DRC-2009-007083

DENISON MINES

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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, 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.

Harold R. Roberts, P.E.
Registered Professional Engineer
State of Utah No. 165838

(seal)

REGISTERED PROFESSIONAL ENGINEER
No. 165838
HAROLD R. ROBERTS
STATE OF UTAH

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State of Utah No. 165838

(seal)

REGISTERED PROFESSIONAL ENGINEER
No. 165838
HAROLD R. ROBERTS
STATE OF UTAH

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 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 (H_2O) 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.

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 due to mounding at the wildlife ponds. Further, the eastern 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 (NO^{3-}) and nitrite (NO^{2-}) 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 (N^2) (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 Aqtesolv™ 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 quantities 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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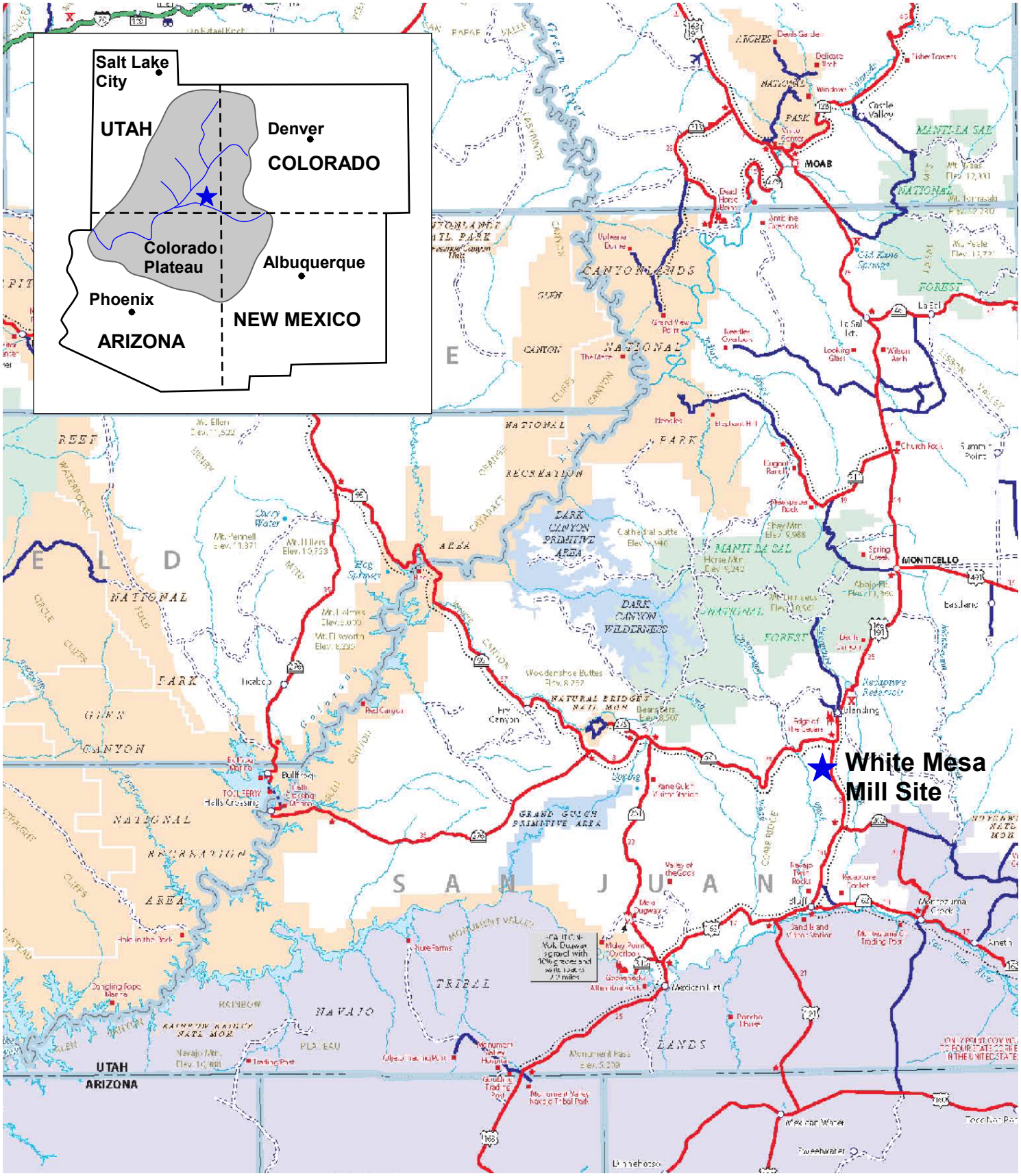
Figures



N

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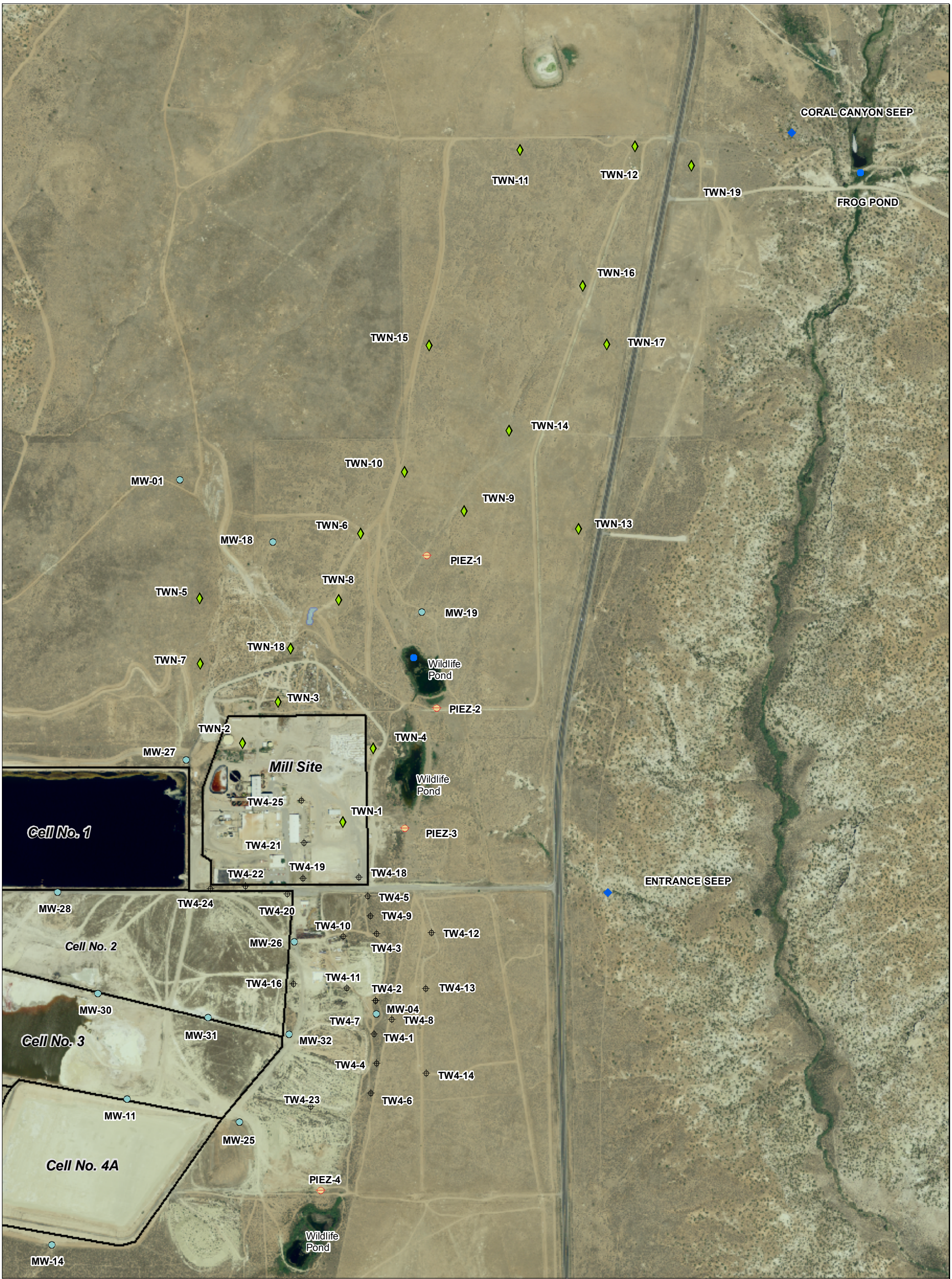
10 0 30 Miles

