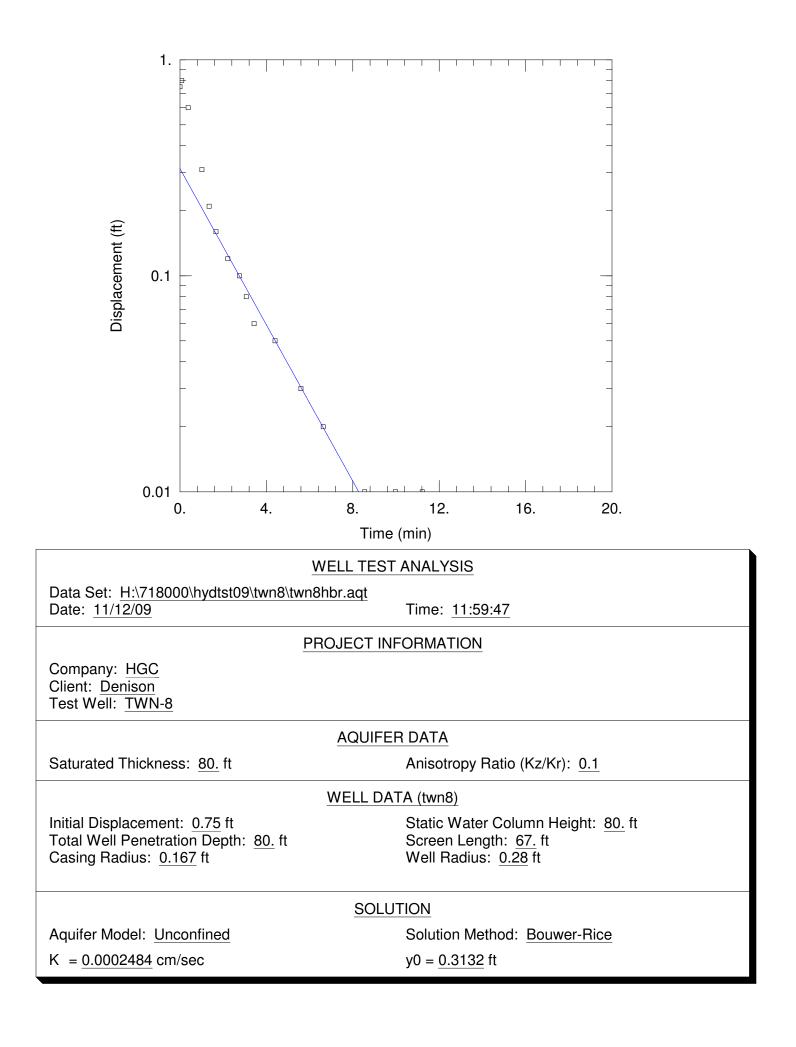


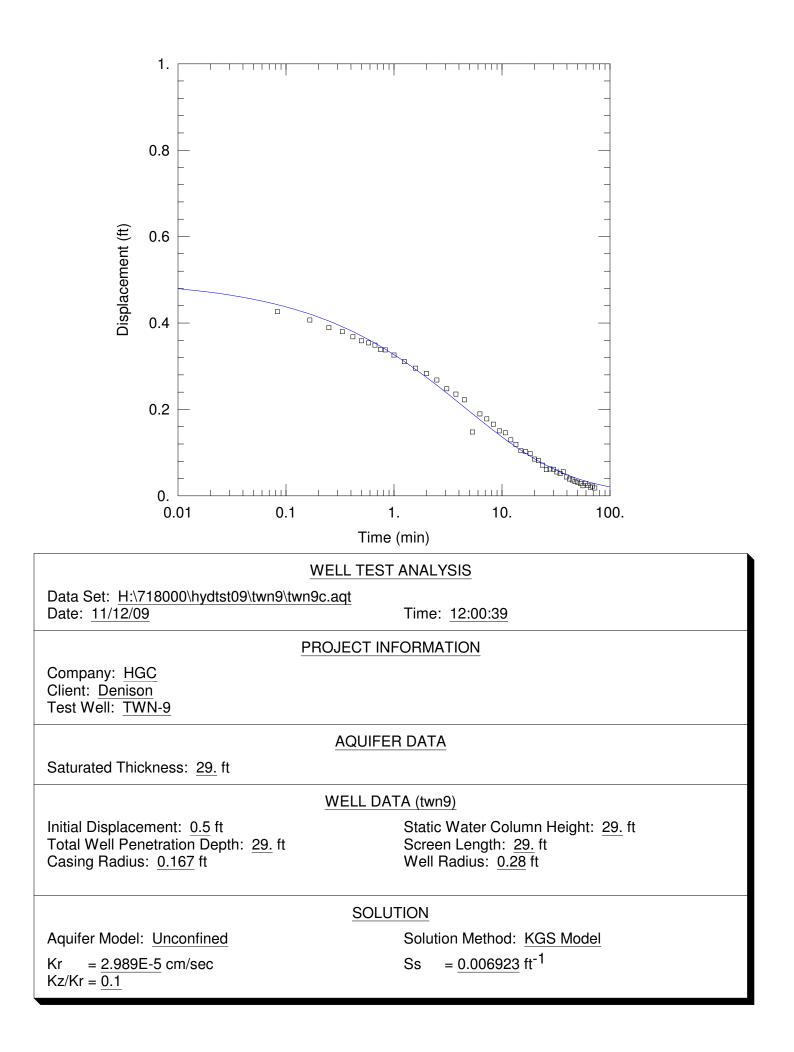


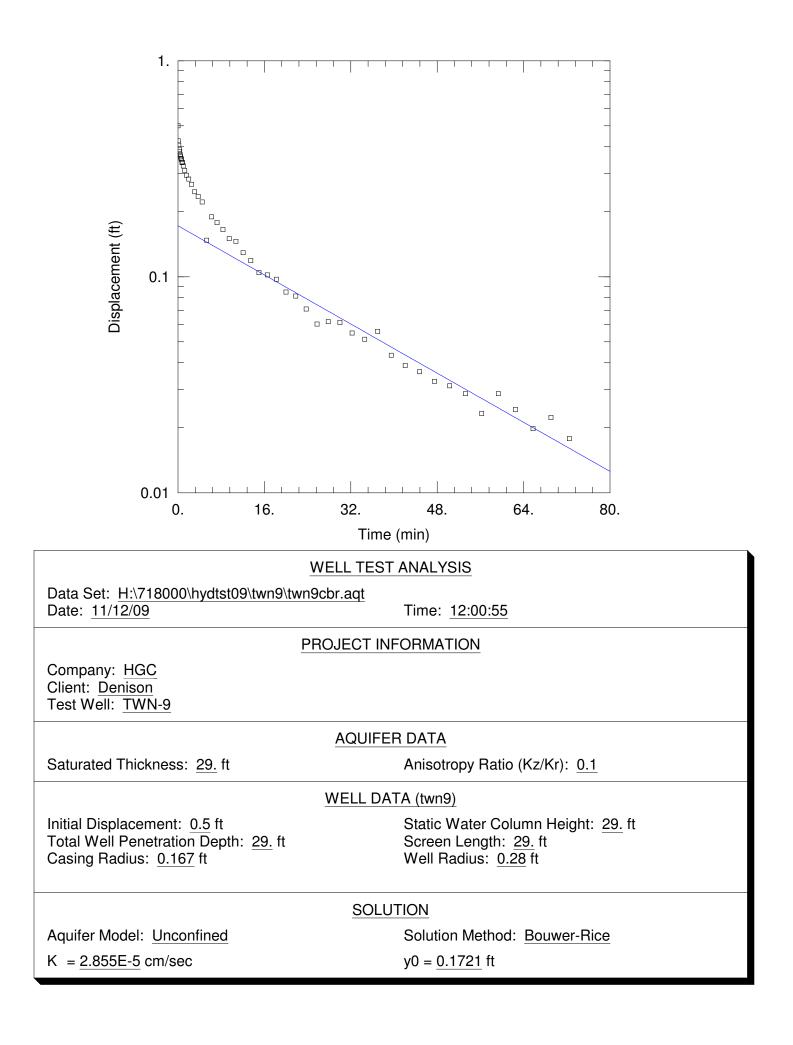


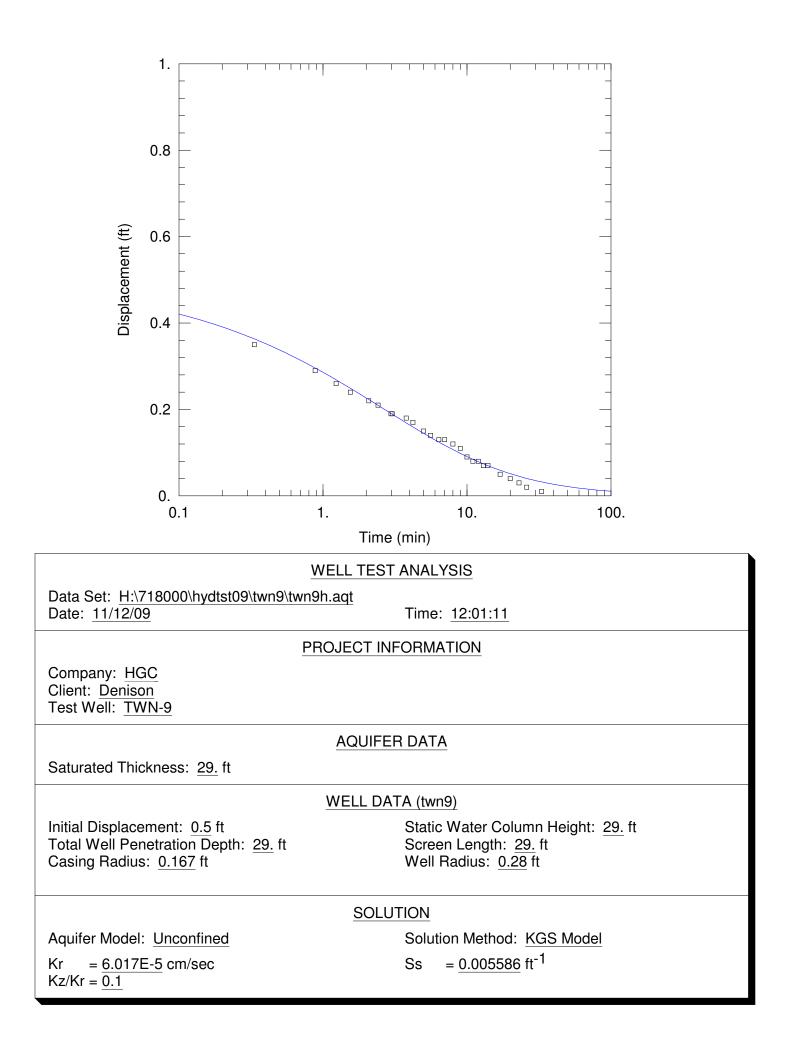


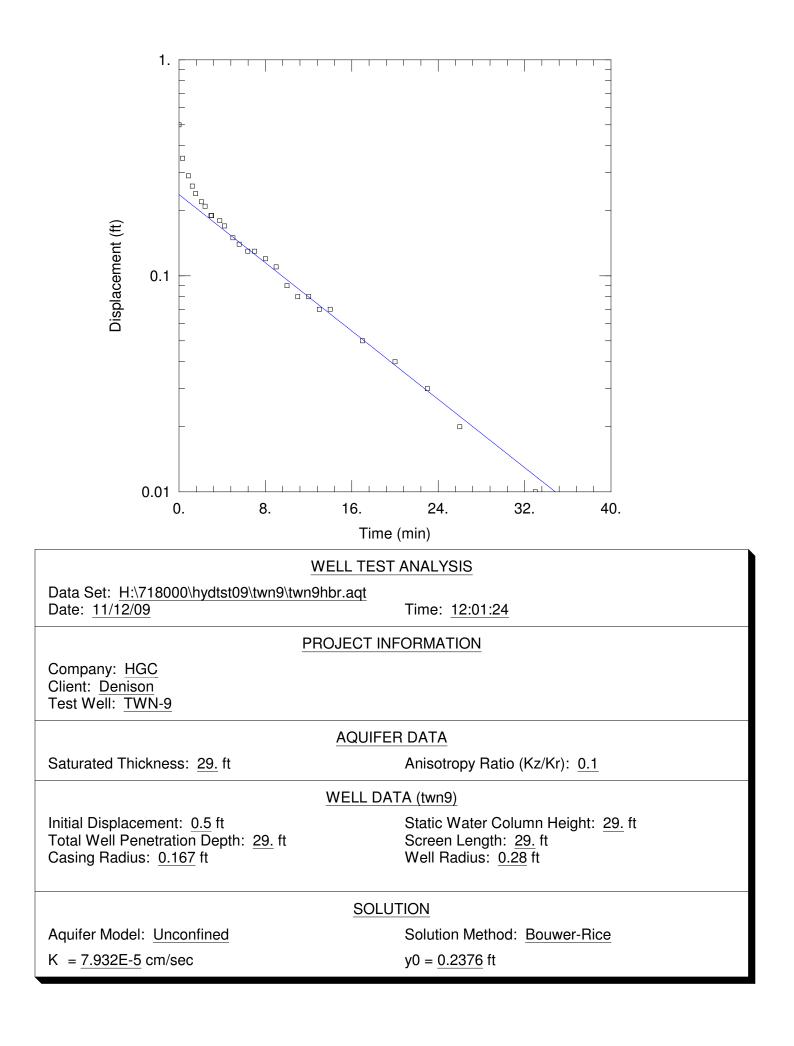


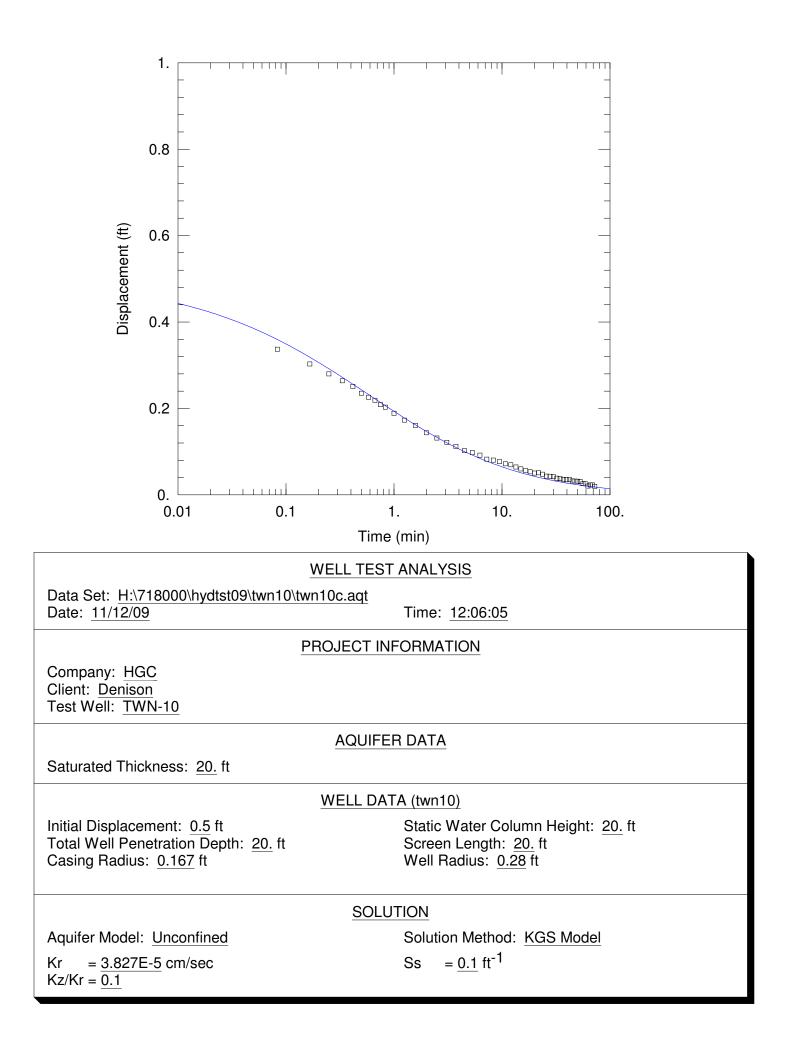


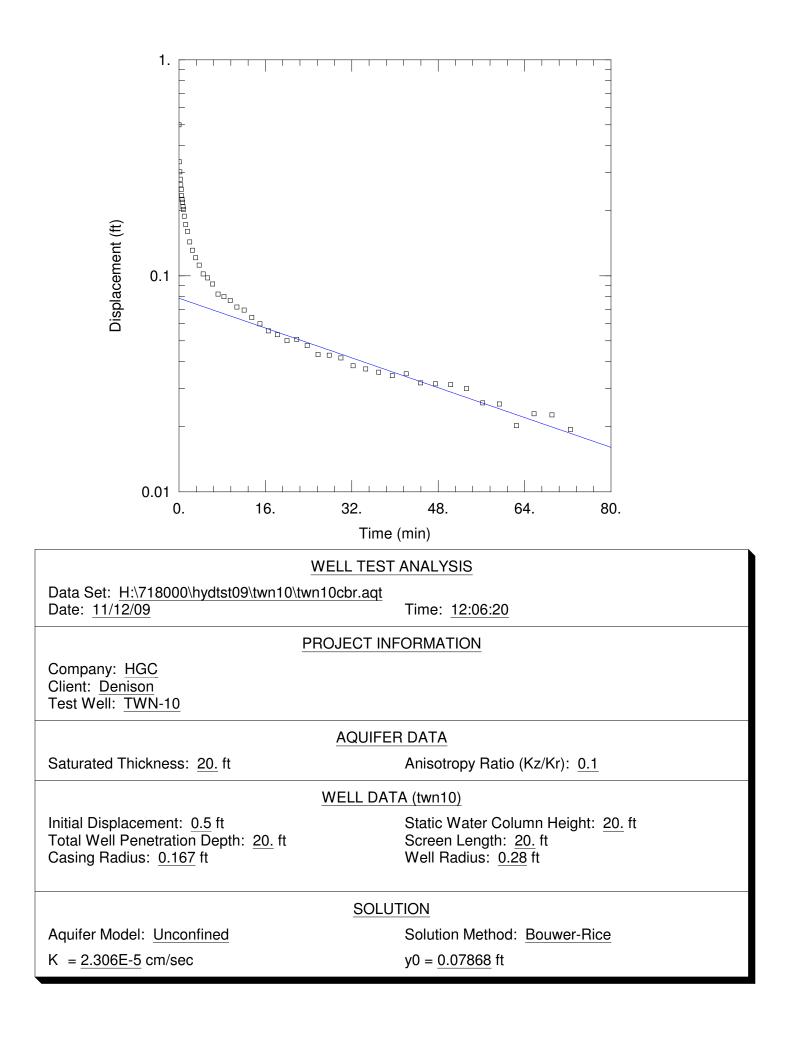


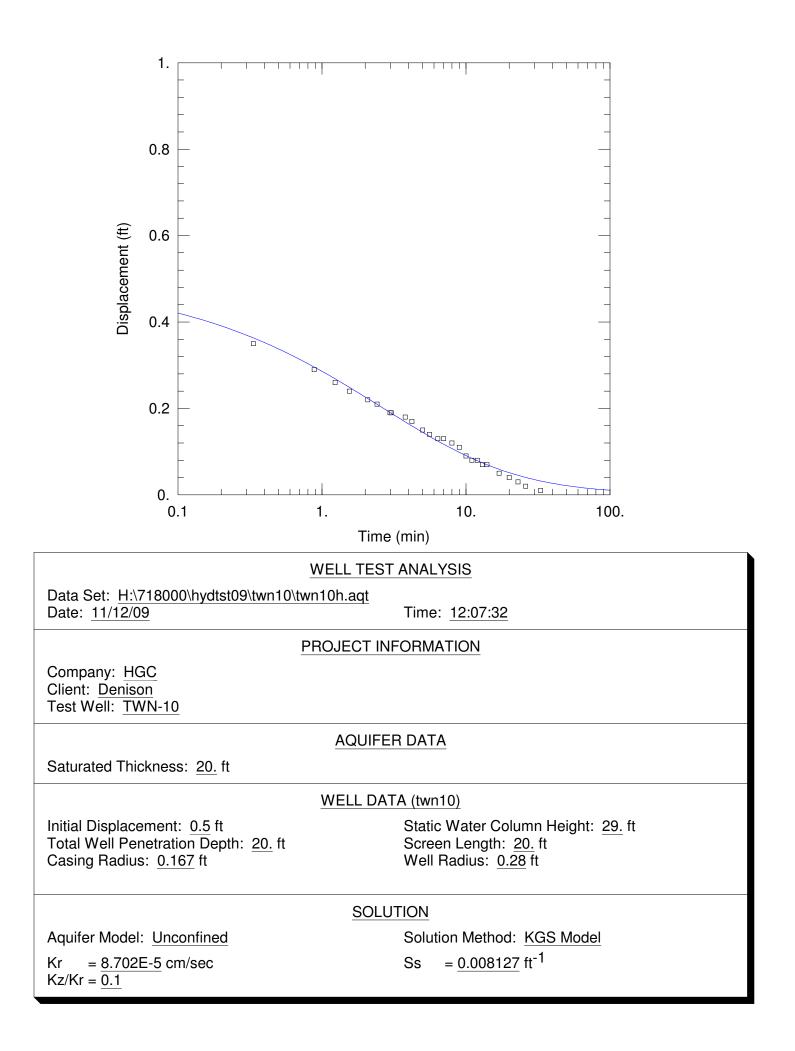