Figure 1
Regional Location Map of White Mesa Mill
Near Blanding, Utah



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

N
S

800 400 0 800
Feet

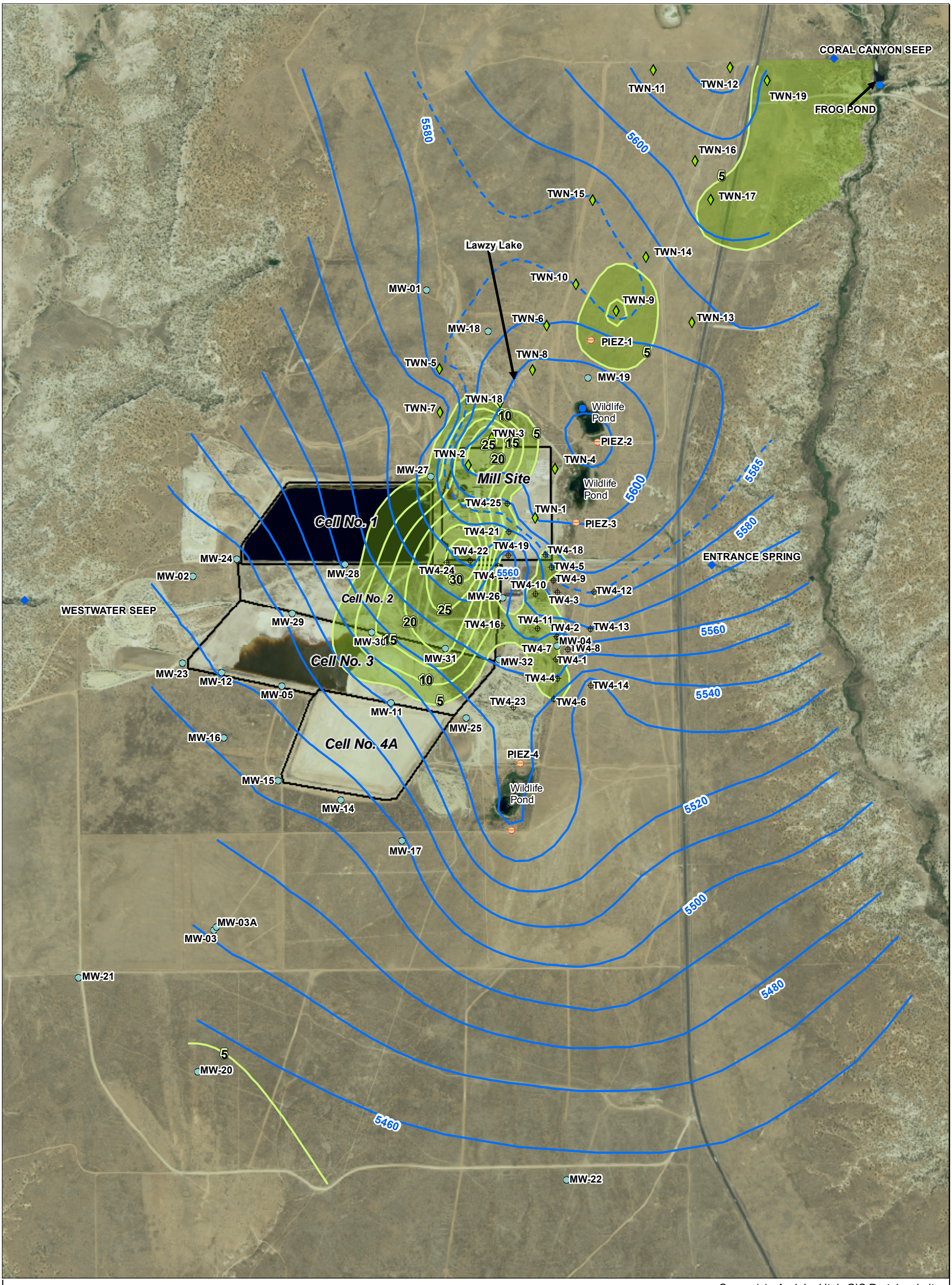
Legend

- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Lawzy Lake

Figure 2
Nitate Well Location Map

INTERA

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



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

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

N
S

1,200 600 0 1,200
Feet

Legend

- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Nitrate Concentration (mg/L)
- Groundwater Elevation Contours 10Ft
- Groundwater Elevation Contours 5ft

Figure 3
Nitrate Concentrations with Groundwater Elevations

INTERA

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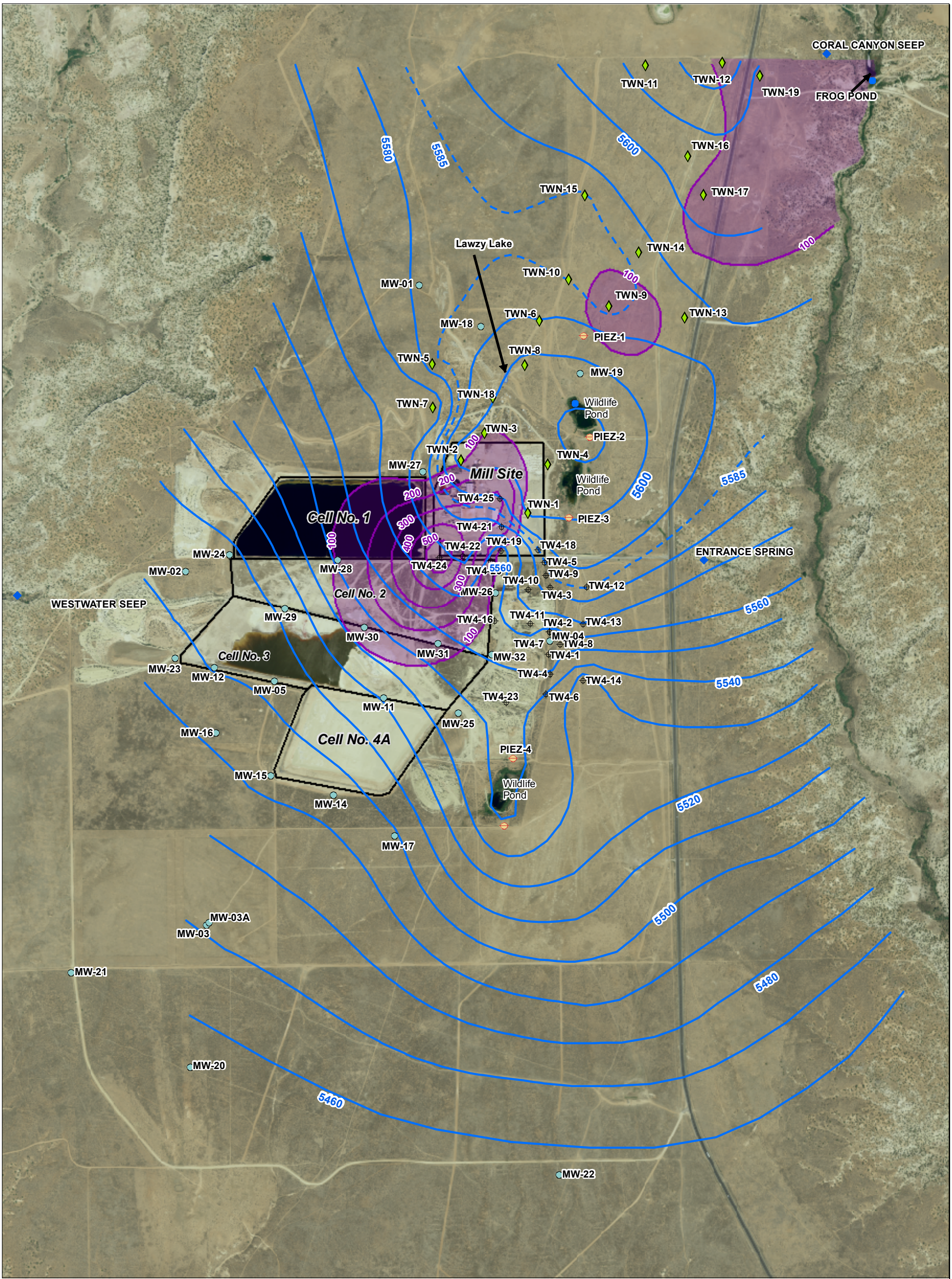

Chloride data from September, October, or November of 2009. A single data point was used for each well.

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

N
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1,200 600 0 1,200
Feet

Legend

- Monitoring Well
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Chloride Concentration (mg/L)
- Groundwater Elevation Contours 10Ft
- Groundwater Elevation Contours 5ft

Figure 4
Chloride Concentrations with Groundwater Elevations

INTERA

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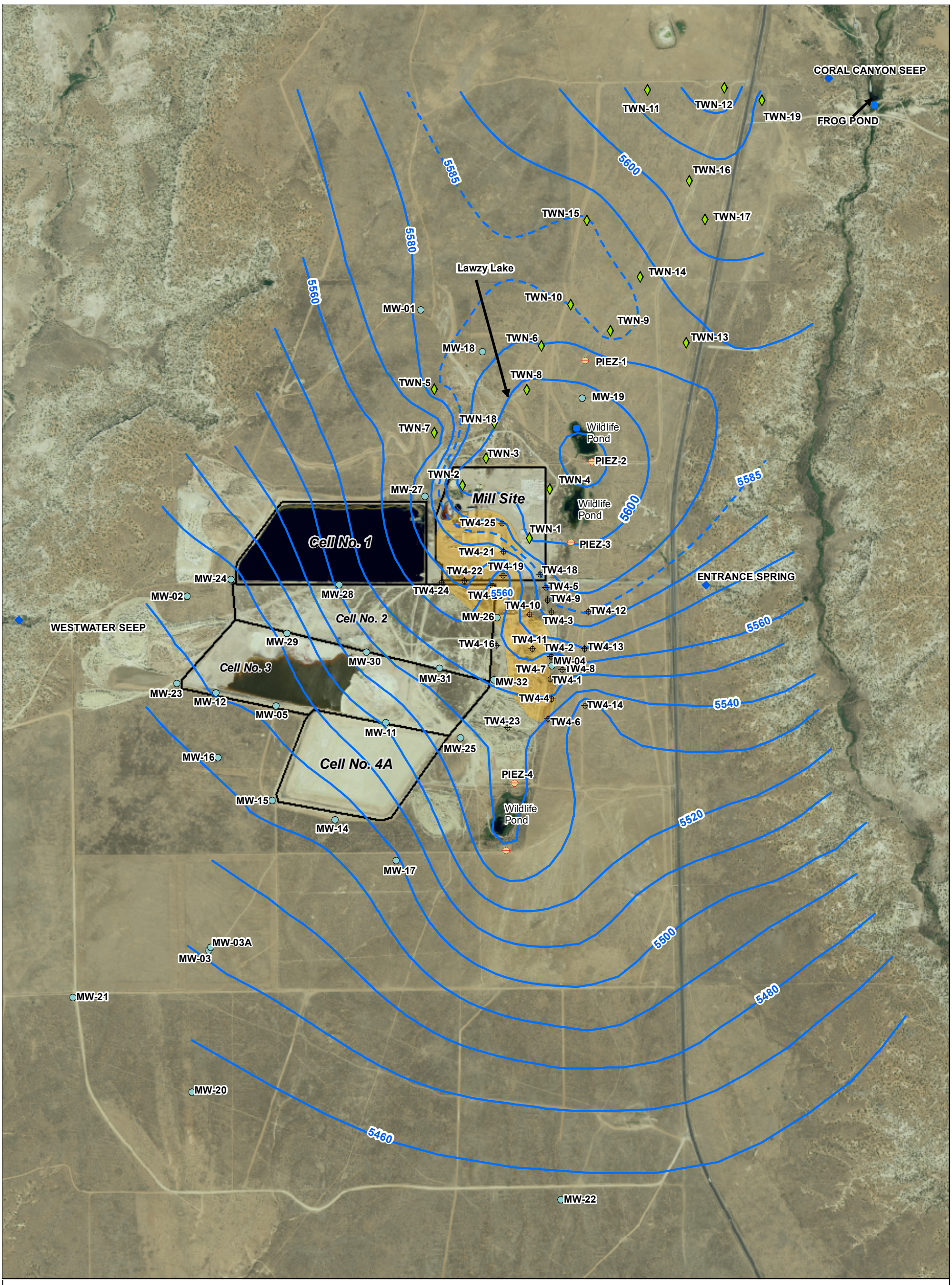