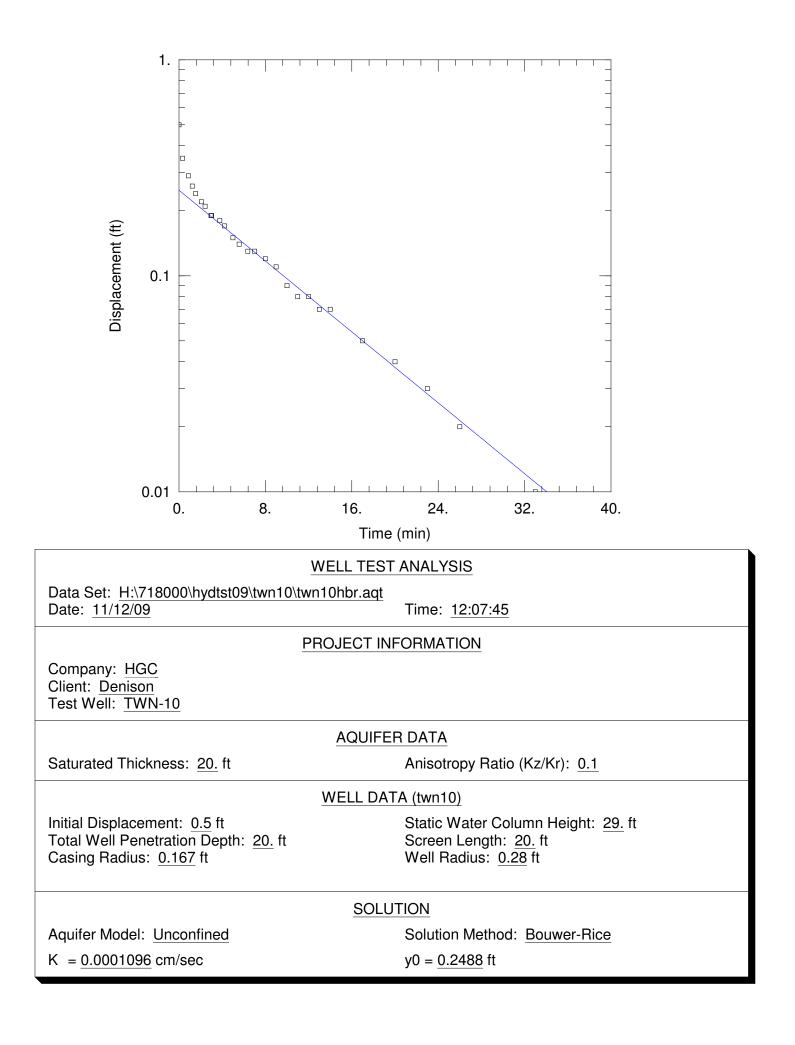


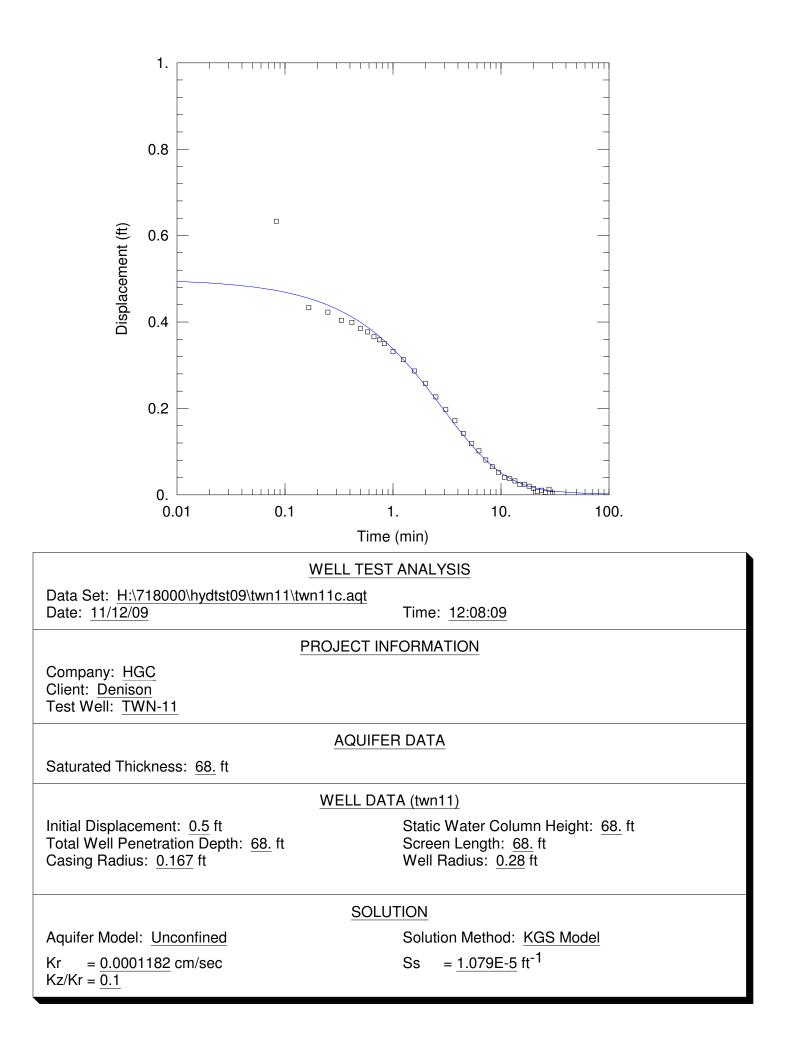


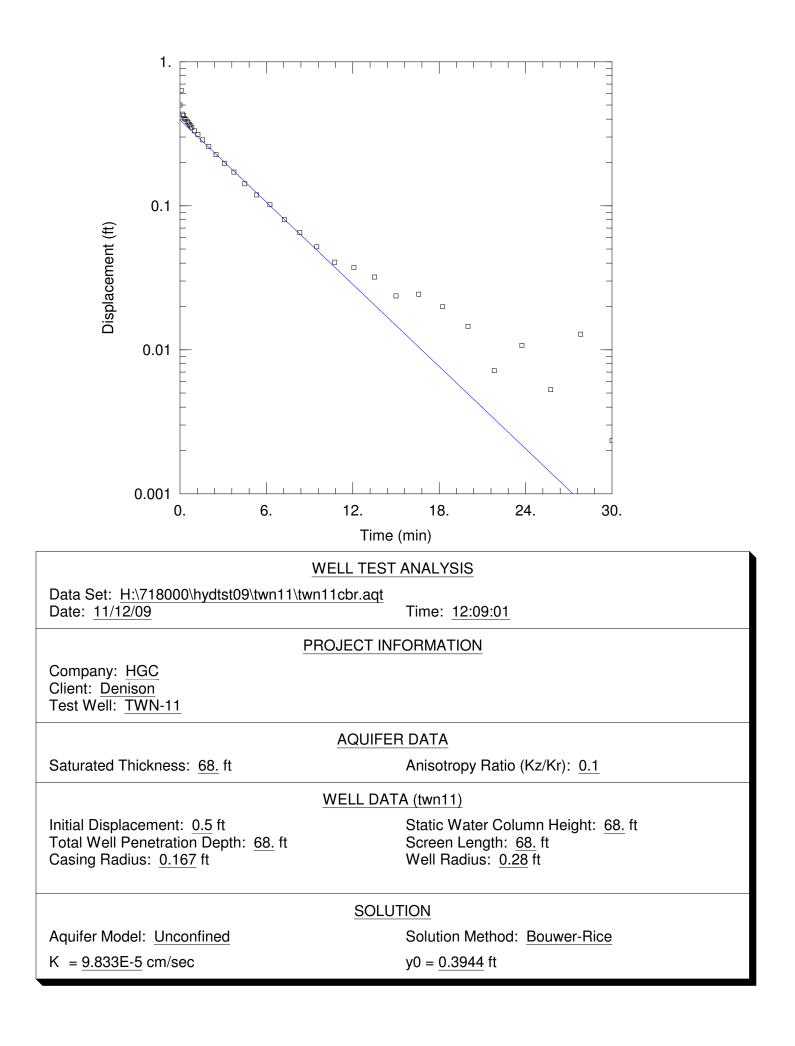


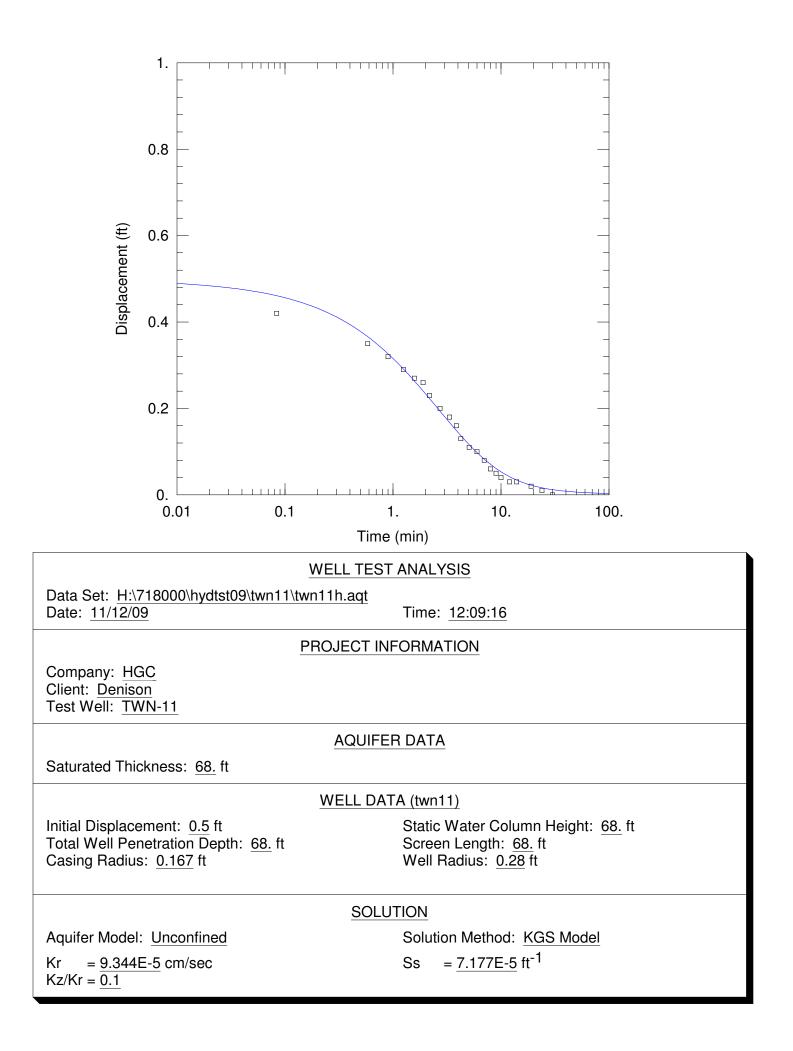


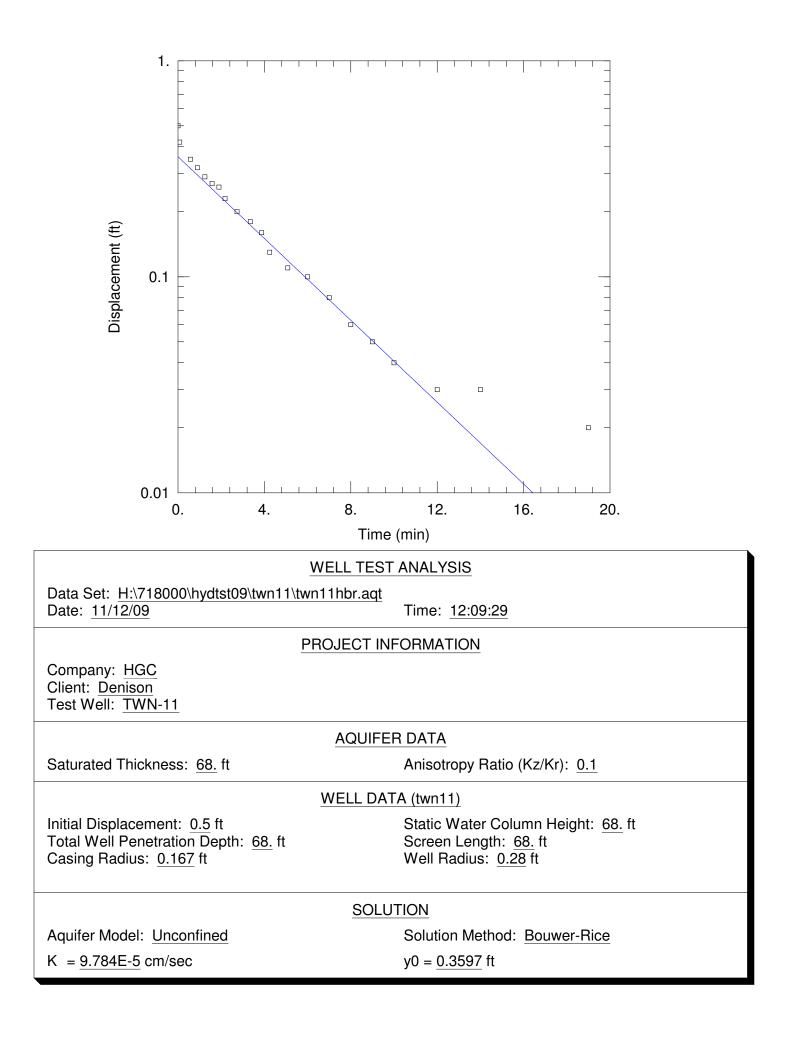


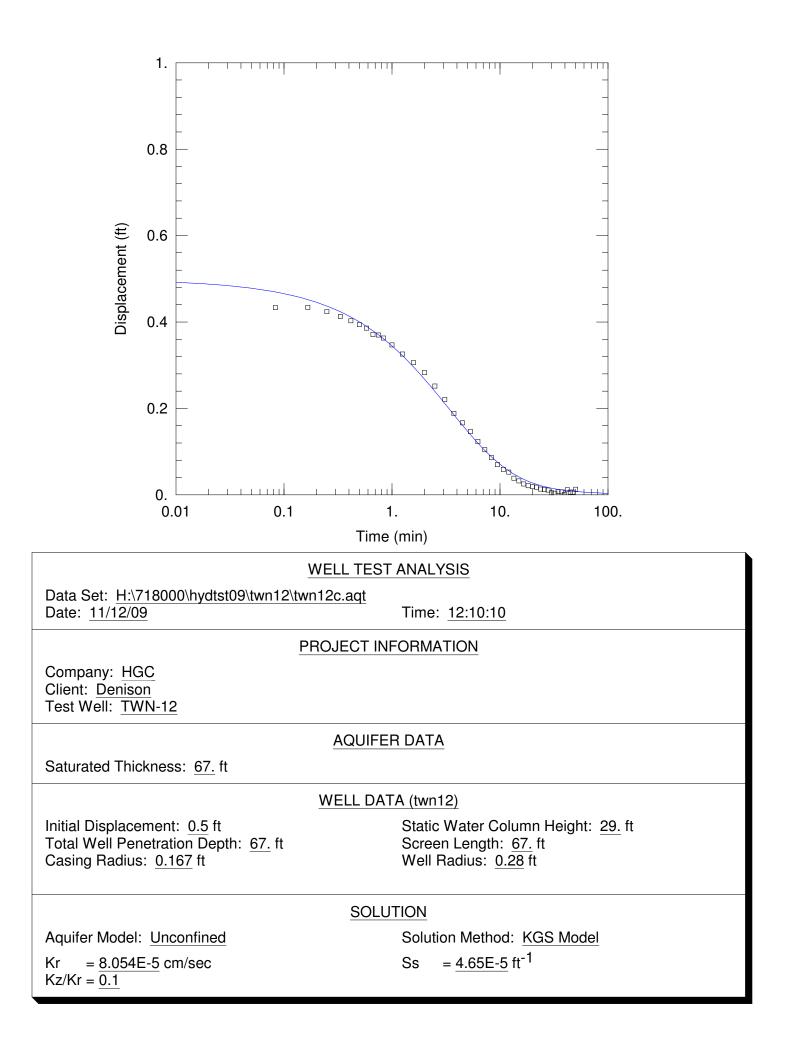


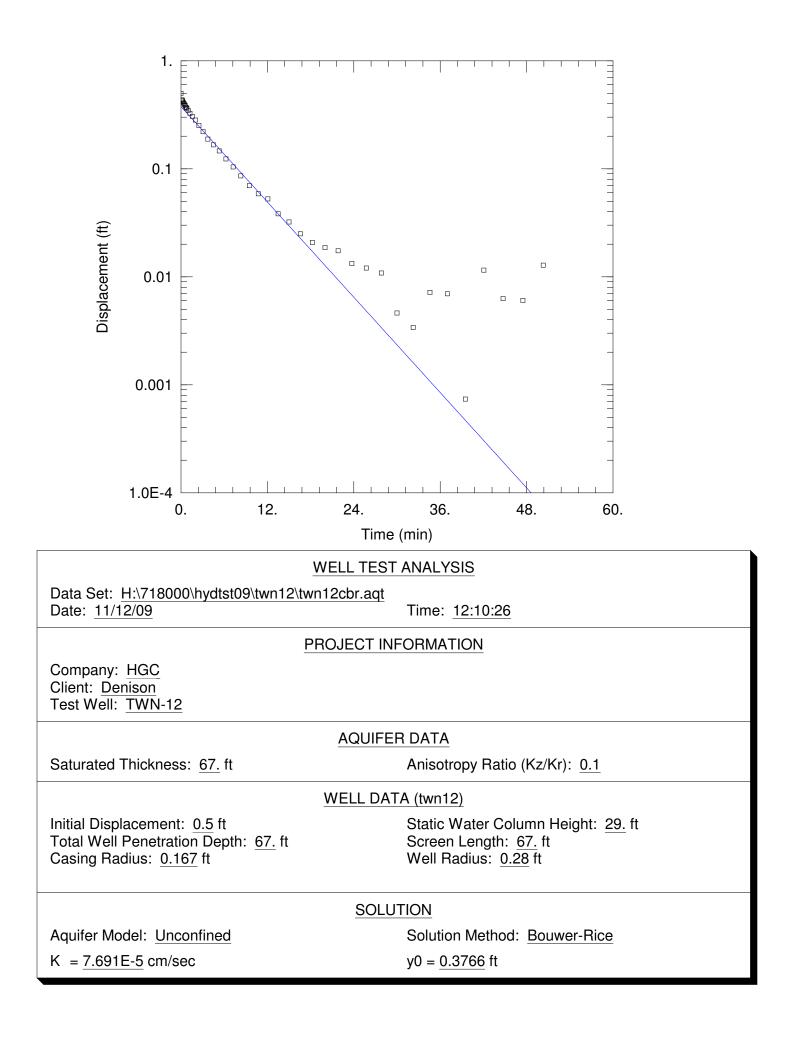


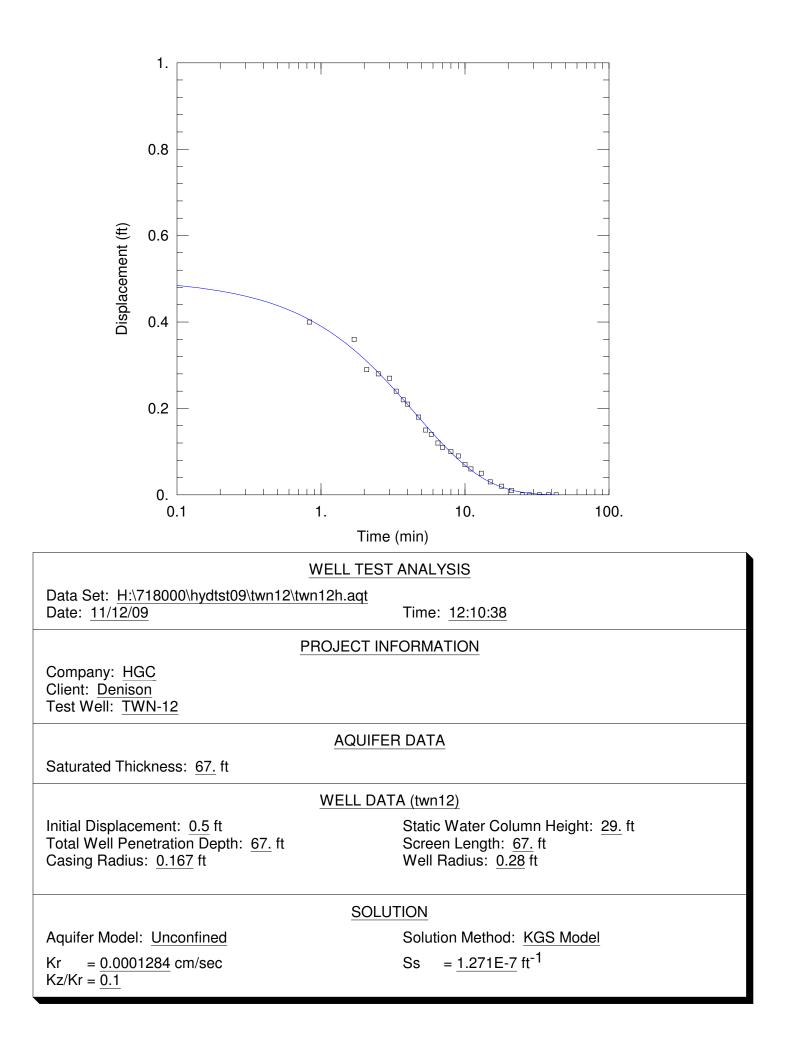


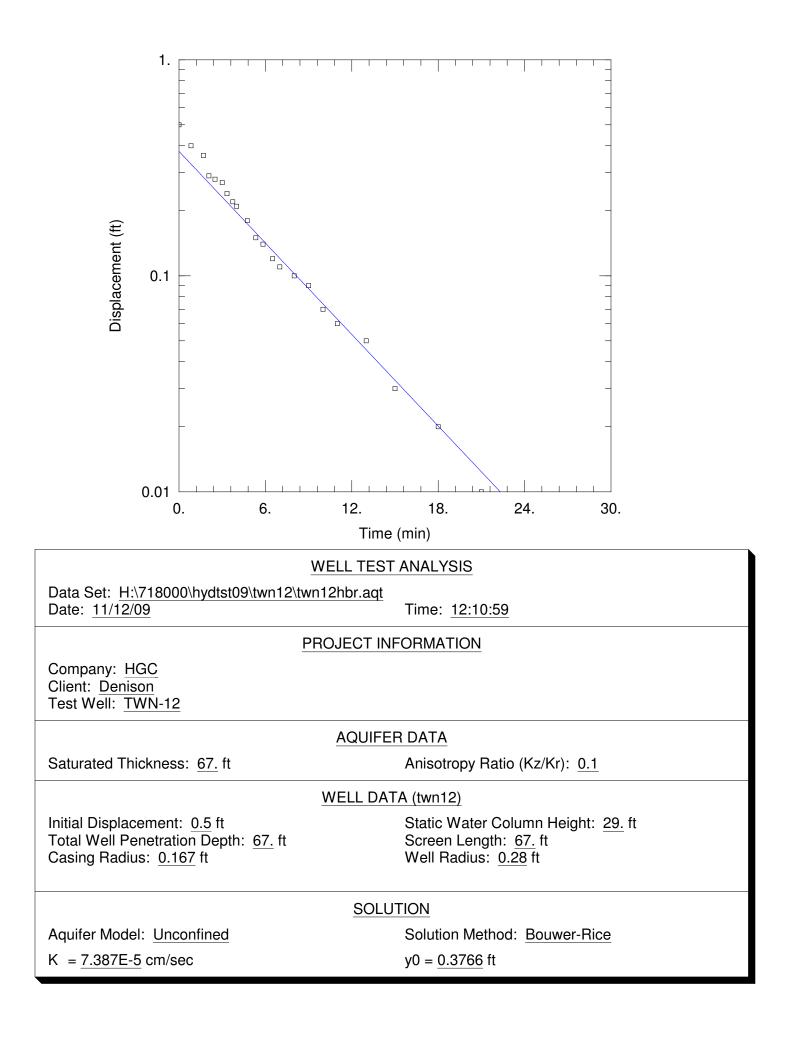


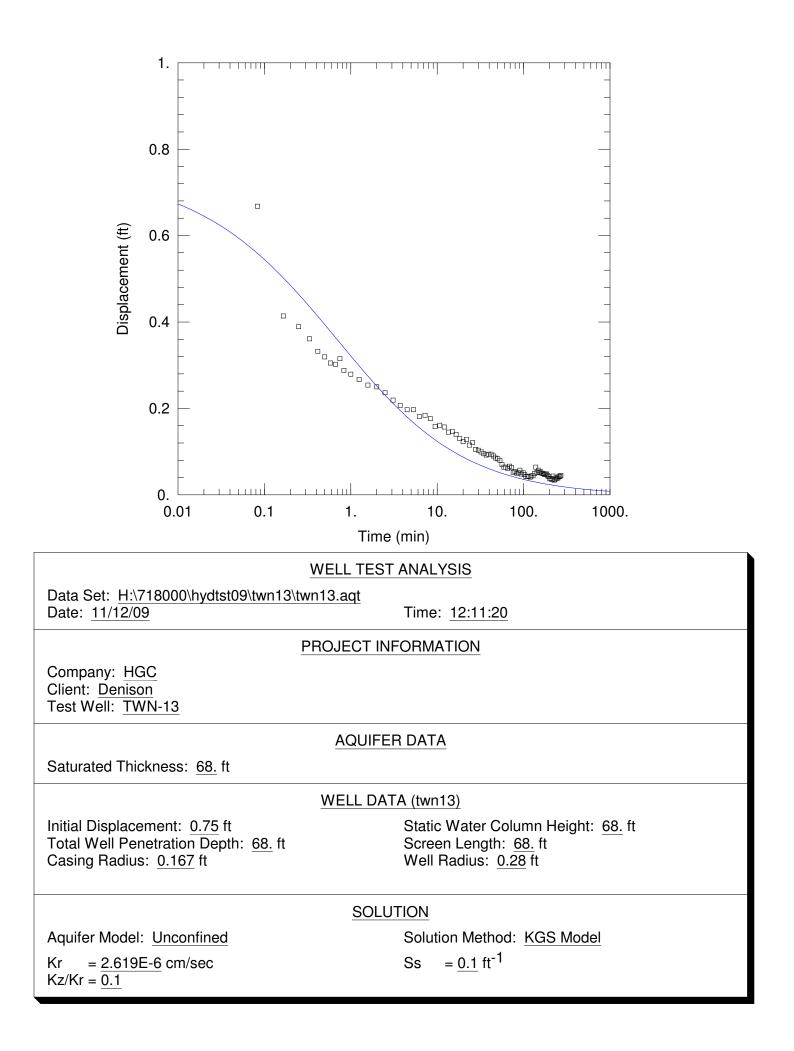


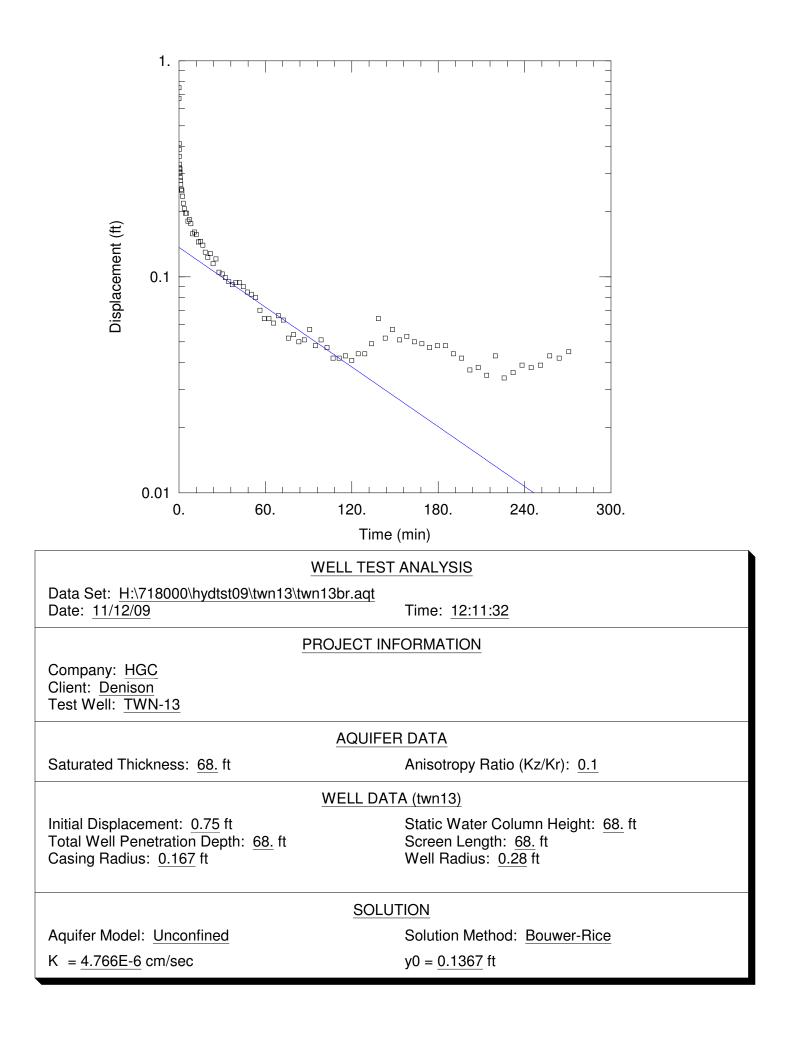


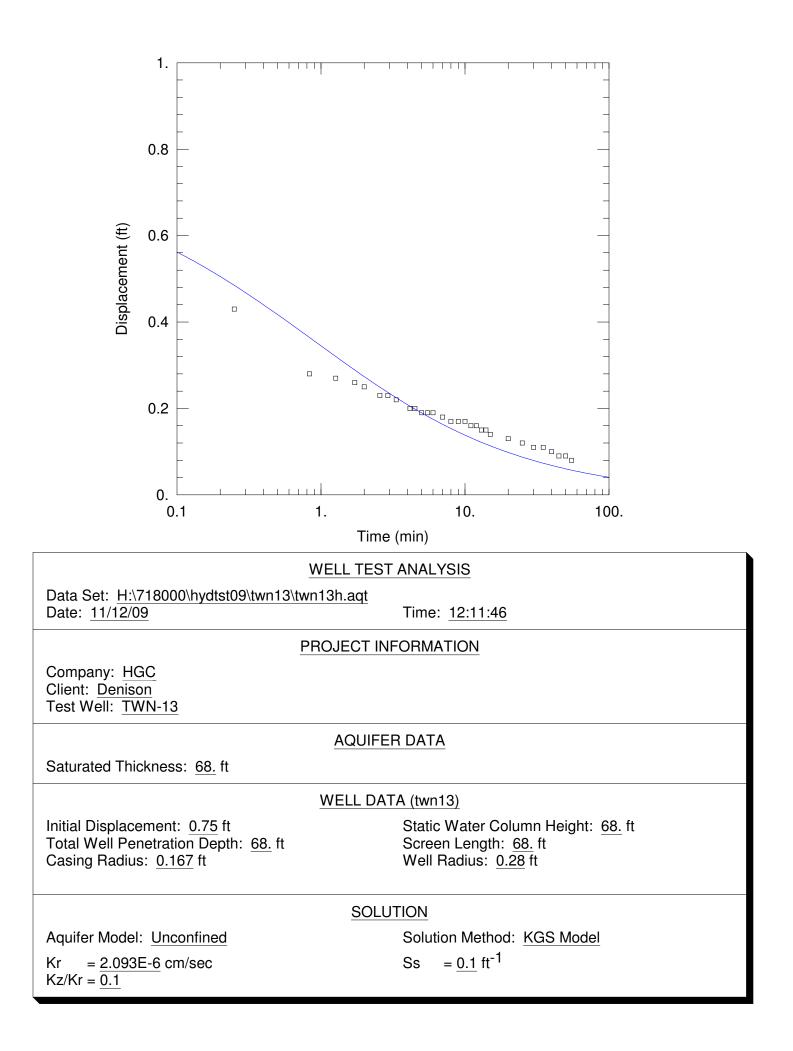


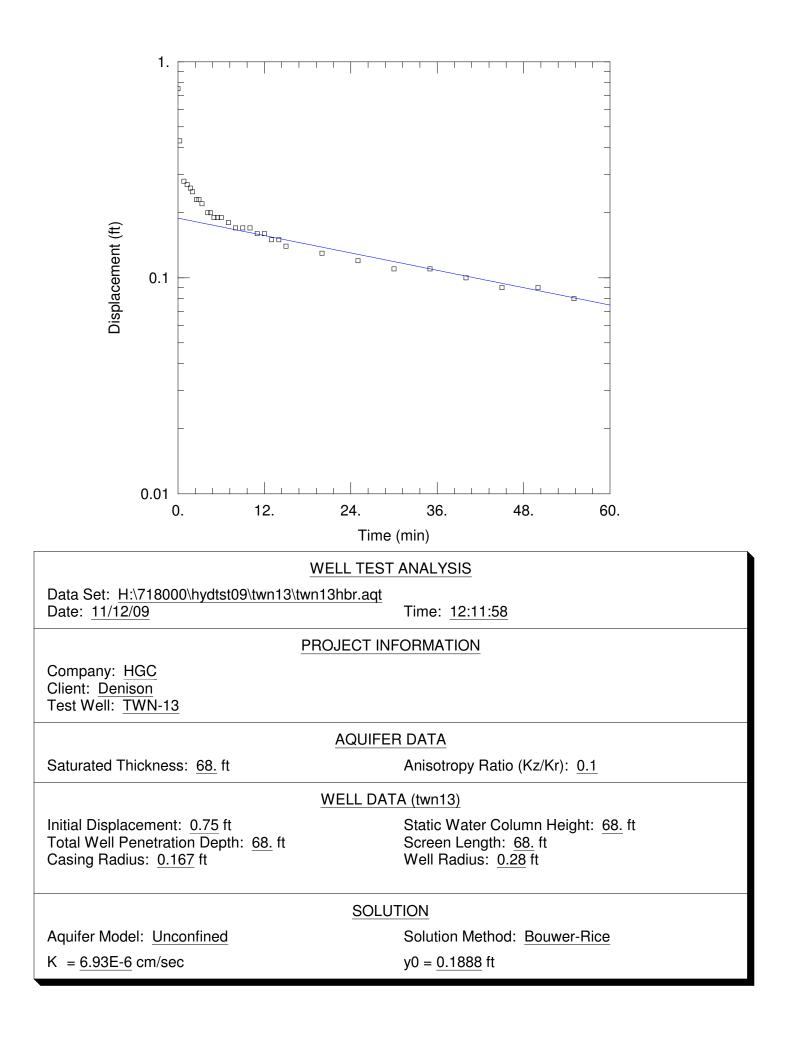


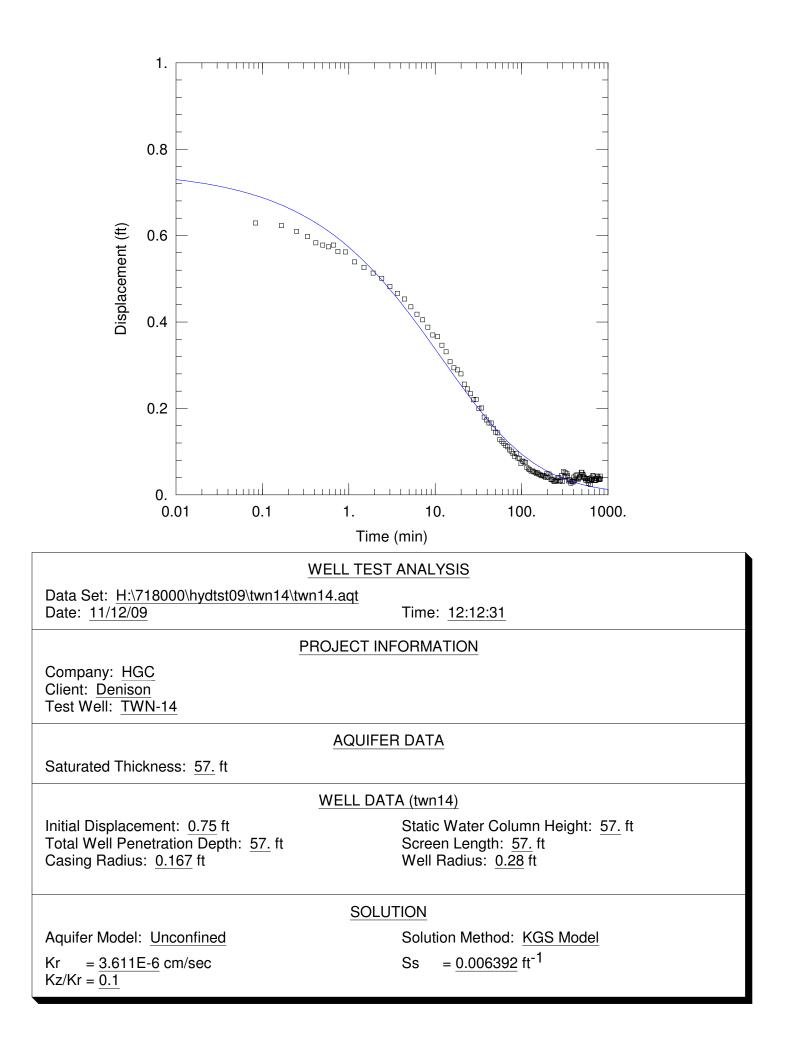


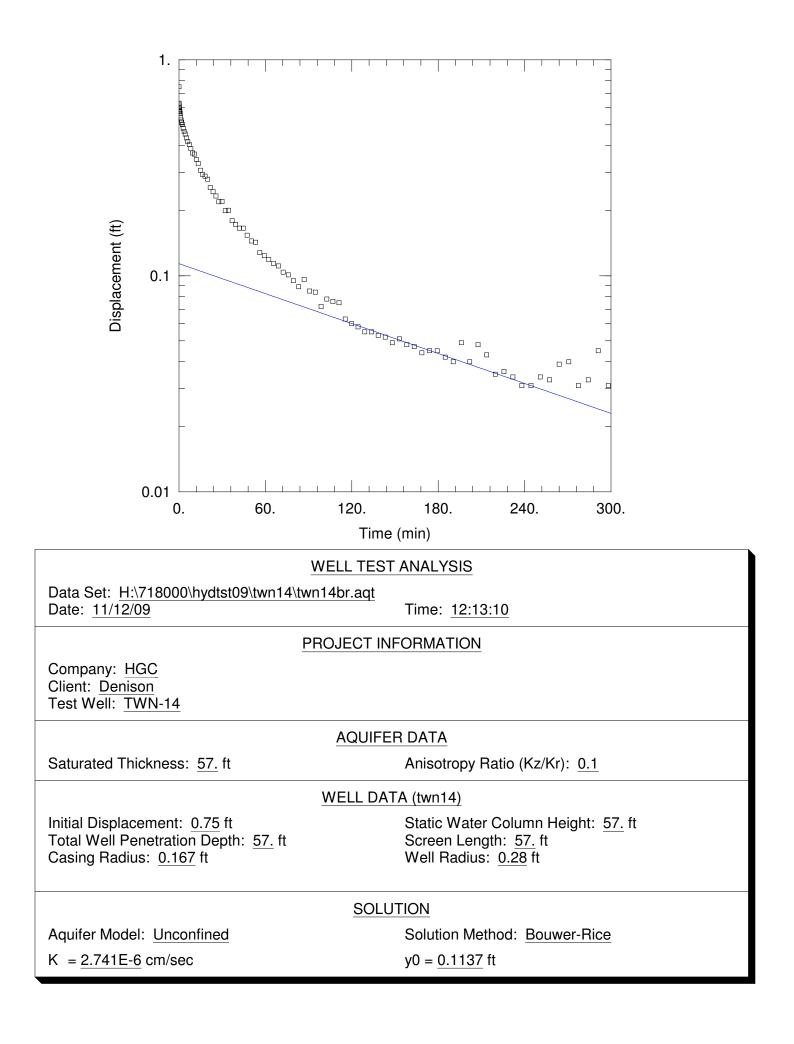


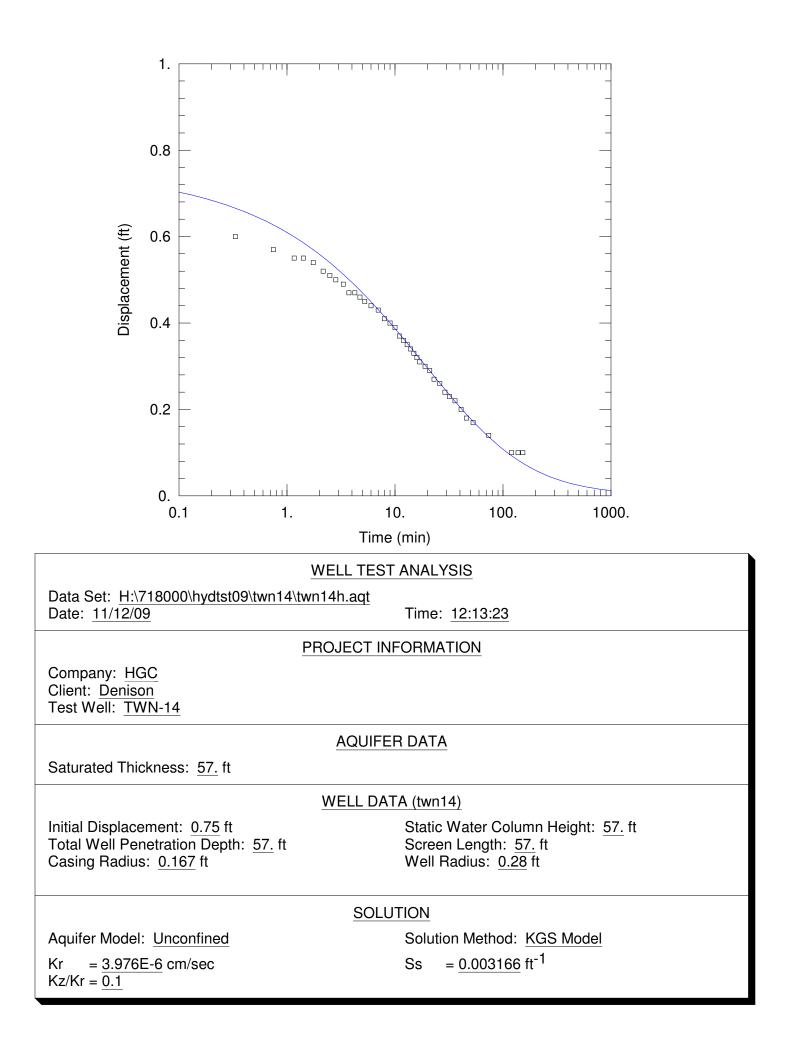