Chloroform plume from HGC, 2009

N
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1,200 600 0 1,200
Feet

Legend

- Chloroform Plume (>70 ug/L)
- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Groundwater Elevation Contours 10Ft
- Groundwater Elevation Contours 5ft

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

Figure 5
Ground Water Elevations and Chloroform Plume

INTERA

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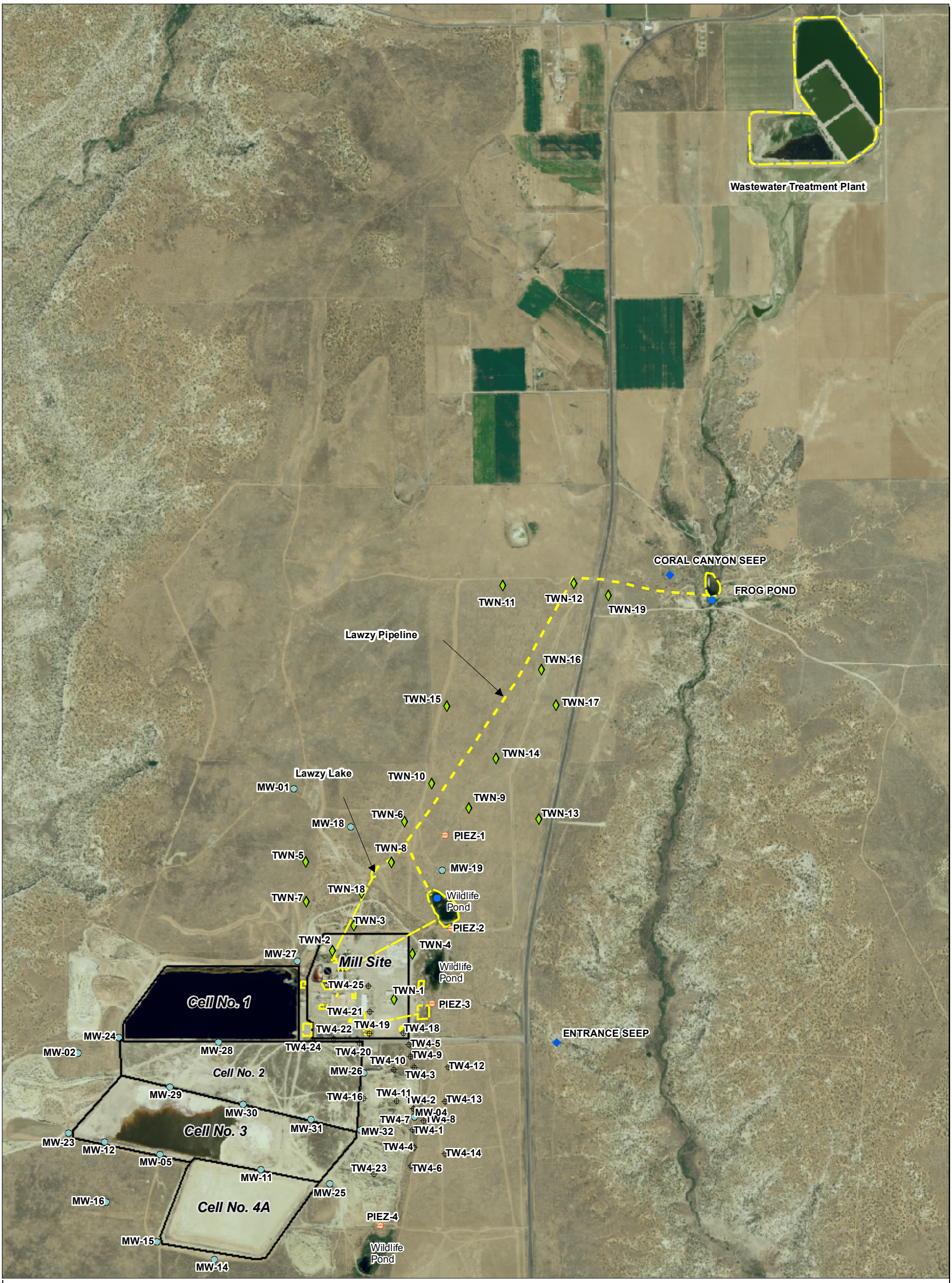

N
S

Legend

- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Possible Nitrate and Chloride Sources
- Lawzy Pipeline
- Lawzy Lake

1,300 650 0 1,300
Feet

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

Figure 6
Possible Sources of Nitrate and Chloride in the Vicinity of the Mill

INTERA

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

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

N
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Legend

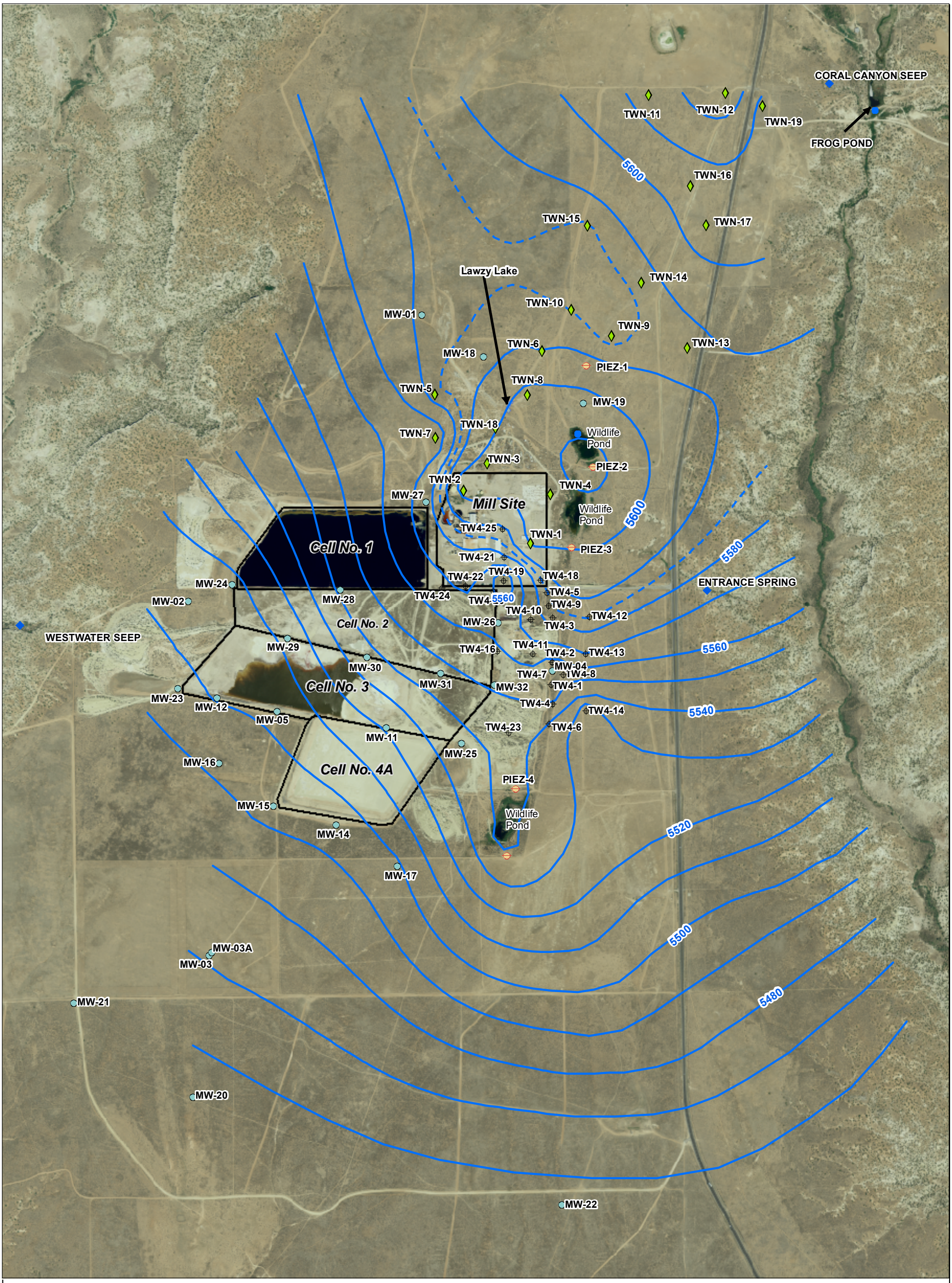
- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Potential Nitrate and Chloride Sources
- Lawzy Pipeline
- Lawzy Lake

250 125 0 250
Feet

Figure 7
Potential Nitrate and Chloride Sources at the Mill Site

INTERA

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



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.