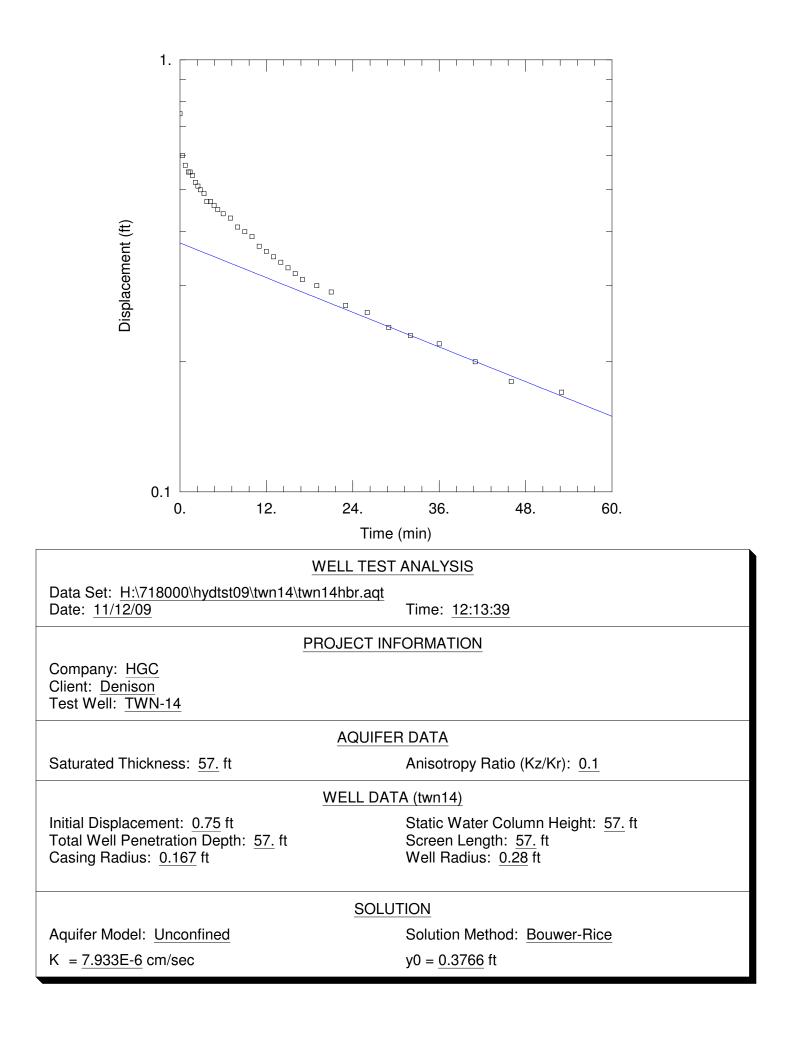


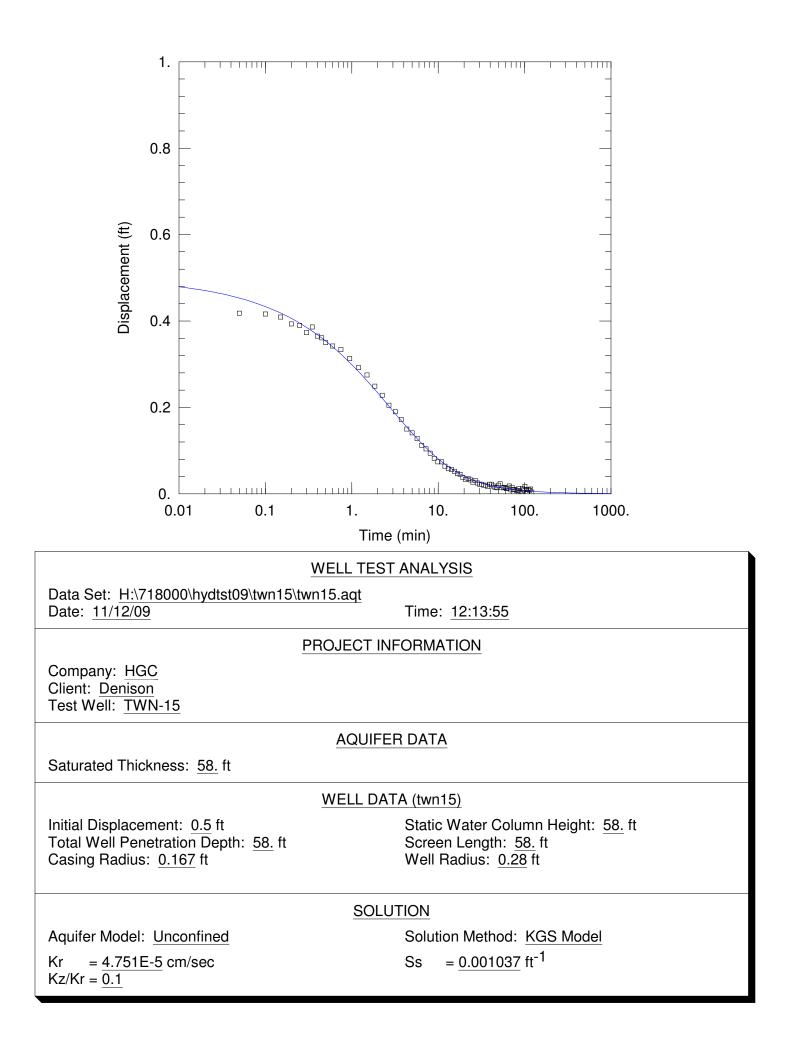


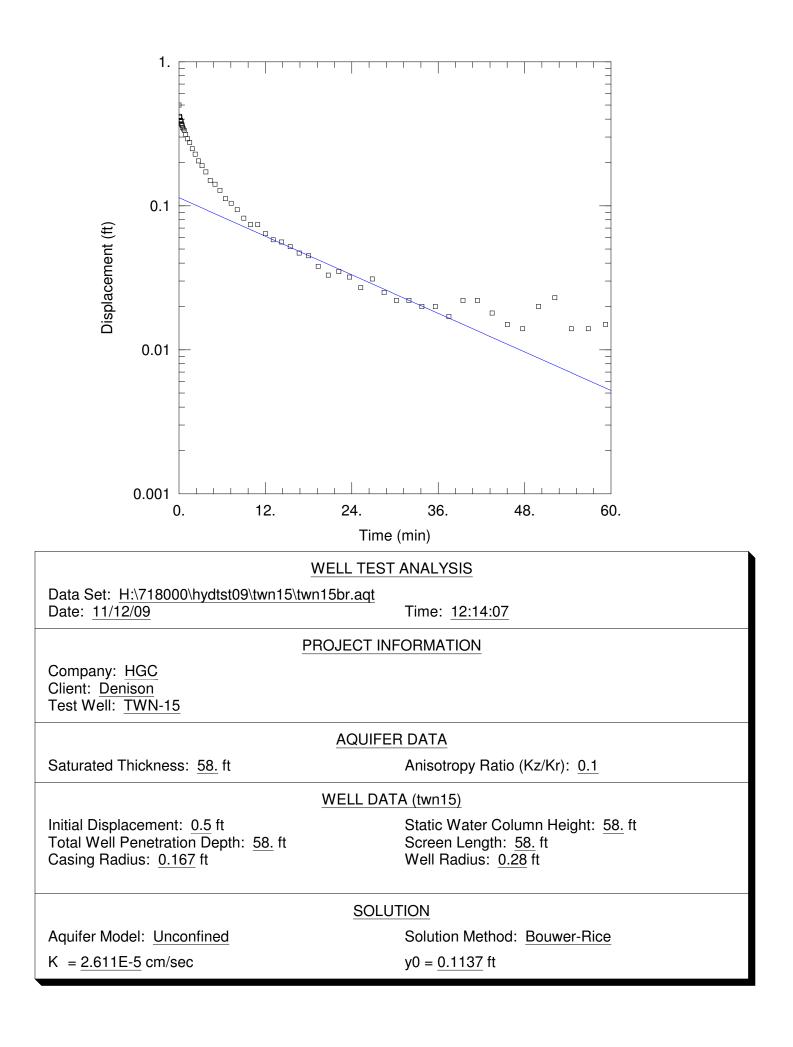


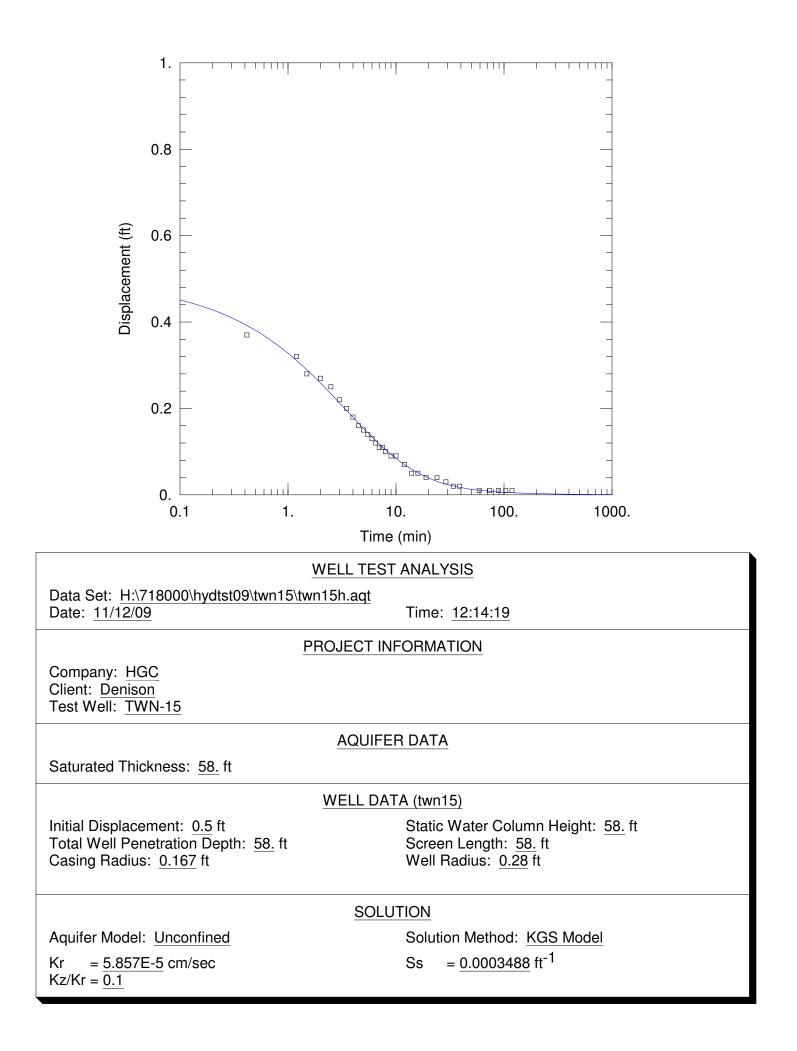


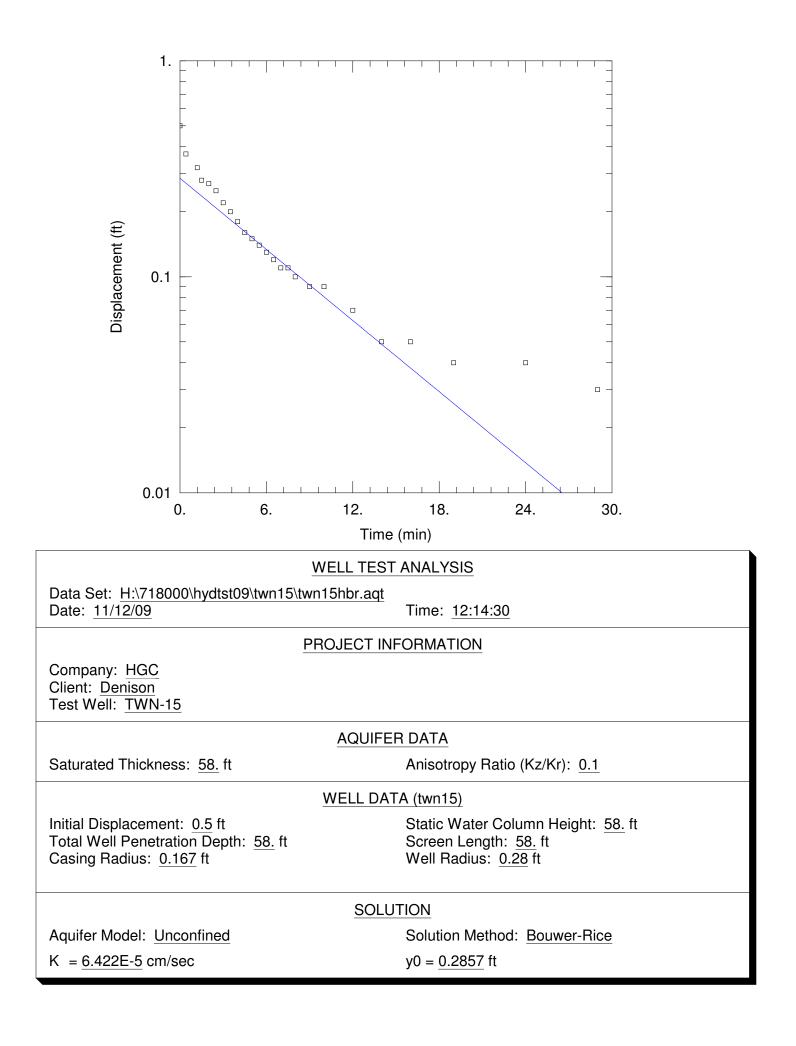


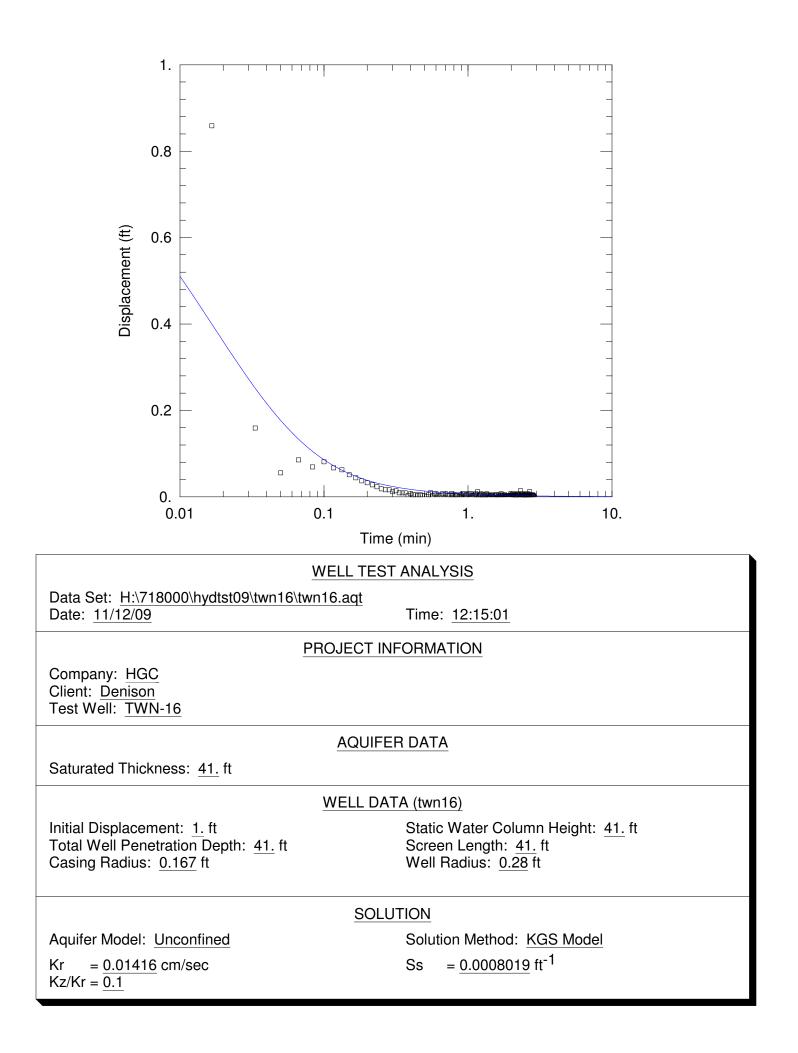


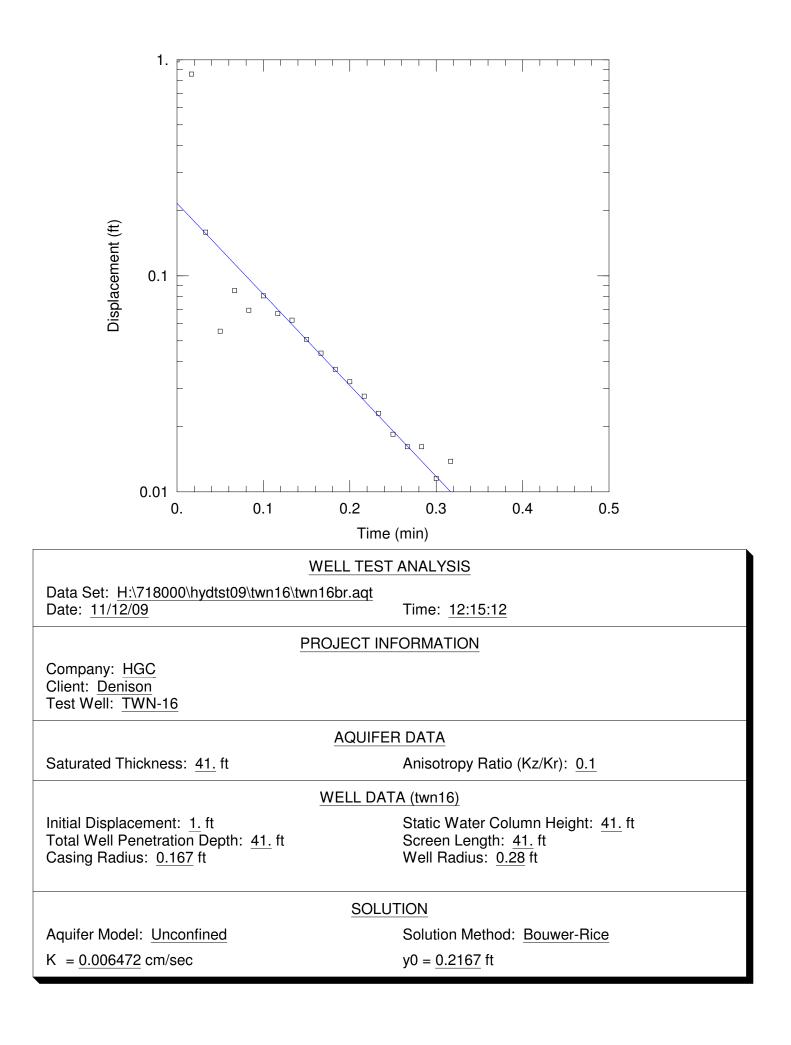


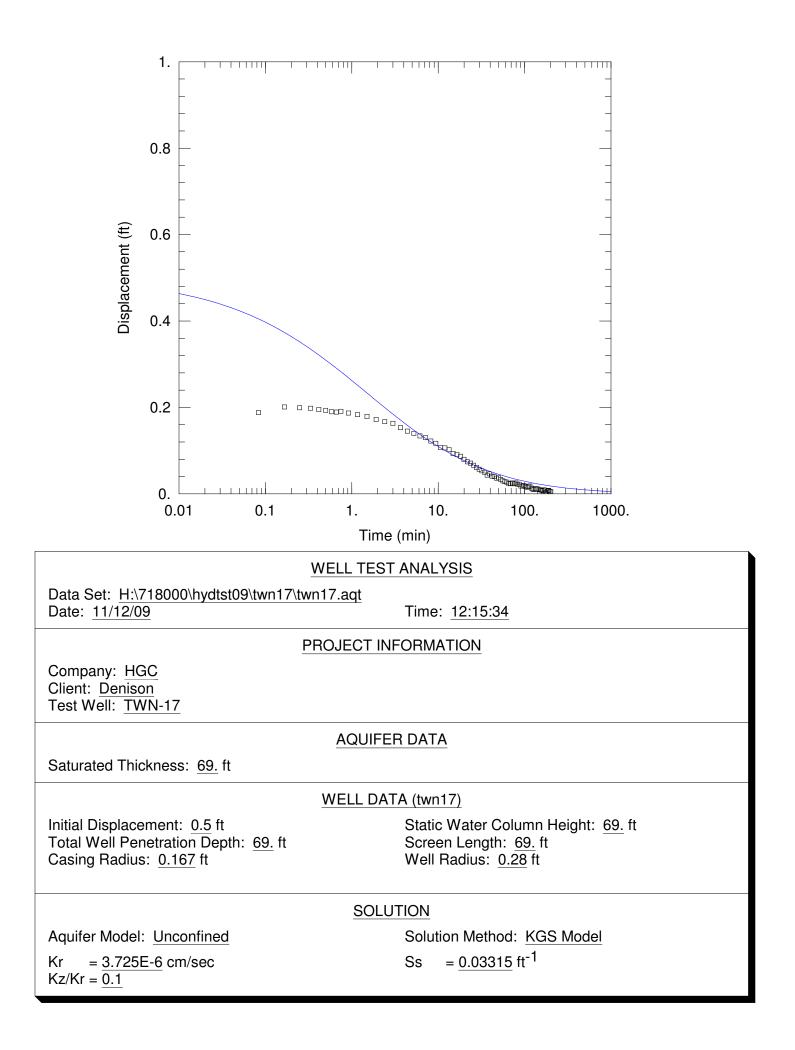