N
S

1,200 600 0 1,200
Feet

Legend

- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Groundwater Elevation Contours 10Ft
- Groundwater Elevation Contours 5ft

Figure 8
Groundwater Elevations

INTERA

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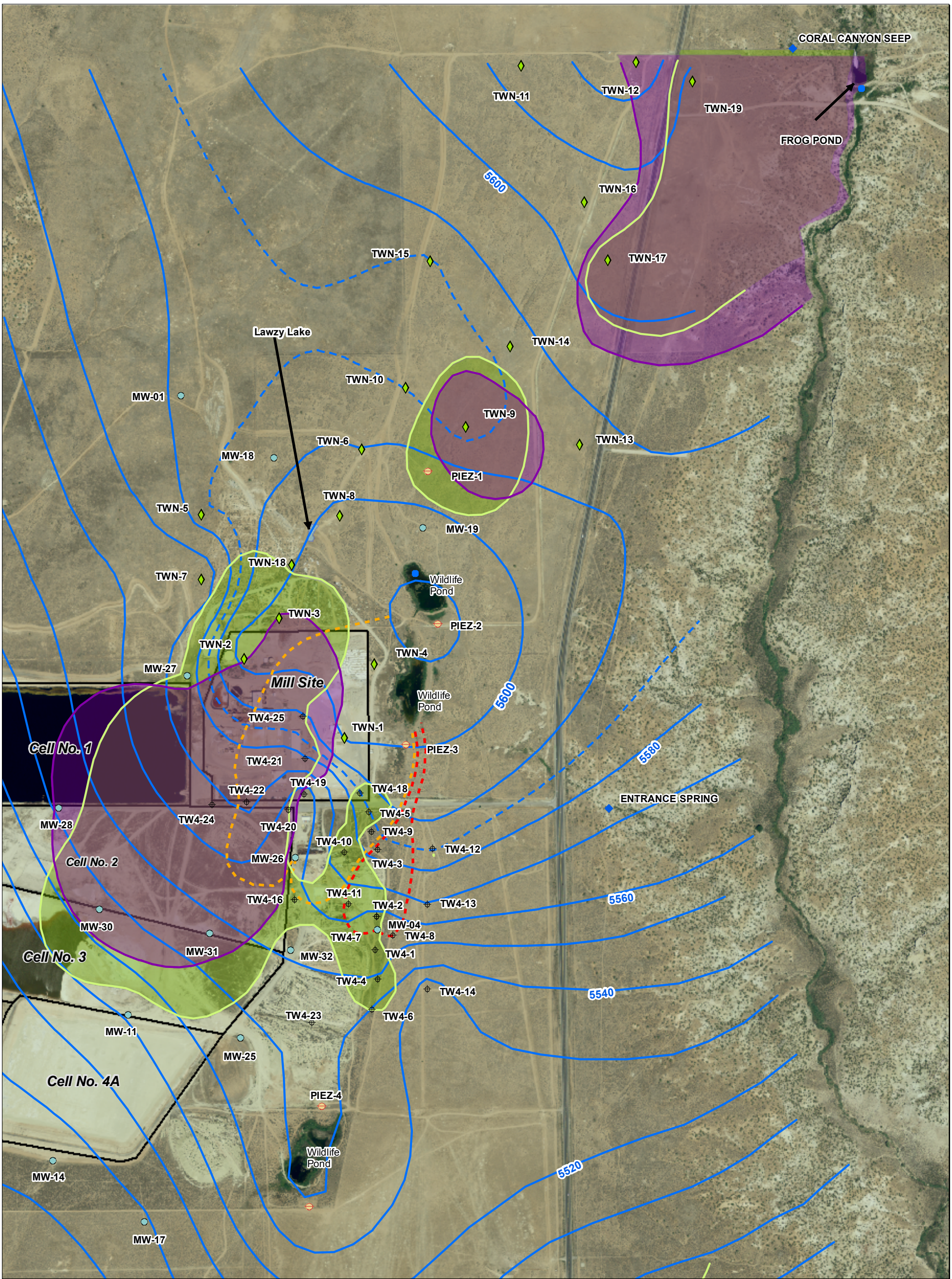

Source(s): Aerial – Utah GIS Portal website; Wells – HGC, Inc., May 2008 report.

N
S

800 400 0 800
Feet

Legend

- Estimated Capture Zone MW-4
- Estimated Combined Capture Zone (MW-26, TW4-19, and TW4-20)
- Chloride Plume
- Nitrate Plume
- Groundwater Elevation Contours 10Ft
- Groundwater Elevation Contours 5ft

Figure 9
Nitrate and Cloride Plumes
with Estimated Capture Zones

INTERA

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

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

Table 2
Nitrate and Chloride Sampling Results

Well	Sample Date	Nitrate (mg/L)	Chloride (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

Well	Sample Date	Nitrate (mg/L)	Chloride (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

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

cc DCF, RFM, MWL, SDL, & 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 08 2008
Per _____

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).
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.
5) The source(s) of the nitrate contamination are currently unknown.

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).

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

UTAH WATER QUALITY BOARD

Dane L. Finerfrock
Co - Executive Secretary

DCH:dh

Attachment 2

Source Review Report (Tischler, 2009)

MEMORANDUM

To: Denison Mines (USA) Corp.

From: Jo Ann Tischler

Date: December 30, 2009

Subject: 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.

9. *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 (NH_3) at high pH, and ionized form (NH_4OH) at neutral and low pH;
- Inorganic nitrite, an intermediate oxidized form (NO_2); and
- Inorganic nitrate, a stable oxidized form (NO_3).

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 oxygen-deficient 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 1974 Needs Survey, 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 NH_3 form. At neutral pHs and in low pH (acidic) systems such as tailings, ammonia is present primarily in the ammonium ion form (NH_4+). 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 non-contaminated 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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Tables

Table 1: Nitrogen from Sewage Sources

	Sewage Plant Influent (liquid)		Sewage Plant Primary Sludges		Sewage Plant Primary Sludges		Sewage Plant Digested Sludge		Sewage Plant Digested Sludge	
	Range (mg/L or ppm)	Mean (mg/L or ppm)	Range (percent)	Typical (percent)	Range (mg/L or ppm)	Typical mg/L or ppm)	Range (percent)	Typical (percent)	Range (mg/L or ppm)	Typical (mg/L or 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

Table 2 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 Sources[5]
Adogen 283, 382, 2364, 2382	Fabric softeners,ore separation, detergents, corrosion inhibitors, bactericides, inks, antislip agent, waterproofing, chemical intermediates.	Yes. Process reagent.	Yes	None identified.
Aluminum nitrate		Yes. Process reagent.	Yes	None identified.
Ammonia and ammonium hydroxide	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 in synthesis of synthetic fibers, urea formaldehyde, nitroparaffins, melamine, ethylenediamine, rocket fuel.	Yes. Anhydrous used in vanadium circuit and yellowcake precipitation.	Yes	Wastewater plant and sludge overflow, agricultural sources.
Ammonio-cupric sulfate (ammoniated copper sulfate)	Calico printing, manufacture of copper arsenate, insecticide, fiber treatment.	No. None of these processes are present at the Mill.	Yes	Possible. Agriculural sources.
Ammonium dimethyldithiocarbamate	Fungicide	Not used at the Mill.	Yes	Possible. Agricultural sources.
Ammonium dinitro-o-cresolate	Herbicide	Not used at the Mill.	Yes	Possible. Agricultural sources.
Ammonium linoleate	Emulsifier for oils, waxes, hydrocarbon solvents, detergents, water-repellants, surface tension reducer.	No. None of these processes are present at the Mill.	Yes	Wastewater plant and sludge overflow.
Ammonium nitrate NH_4NO_3	Fertilizer, explosives, pyrotechnics, herbicide, insecticide, synthesis of nitrous oxide, solid rocket proellant, freezing mixtures, nutrient for antibiotic and yeast synthesis.	Possibly. 1. Trace quantities only in ore. 2. Trace quantities only in lawn care and topsoil fertilizing.	Yes	Wastewater plant and sludge overflow, agricultural sources.
Ammonium polyphosphate (urea ammonium polyphosphate)	Liquid fertilizer.	Possibly.	Yes	Wastewater plant and sludge overflow, agricultural sources.

Table 2 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 Sources[5]
Ammonium sulfate $(NH_4)_2SO_4$	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	Separation agent	Yes. Process and lab reagent.	Yes.	None identified.
Brucine sulfate	Separation agent	Yes. Lab reagent.	Yes.	None identified.
Calcium ammonium nitrate $CaNH_4NO_3$	As 60% ammonium nitrate, 40% limestone in fertilizers	Possibly. Trace quantities only in lawn care and topsoil fertilizing.	Yes	Wastewater plant and sludge overflow, agricultural sources.
Calcium nitrate $Ca(NO_3)_2 \cdot H_2O$	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.
Coal and coal combustion products	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 $(CH_20)_2P(S)OC_6H_3(Cl)NO_3$	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.

Table 2 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 Sources[5]
Hydrazine	Rocket fuel, oxygen scavenger in boiler water treatment.	Yes. Small quantities in drummed solutions used in boiler area. Sulfate form used in lab.	Yes	None identified.
Nitrites	Corrosion inhibitors in boilers and process water treatment.	Yes. Low levels in boiler area.	Yes	None identified.
o-Nitrobiphenyl/nitro diphenyl	Dyes, fungicide, plasticizer for cellulose, wood preservative,	No. None of these processes are present at the Mill.	Yes	Wastewater plant overflow, wastewater sludge overflow, agricultural sources.
Nitrofuran (furazolidone)	Former antibiotic drug for cows.	No. Not used at Mill.	Yes	Possible. Agricultural sources.
Nitrofurantoin	Antibacterial agent.	No. Not used at Mill.	Yes	Possible in wastewater plant overflow, wastewater sludge overflow.
Nitroglycerin	Explosives, medicinals.	Yes. Possible trace levels inores.	Yes	None identified.
Nitro toluenes (mono, di and tri)	Explosives, urethane synthesis, organic synthesis, toluidines, dyes.	Yes. Possible trace levels in ores.	Yes	None identified.
Other organo amines	Water treatment, enhancement of solvent extraction	Yes, Used in Mill's SX circuit.	Yes	None identified.
Other organo ureas, amino acids, proteins	Ubiquitous in human waste, animal waste, food decomposition, domestic sewage.	Yes. In leach fields, sewage sludge overflow ponds.	Yes	Wastewater plant overflow, wastewater sludge overflow, agricultural sources.
Potassium nitrate KNO_3	Pyrotechnics, explosives, matches, fertilizer, meat curing, tobacco, glass manufacture, tempering steel.	Possibly. 1. Trace quantities only in ore. 2. Trace quantities only in lawn care and topsoil fertilizing.	Yes	Wastewater plant overflow, wastewater sludge overflow, agricultural sources.
Potassium thiocyanate	Manufacture of sulfocyanides, thioureas, textile dyeing, photofinishing, dyestuffs, medicine.	Yes. Process and lab reagent.	Yes	None identified.
Silver Nitrate	Photofilm, catalyst for ethylene oxide, silverpalting, inks, mirror plating, hair dye, germicide, antisepic and cauterizing agent, lab reagent.	Yes. Process and lab reagent.	Yes	None identified.

Table 2 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 Sources[5]
Sodium nitrate $NaNO_3$	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.	Yes. Process and lab reagent. Also possibly in fertilizer.	Yes	Wastewater plant overflow, wastewater sludge overflow, agricultural sources.

Table 2 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 Sources[5]
Ammonio ferric sulfate (ferric ammonium sulfate)	Medicine, textile dyeing.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium acetate	Analytical reagent, drugs, textile dyeing, meat preserving, foam rubber, vinyl plastics, explosives.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium benzene sulfonate	Igniter, chemical synthesis.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium benzoate	Medicine, latex preservative.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium bicarbonate	Production of ammonium salts, dyes, leavening for cookies, crackers, pastry dough, fire extinguishers, pharmaceuticals, foam rubber blowing, boiler scale removal, compost treatment, degreasing textiles.,	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium bifluoride	Ceramics, reagent, glass etching, laundry sour, brewery and dairy sterilizer, beryllium electroplating.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium bioxalate	Analytical reagent, ink removal from fabrics.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium bisulfate	Catalyst in organic synthesis, permanent wave hair solutions.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium bitartrate	Baking powder.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium borate	Fireproofing compounds, electrical condensers, herbicide.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium bromide	Photographic silver precipitation, medicine, engraving, textile finishing, fire retardant, anticorrosive agents, analytcial chemistry.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium cadmium bromide (cadmium ammonium bromide)	Plating and preparation of metals.	No. None of these processes are present at the Mill.	NA	Agricultural sources.
Ammonium caprylate	Pesticide, photo emulsions, chemical intermediate.	No. None of these processes are present at the Mill.	NA	Agricultural sources.

Table 2 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 Sources[5]
Ammonium carbamate	Fertilizer.	No. None of these processes are present at the Mill.	NA	Agricultural sources.
Ammonium carbonate	Ammonium salts, medicine, baking powder, smelling salts, fire extinguishers, pharmaceuticals, textiles, wine fermentation, ceramics, wool washing, organic sythesis.	No. None of these processes are present at the Mill.	NA	Agricultural sources.
Ammonium chloride	Dry batteries, dye and printing mordant, solderflux, synthesis of ammonia compounds, fertilizer, pickling agent in zinc processing, electoplating, washing powders, melt retardant for snow treating, urea formaldehyde resins, bakery products.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium chromate	Dye mordant, photogrpahic coatings, anlaytical reagent, catalyst, corrosion inhibitor.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium chromium sulfate (chromium ammonium sulfate)	Dye mordant, tanning.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium citrate	Pharmaceuticals, rustproofing, cotton printing, plasticizer, analyzing phosphate in fertilizer.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium cobaltous phosphate (cobaltous ammonium phosphate)	Plant nutrient, glass coloring, glazes, enamels, anlaytical chemistry.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium cobalt sulfate	Ceramics, cobalt plating, catalyst.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium dichromate (ammoniumbichromate)	Dyeing, pigments, manufacture of alizarin, chrome alum, oil purification, pickling, manufacture of catalysts, tanning, perfumes, photography, engraving, lithography, chromic oxide,pyrotechnics.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium dithiocarbamate	Synthesis of heterocyclic compounds, anlaytical reagent.	No. None of these processes are present at the Mill.	NA	None identified.

Table 2 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 Sources[5]
Ammonium fluoride	Fluoride synthesis, analytical chemistry, disinfectant in brewing, glass etching, textile mordant, wood preserving, mothproofing.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium fluosilicate	Laundry sours, mothproofing, disinfectant in brewing, glass etching, electroplating, light metal casting.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium formate	Analytical chemistry for precipitating metals.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium gluconate	Emulsifying agent in cheese and salad dressing.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium glutamate (sodium glutamate)	Flavor enhancer in foods.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium hexachloro-osmate	Plating.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium hexachloroplatinate	Plating, platinum sponge.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium hexafluoro germanate	Plating.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium hydroxide	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 synthesis.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium hypophosphite (phosphine)	Organic preparations, doping agent for semiconducors, polymerization initiator, condensation catalyst.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium ichthosulfonate (ichthammol)	Pharmaceutical preparations, cosmetic preparations, dermatological soaps.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium iodate	Oxidizing agent.	No. Mill does not use this oxidizer.	NA	None identified.

Table 2 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 Sources[5]
Ammonium iodide	Iodides, medicine, photography.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium laurate	Production of oil-water emulsions, cosmetics.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium lignin sulfate (lignin sulfonate)	Dispersing agent in concrete and rubber mixes, tanning, oil well drilling mud, ore flotation, production of vanillin, industrial cleaners, gypsum, dyes,pesticides.	No. Not used in ore flotation at the Mill. None of these processes are present at the Mill.	NA	None identified.
Ammonium molybdate	Reagent, pigments, dehydrogenation and desulfurization catalyst in petroleum refining, production of molybdenum.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium-12-molybdophosphate	Reagent, ion exchange columns, photographic additive, water resistance additive.	No. None of these processes are present at the Mill. Not used in Mill's ion exchange	NA	None identified.
Ammonium-12-molybdosilicate	Catalyst, reagent, precipitant and ion exchange mediumin nuclear fuel cycle, photofixing and photo-oxidizing agent,	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium nickel chloride	Electroplating, dyeing.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium nickel sulfate	Electroplating.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium nitroso-b-phenylhydroxyl amine (cupferron)	Analytical reagent for separation of metals (coper, vanadium, iron).	Not used at the Mill.	Yes	None identified.
Ammonium oleate	Emulsifying agent in cosmetics.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium oxalate	Analytical chemistry, safety explosives, manufacture of oxalates, rust and scale removal.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium palmitate	Thickening agent of rpetroleum-derived solvents and lubricants, waterproofing agent.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium pentaborate	Intermediate for boron chemicals, power level controller in nuclear submarine reactors.	No. None of these processes are present at the Mill.	NA	None identified.