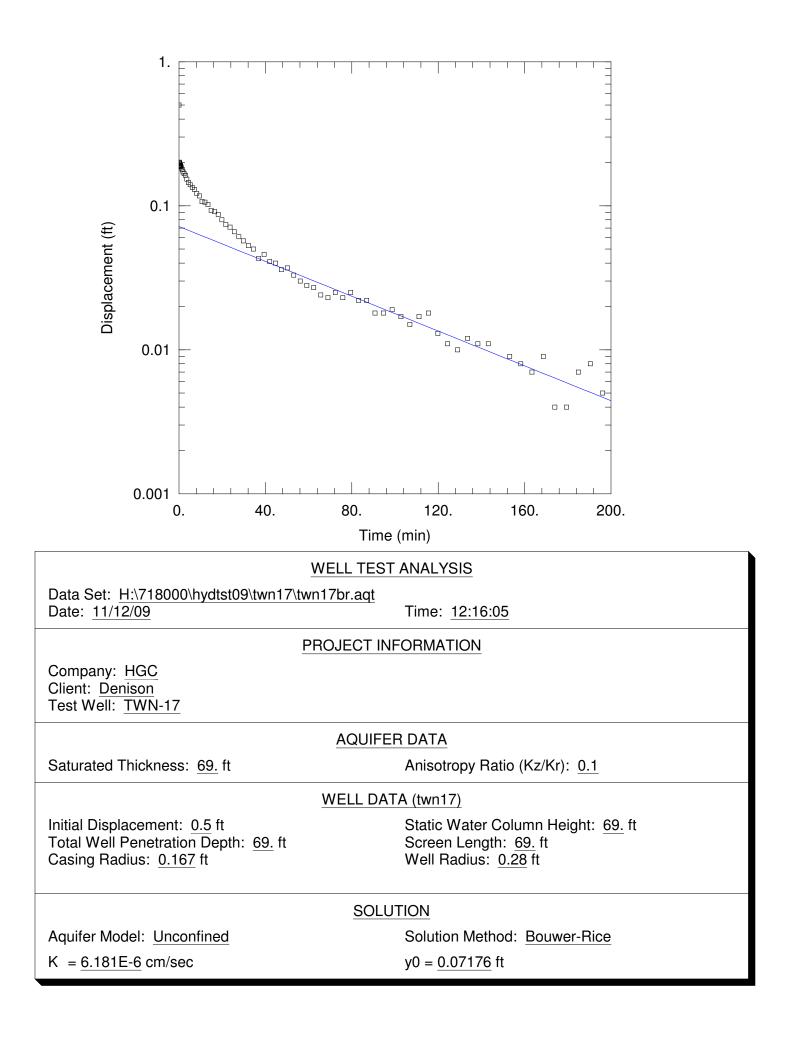


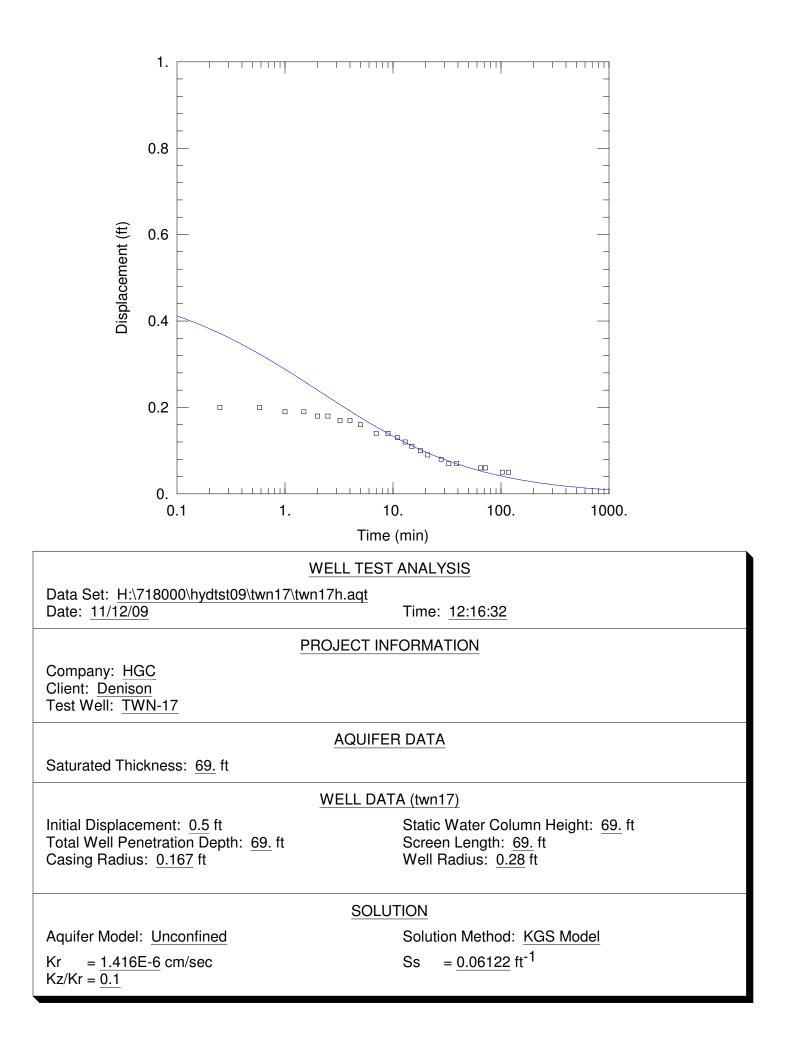


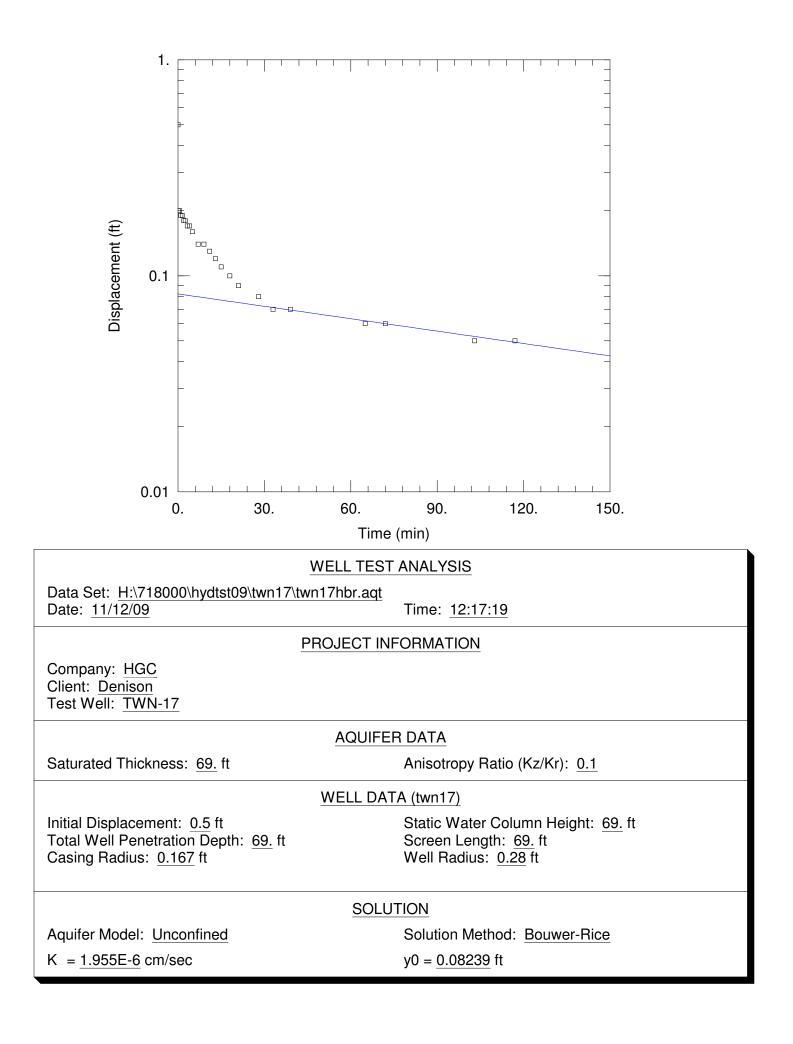


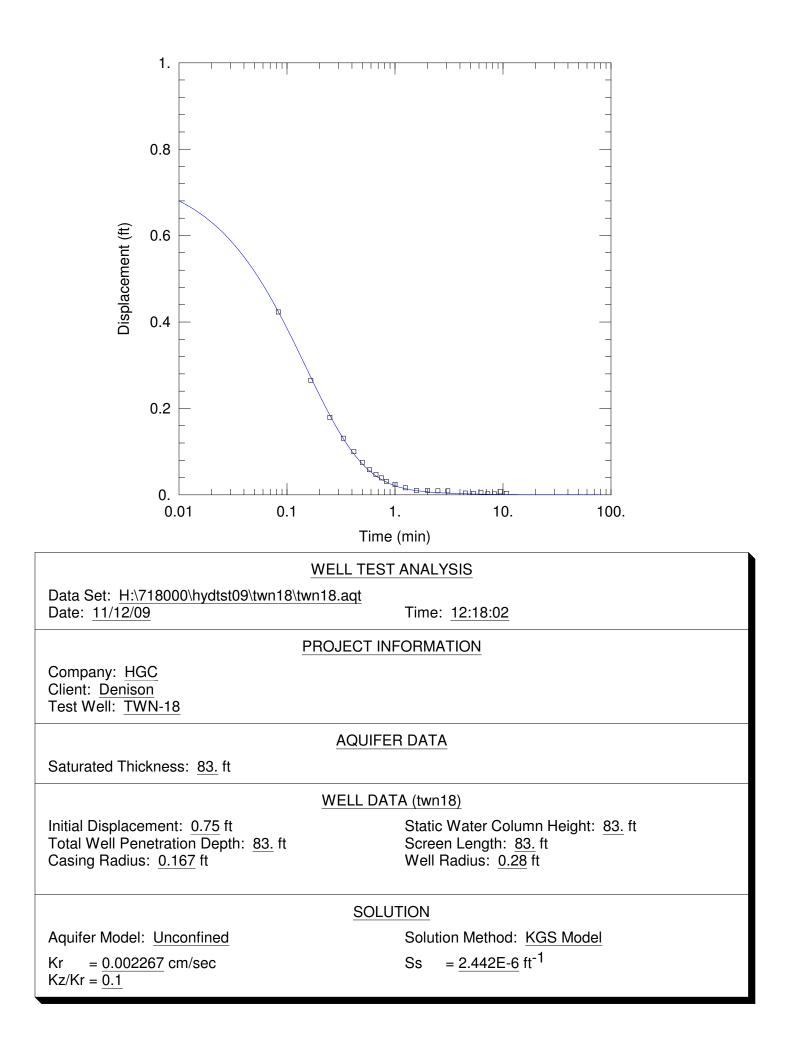


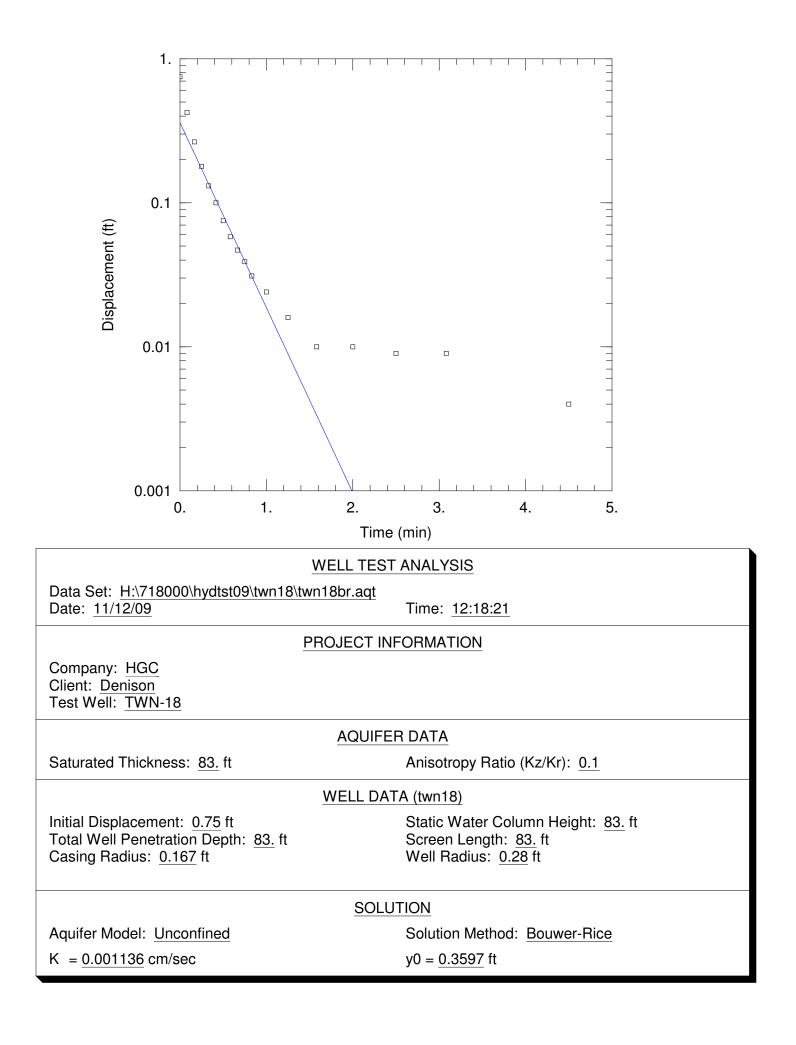


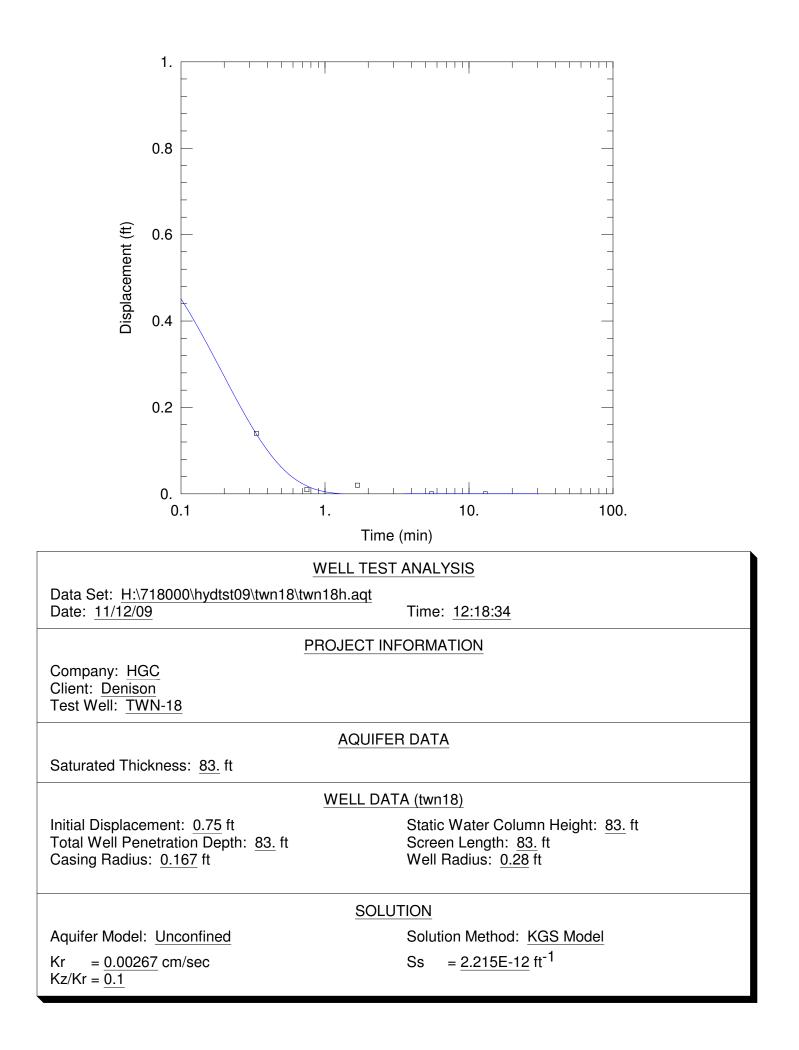


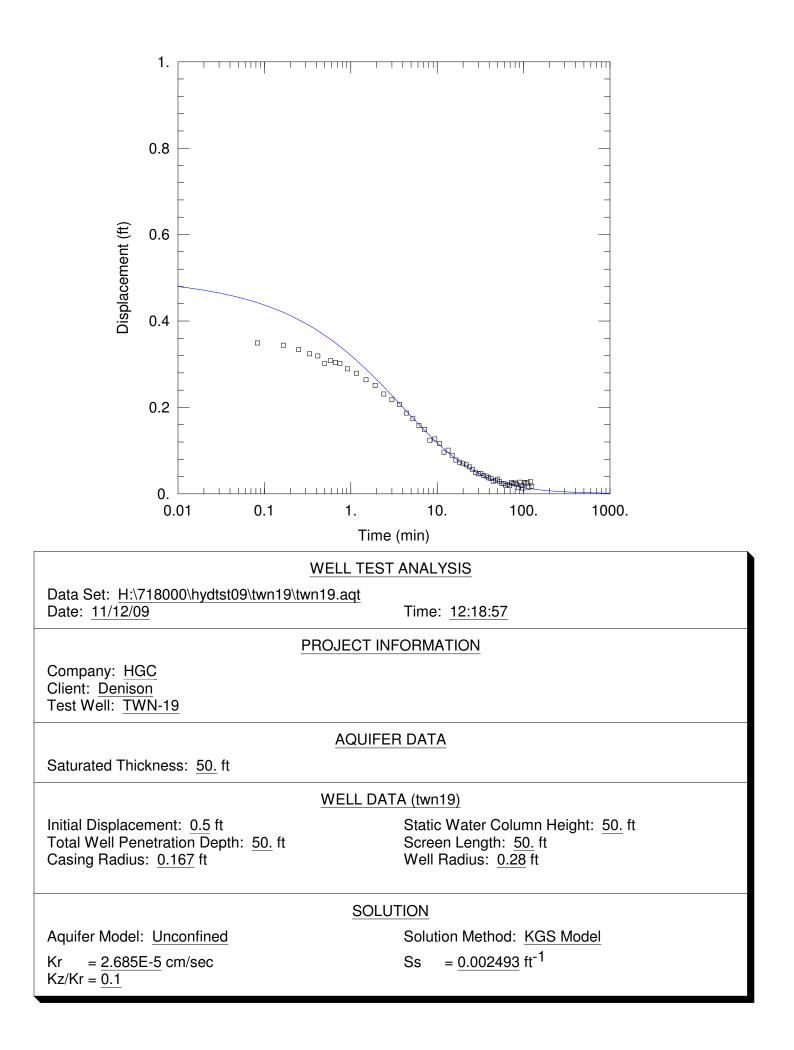


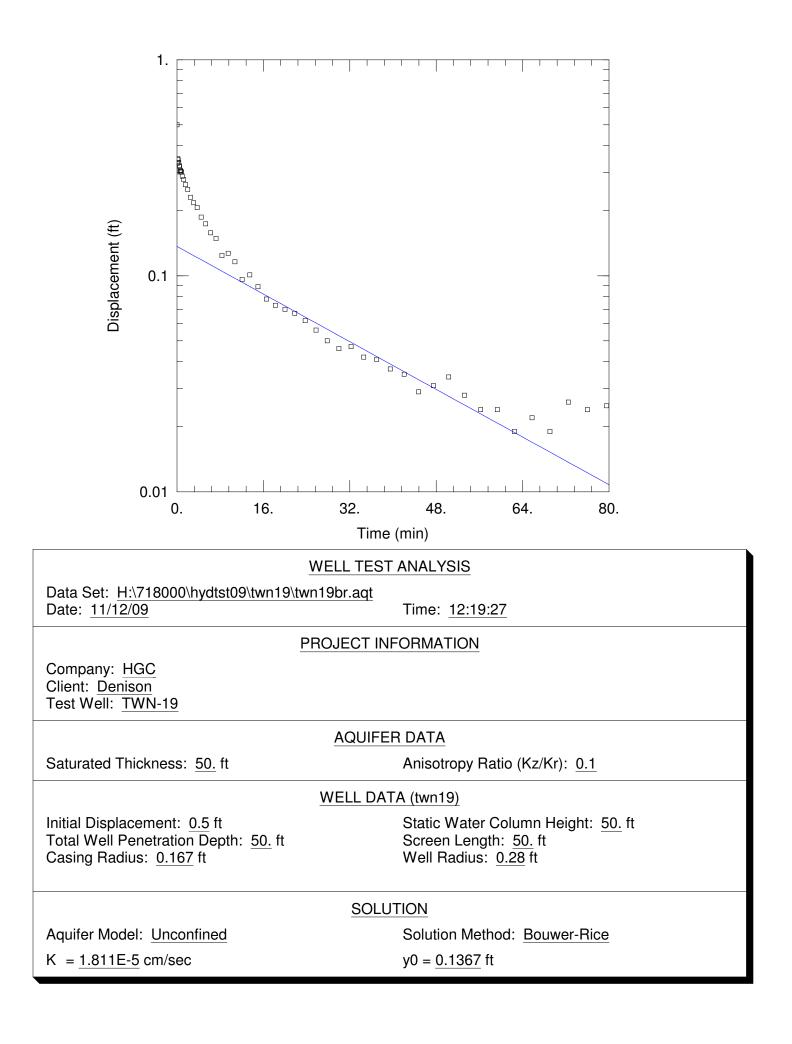