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

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

Table 2 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 Sources[5]
Ammonium zirconifluoride (zirconium ammonium fluoride)	Chemical reagent.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonium zirconyl carbonate	Water repellant for paper and textiles, catalyst, latex paint stabilizer, floor wax additive, glass fiber fabrication.	No. None of these processes are present at the Mill.	NA	None identified.
Ammonobasic mercuric chloride (ammoniated mercury)	Topical germicide, medicines.	No. None of these processes are present at the Mill.	NA	None identified.
Amobarbitol	Medicine, pharmaceutical, hypnotic.	No. None of these processes are present at the Mill.	NA	None identified.
Aniline	Dyestuffs, rubber accelerators and antioxidants, shoe polish, photographic chemicals, isocyanates for urethanes, explosives, petroleum refining, synthesis of pharmaceuticals, phenolics, herbicides, fungicides.	No. None of these processes are present at the Mill.	NA	None identified.
Beryllium nitrate $BeNO_3$	Oxidizer	No beryllium oxidizers used in Mill circuit.	NA	None identified.
Cellulose nitrate/nitrocellulose	Auto lacquers, explosives, collodion for wound dressing and gun cotton, rocket fuel, printing ink, bookbinder's cloth, leather finishing, celluloid film, flashless powder.	No. None of these processes are present at the Mill.	NA	None identified.
Ceric ammonium nitrate	Oxidant for organic compounds, azide manufacture, polymerization catalyst for polyolefins.	No. None of these processes are present at the Mill.	NA	None identified.
4-Chloro-3-nitrobenzenoic acid	Dyes, perfumes, flavors, pharmaceuticals.	No. None of these processes are present at the Mill.	NA	None identified.
2-Chloro-3-nitrobenzene sulfonamide	Dyes, pharmaceuticals	No. None of these processes are present at the Mill.	NA	None identified.
6-Chloro-3-nitro benzene sulfonic acid sodium salt	Dyes, pharmaceuticals	No. None of these processes are present at the Mill.	NA	None identified.
4-Chloro-3-nitro benzoic trifluoride	Dyes, synthesis of agricultural chemicals, pharmaceuticals.	No. None of these processes are present at the Mill.	NA	None identified.
4 Chloro -2 nitrophenol	Dyes, synthesis of amino chlorophenols	No. None of these processes are present at the Mill.	NA	None identified.

Table 2 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 Sources[5]
Chromium nitrate/chromic nitrate	Catalyst, corrosion inhibitor.	No. No catalysts used. No chrome-based inhibitors used.	NA	None identified.
Di-isocyanates	Sythesis of urethane plastics and foams, cross-linking agent for nylon.	No. None of these processes are present at the Mill.	NA	None identified.
Dinitrogen tetroxide	Primarily sythesized as hydrazine oxidizer in rocket fuels.	No. None of these processes are present at the Mill.	NA	None identified.
Ferric nitrate	Dyes, tanning, analytical chemistry.	No. None of these processes are present at the Mill.	NA	None identified.
Lithium nitrate	Ceramics, pyrotechnics, salt baths, refrigeration, heat exchange media, rocket propellant.	No. No refrigeration fluids or heat exchange salts used at Mill. No other uses at Mill.	NA	None identified.
Magnesium nitrate	Pyrotechnics, synthesis of concentrated nitric acid.	No. None of these processes are present at the Mill.	NA	None identified.
Manganous nitrate	Ceramics, catalyst, chemical intermediate.	No. None of these processes are present at the Mill.	NA	None identified.
Nitric acid	Manufacture of ammonium nitrate fertilizer, explosives, dyes, drugs, cellulose nitrate, photoengraving, etching steel, ore flotation, urethanes, rubber, spent nuclear fuel.	No. Leach circuit is based on sulfuric acid, no nitric used. No ore flotation conducted at mill. No spent fuel reprocessing is conducted at the Mill. No other processes are present at the Mill.	NA	None identified.
Strontium nitrate	Oxidizer, pyrotechnics, railroad flares, matches, marine signals.	No. None of these processes are present at the Mill.	NA	None identified.
Thallium Nitrate	Analysis, green pyrotechnics	No. None of these processes are present at the Mill.	NA	None identified.
Silver nitrate AgNO3	Photofilm, ethylene oxide catalyst, inks, silverplating, mirrors, germicide (wall spray), dyes, antiseptic, wound cauterization, lab reagent.	No. None of these processes are present at the Mill.	NA	None identified.
Silver nitrite AgNO2	Alcohol synthesis, preparation of oliphatic nitrogen compounds, standards for water anlaysis.	No. None of these processes are present at the Mill.	NA	None identified.
Nitroacetanilide $NO_2C_6H_4NHCOCH_3$	Manufacture of nitroaniline.	No. None of these processes are present at the Mill.	NA	None identified.
p-Nitro o-aminophenol $O_2NC_6H_4NH_2$	Dyes.	No. None of these processes are present at the Mill.	NA	None identified.

Table 2 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 Sources[5]
m-Nitroaniline	Dye intermediate.	No. None of these processes are present at the Mill.	NA	None identified.
o-Nitroaniline	Dye, synthesis of phtographic antifog, coccidiostats, o-phenylenediamine	No. None of these processes are present at the Mill.	NA	None identified.
p-Nitroaniline	Dye intermediate, corrosion inhibitors, gasoline gum inhibitors, antioxidants.	No. None of these processes are present at the Mill.	NA	None identified.
o-nitroanisole $C_6H_4OCH_3NO_2$	Dyes, pharmaceuticals.	No. None of these processes are present at the Mill.	NA	None identified.
p-nitroanisole $C_6H_4OCH_3NO_2$	Dyes.	No. None of these processes are present at the Mill.	NA	None identified.
Nitrobenzaldehyde	Dyes, pharmaceuticals, surface active agents (surfactants), mosquito repellant, vapor phase corrosion inhibitor.	No. None of these processes are present at the Mill.	Yes.	None identified.
Nitrobenzene $C_6H_5NO_2$	Manufacture of aniline, cellulose eteher solvent, cellulose acetate, metal polish, shoe plish, manufacture of benzidine, quinoline.	No. None of these processes are present at the Mill.	NA	None identified.
Nitorbenzene azo resorcinol	Determination of magnesium.	No. None of these processes are present at the Mill.	NA	None identified.
m-Nitrobenzene sulfonic acid	Organic synthesis, anti-reduction agent.	No. None of these processes are present at the Mill.	NA	None identified.
6-Nitrobenzimide azole	Photo antifogging agent.	No. None of these processes are present at the Mill.	NA	None identified.
Nitrobenzoic acid $C_6H_4(NO_2)COOH$	Dyes, reagent for alkaloids, organic synthesis.	No. None of these processes are present at the Mill.	NA	None identified.
m-Nitrobenzoyl chloride	Dyes, photochemicals, pharmaceuticals.	No. None of these processes are present at the Mill.	NA	None identified.
p-Nitrobenzyl chloride	Dyes, photochemicals, intermediate for procaine hydrochloride (novocaine).	No. None of these processes are present at the Mill.	NA	None identified.
p-Nitrobenzyl cyanide	Dyes, pharmaceuticals, syntheis of p-nitro phenyl acetic acid	No. None of these processes are present at the Mill.	NA	None identified.
Nitrobromoform (bromo picrin)	Military poison, organic synthesis	No. None of these processes are present at the Mill.	NA	None identified.
2-Nitro, 1-butanol	Organic synthesis	No. None of these processes are present at the Mill.	NA	None identified.
Nitro carbon nitrate	Strong oxidizer.	No. Not used at Mill.	NA	None identified.

Table 2 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 Sources[5]
Nitro chlorobenzene (Chloro nitrobenzene)	Dyes, parathion manufacture, agricultural chemicals, rubber chemicals.	No. None of these processes are present at the Mill.	NA	None identified.
2-Nitro p-cresol	Chemical synthesis intermediate.	No. None of these processes are present at the Mill.	NA	None identified.
o-Nitro diphenylamine	Chemical synthesis intermediate; stabilizer for nitrogylcerine.	No. None of these processes are present at the Mill.	NA	None identified.
Nitroethane	Solvent for nitrocellulose, cellulose acetate, dyes, vinyl and alkyd resins, waxes, fats. Used as fuel additive.	No. None of these processes are present at the Mill.	NA	None identified.
2-Nitro-2-ethyl-1,3-propanediol	Organic synthesis.	No. None of these processes are present at the Mill.	NA	None identified.
Nitrous oxide (N_2O or laughing gas)	Anaesthetic	No. None of these processes are present at the Mill.	NA	None identified.
Picramic acid	Azo dye synthesis, reagent for aluminum	No. None of these processes are present at the Mill.	NA	None identified.
Picric acid	Explosives, matches,electric batteries, etching of copper, textile dyeing.	No. None of these processes are present at the Mill.	NA	None identified.
Picrolinic acid	Analytical chemistry for estimation of calcium, identification of alkaloids	No. None of these processes are present at the Mill.	NA	None identified.
Picrotoxin	Medicine fomulations	No. None of these processes are present at the Mill.	NA	None identified.
Picryl chloride	Explosives	No. This type of explosive is not used in mining.	NA	None identified.
Sodium Azide	Air bag explosive anisters, preservative for diagnostic medicines, intermediate in explosive manufacture.	No. None of these processes are present at the Mill.	NA	None identified.
Toluene diamines	Chain extender and cross linker, sythesis of dyes, polymers,polyurethanes.	No. None of these processes are present at the Mill.	NA	None identified.
Toluidines (amino toluenes)	lignin, reagent for nitrite, vulcanization accelerator.	No. None of these processes are present at the Mill.	NA	None identified.
Zirconium nitrate $Zr(NO_3)_2 \cdot 5H_2O$	Preservative.	No. None of these processes are present at the Mill.	NA	None identified.
Zirconium nitride ZrN	Crucibles, cermets, refractories.	No. None of these processes are present at the Mill.	NA	None identified.

Table 2 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 Sources[5]

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.

Table 2 Nitrogen Compound Sources

Chloride Compounds and Classes [1,2,3]	Uses[2,3]	Present on Mill Site[4]	Present Near Mill Site	Potential Off Site Sources[5]
chloramines	Dye intermediates, disinfectant, oxidizer,	Yes	Yes	As disinfectant in drining water and wastewater treatment plants
chlorates and perchlorates	pulp bleaching, synthesis of solid rocket propellants, herbicides, defoliants, 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.
chlorine	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, drinking water, and wastewater treatment.	Yes	Possibly	As disinfectant in drining water 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.
chlorophenols and derivatives	Organic synthesis intermediate, dyes, drugs, alcohol denaturants, antiseptics, solvents, insecticides, fungicides	No	No	NA
chlorosulfo compounds (inorganic and organic)	Detergents, phamaceuticals, intermediates, pesticides, ion exchange resins, smoke-prodcuing chemicals, anhydrous HCl synthesis, rubber-based plastics, rayon, solvents, dehydrating agent, acrylation reactions, chemical	No	No	NA

Table 2 Nitrogen Compound Sources

Chloride Compounds and Classes [1,2,3]	**Uses[2,3]**	**Present on Mill Site[4]**	**Present Near Mill 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

Table 2 Nitrogen Compound Sources

Chloride Compounds and Classes [1,2,3]	**Uses[2,3]**	**Present on Mill Site[4]**	**Present Near Mill Site**	**Potential Off Site Sources[5]**
other inorganic chemical production	metal chlorides for catalyst use, acids, plating solutions, printing inks, mirror coatings, ceramic colors.	No	No	NA
ethylene dichloride	ethylene oxide and propylene oxide production	No	No	NA
other chlorinated alkane hydrocarbons	epoxies, flame resistant olefins, synthetic caffeine, photography, antifreezes, perfumes.	No	No	NA
chlorine, chlorine dioxide and other bleaching agents in paper production	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	Hydroxylamine sulfate	
Ammonium acetate	Methyl red	
Ammonium chloride	Methylene blue	
Ammonium hydroxide	Monoethanolamine	
Ammonium iodide	Naphthy, N-(1-naphthy) ethylene-diamine dihydrochloride	
Ammonium meta-vanadate	Nitrazine yellow	
Ammonium molybdate	Nitric acid	
Ammonium nitrate	Nitro-benzene	
Ammonium oxalate, monohydrate	Phenanthroline, 1, 10	
Ammonium persulfate	Phenanthroline, 1, 10 ferrous sulfate	
Ammonium phosphate, dibasic	Phenanthroline, 1, 10 monohydrate	
Ammonium phosphate, monobasic	Phenyl benzohy, N-phenylbenohy-droxamic acid	
Ammonium pyrolidine, dithiocarbamate	Potassium cyanide	
Ammonium sulfate	Potassium nitrate	
Ammonium thiocyanate	Potassium nitrite	
Ammonium vanadate	Potassium thiocyanate	
Ammonium chloride	Primene, JM-T	solvent
Barbituric acid	Pyridine	
Brucine sulfate	Quinoline	
Cobalt nitrate	Hydroxyquinoline	
Cupferron	Rhodamine	
Cyclohexanedintrilotetraacetic acid	Silver nitrate	
Diphenylamine sulfonic acid sodium salt	Sodium ammonium phosphate	
Diphenyl, 1,3-diphenyl-1,3-propanedione	Sodium cyanide	
Dipyridyl a	Sodiumnitrate	
Disodium ethylenediamine tetraacetate	Sodium nitrite	
EDTA	Sodium thiocyante	
Ethylenedinitrilo tetraacetic acid disodium salt	Sulfanilamide	
Ethyl, 1-ethyl-2-[(1,4 dimethyl-2-phenyl-6-pyrimidinylidene)-methyl] quinolone chloride	Sulfanilic acid	
Ferric ammonium sulfate	Thallic nitrate	
Hydrazine sulfate	Tris (hydroxymethyl) aminomethane	
Hydroxyquinolone	Thorin	thorium determination
Hydroxylamine hydrochloride	Urea	

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 (HCl solution)

Table 3d Chlorine Compounds in Laboratory Inventory

Ammonium chloride

Ethyl, 1-ethyl-2-[(1,4 dimethyl-2-phenyl-6-pyrimidinylidene)-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					
15-Mar-00	5520					
15-Mar-00	5430					
2-Sep-00	5420				9.63	
30-Nov-00	6470				9.37	
29-Mar-01	4360				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				8.21	
12-Sep-02	6000				8.45	
24-Nov-02	2500				8.1	
28-Mar-03	2000				8.3	
30-Apr-03	3300				NA	
30-May-03	3400				8.2	
23-Jun-03	4300				8.2	
30-Jul-03	3600				8.1	
29-Aug-03	4100				8.4	
12-Sep-03	3500				8.5	
15-Oct-03	3800				8.1	
8-Nov-03	3800				8.0	
29-Mar-04	NA				NA	
22-Jun-04	NA				NA	
17-Sep-04	3300				6.71	
17-Nov-04	4300				7.5	
16-Mar-05	2900				6.3	
25-May-05	3170				7.1	
31-Aug-05	3500				7.0	
1-Dec-05	3000				7.0	
9-Mar-06	3100				6.0	
14-Jun-06	3000				6.0	
20-Jul-06	2820				1.2	
9-Nov-06	2830				6.4	
15-Aug-07	2600				6.2	
10-Oct-07	2300				6.2	
26-Mar-08	2400				5.8	
25-Jun-08	2500				6.09	
10-Sep-08	1800				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	
29-Mar-04					NA	
22-Jun-04					NA	
17-Sep-04	3300				6.83	

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

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					
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	
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					
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

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				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-Feb-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

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				13.4	
24-Nov-02	3800				12.6	
28-Mar-03	3300				13.4	
23-Jun-03	3600				12.8	
12-Sep-03	2900				12.3	
8-Nov-03	3500				12.3	
29-Mar-04	3200				12.2	
22-Jun-04	3500				12.1	
17-Sep-04	3100				11.1	
17-Nov-04	3600				10.8	
16-Mar-05	3100				11.6	
25-May-05	2400				10	
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

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					
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

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

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					
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

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				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				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				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

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					
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				0.8	
31-Aug-05	110				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

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				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

TW4-13	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (ug/l)	Methylene Chloride (ug/l)	Nitrate (mg/l)	Chloride (mg/l)
12-Sep-02	ND				ND	
24-Nov-02	ND				ND	
28-Mar-03	ND				0.2	
23-Jun-03	ND				0.2	
12-Sep-03	ND				ND	
9-Nov-03	ND				0.9	
29-Mar-04	ND				0.12	
22-Jun-04	ND				0.17	
17-Sep-04	ND				4.43	
17-Nov-04	ND				4.7	
16-Mar-05	ND				4.2	
25-May-05	ND				4.3	
31-Aug-05	ND	<1	3.1	<1	4.6	
1-Dec-05	ND	<1	<1	<1	4.3	
9-Mar-06	ND	<1	1.7	<1	4.2	67
14-Jun-06	ND	<1	1.4	<1	4.9	66
20-Jul-06	ND	<1	<1	<1	4.3	65
8-Nov-06	ND	<1	<1	<1	0.8	33
28-Feb-07	ND	<1	<1	<1	4	59
27-Jun-07	ND	<1	<1	<1	4.6	59
15-Aug-07	ND	<1	<1	<1	4.4	58
10-Oct-07	ND	<1	<1	<1	4.1	58
26-Mar-08	ND	<1	<1	<1	3.8	54
25-Jun-08	ND	<1	<1	<1	4.24	58
10-Sep-08	ND	<1	<1	<1	4.26	50
15-Oct-08	ND	<1	<1	<1	4.63	58
4-Mar-09	ND	<1	<1	<1	3.7	58
24-Jun-09	ND	<1	<1	<1	1.2	57
15-Sep-09	ND	<1	<1	<1	4.7	63

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

TW4-15	Chloroform (ug/l)	Carbon tetrachloride (ug/l)	Chloromethane (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

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				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

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				12.2	
17-Sep-04	38				14.5	
17-Nov-04	51				17.3	
16-Mar-05	38				14.1	
25-May-05	29.8				12.9	
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

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				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

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

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

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

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

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

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

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

Monitoring Event	Monitor Well											
	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

TABLE A: Chloride and Nitrate in On Site Wells 4th Quarter 2009

PT_NAME	SDATE	Report	Chloride	Nitrate	
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	58	0.1	U
MW-19	10/19/2009	C09100882	25	2.2	
MW-20	10/28/2009	C09101105	71	6.2	
MW-21					
MW-22	10/27/2009	C09101105	67	3.8	
MW-23	10/20/2009	C09100882	8	0.1	
MW-24	10/28/2009	C09101105	46	0.1	
MW-25	10/13/2009	C09100623	34	0.1	U
MW-26	10/13/2009	C09100623	58	0.1	
MW-27	10/12/2009	C09100623	44	5.2	
MW-28	10/12/2009	C09100623	104	0.1	
MW-29	10/26/2009	C09101105	35	0.1	U
MW-30	10/14/2009	C09100623	129	15	
MW-31	10/14/2009	C09100623	138	22.6	D
MW-32	10/14/2009	C09100623	32	0.1	U
PIEZ-1	10/27/2009	C09101104	61	7.4	
PIEZ-2	10/27/2009	C09101104	7	0.6	
PIEZ-3	10/27/2009	C09101104	19	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	618	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