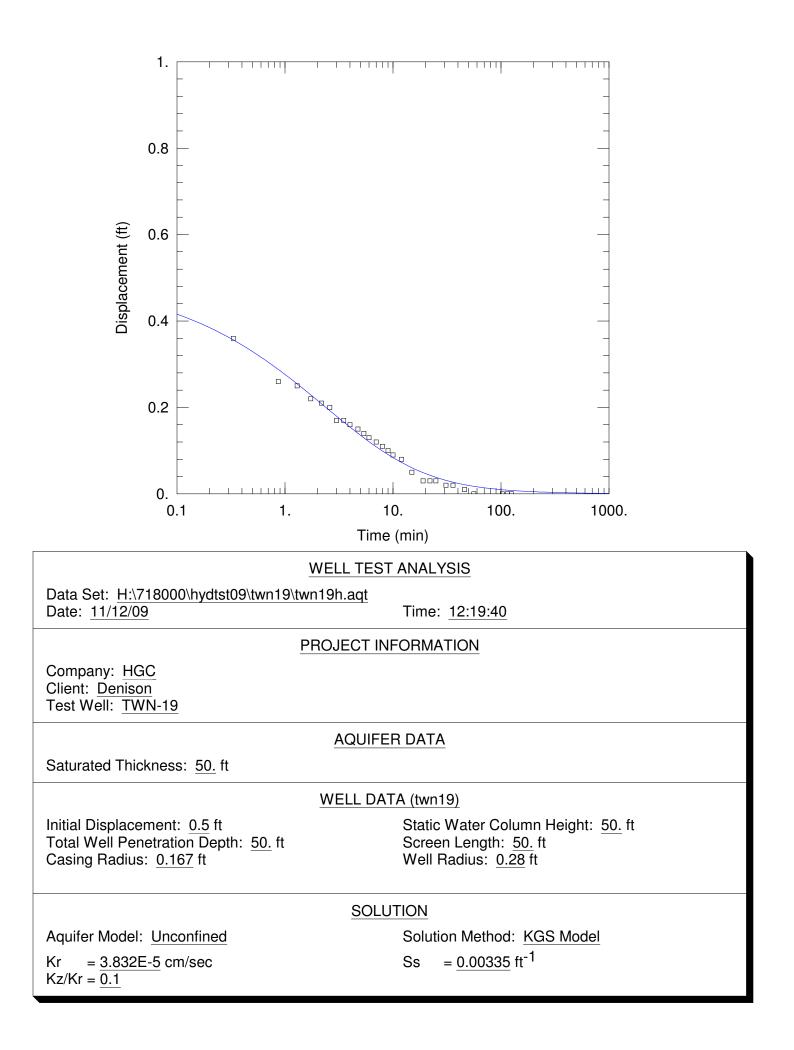












Attachment 6: Calculation to Evaluate Potential Tailings Cell Source

Assume:

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

 $C_t^*V_t + C_a^*V_a = C_m^*V_m$ Mixing Equation: (eq 1) Where: Ct = Concentration of nitrate in tailings solutions V_t = Volume of tailings solutions Cg = Concentration of nitrate in unimpacted groundwater V_q = Volume of unimpacted groundwater C_m = Concentration of nitrate in mixture V_m = Volume of mixture Another Equation: $V_t + V_q = V_m$ (eq 2) $C_t^* V_t + C_q^* V_q = C_m^* (V_t + V_q)$ Substituting eq2 in eq1: (eq 3)

Substitute Nitrate Concentrations in eq3

```
290^{*}Vt + 1^{*}Vg = 30^{*}(Vt + Vg)290^{*}Vt + 1^{*}Vg = 30^{*}Vt + 30^{*}Vg260^{*}Vt = 29^{*}VgVt = 29/260^{*}Vg = 0.11^{*}Vg
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The volume of tailings solution would have to be eleven percent of the volume of unimpacted groundwater in the mixture.

Attachment 6

Calculation to Evaluate Potential Tailings Cell Source