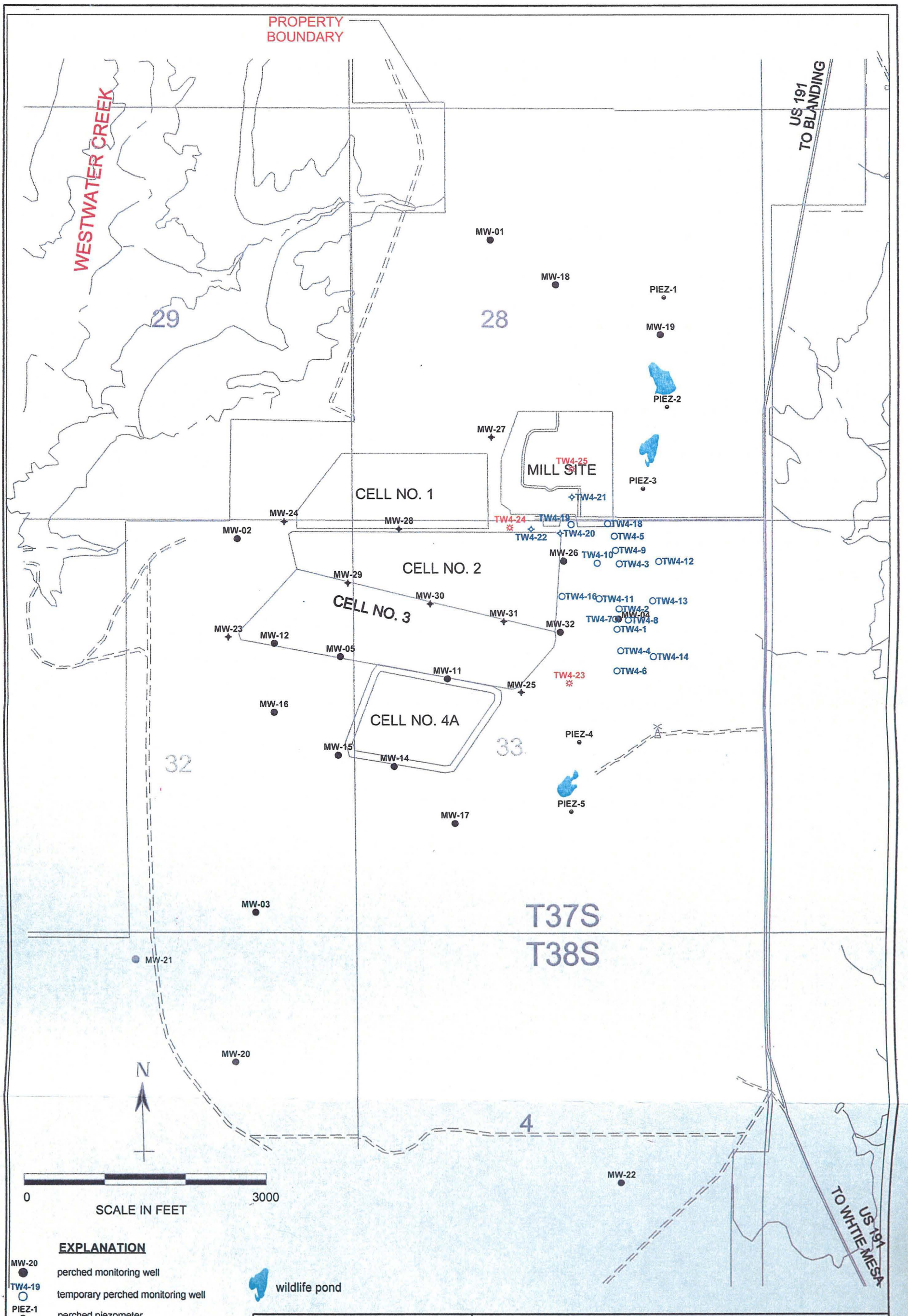
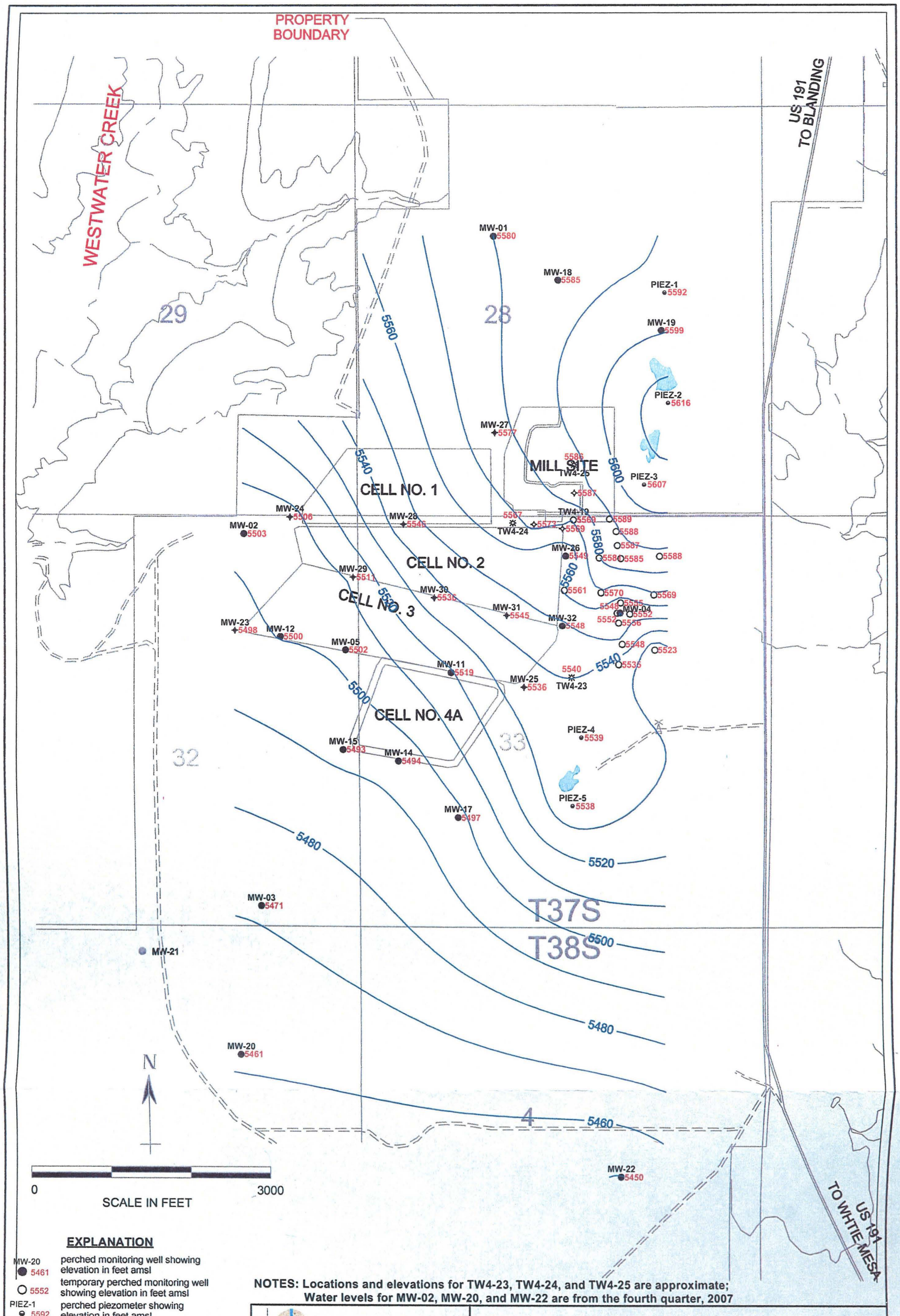

PROPERTY BOUNDARY
WESTWATER CREEK
US 191 TO BLANDING
US 191 TO WHITE MESA
29
28
32
33
4
T37S
T38S
MW-01
MW-18
PIEZ-1
MW-19
PIEZ-2
PIEZ-3
PIEZ-4
PIEZ-5
MW-27
MILL SITE
TW4-25
TW4-21
CELL NO. 1
MW-24
MW-28
TW4-24
TW4-19
TW4-22
TW4-20
OTW4-18
OTW4-5
MW-02
MW-26
TW4-10
OTW4-9
OTW4-3
OTW4-12
CELL NO. 2
MW-29
MW-30
OTW4-16
OTW4-11
OTW4-13
OTW4-2
CELL NO. 3
MW-31
MW-04
TW4-7
OTW4-8
OTW4-1
MW-23
MW-12
MW-32
MW-05
OTW4-4
OTW4-14
MW-11
OTW4-6
TW4-23
MW-25
MW-16
CELL NO. 4A
MW-15
MW-14
MW-17
MW-03
MW-21
MW-20
MW-22
N
0
3000
SCALE IN FEET
EXPLANATION
MW-20 perched monitoring well
TW4-19 temporary perched monitoring well
PIEZ-1 perched piezometer
MW-31 perched monitoring well installed April, 2005
TW4-20 temporary perched monitoring well installed April,2005
TW4-23 new temporary perched monitoring well installed May,2007 (locations approximate)
wildlife pond
HYDRO GEO CHEM, INC.
SITE PLAN AND PERCHED WELL LOCATIONS WHITE MESA SITE
APPROVED SJS
DATE 5/28/08
REFERENCE H:/718000/may08/welloc.srf
FIGURE 1

FIGURE 1



EXPLANATION

MW-20 ● 5461	perched monitoring well showing elevation in feet amsl
○ 5552	temporary perched monitoring well showing elevation in feet amsl
PIEZ-1 ◒ 5592	perched piezometer showing elevation in feet amsl
MW-31 ✦ 5545	perched monitoring well installed April, 2005 showing elevation in feet amsl
✧ 5573	temporary perched monitoring well installed April, 2005 showing elevation in feet amsl
✲ 5540	temporary perched monitoring well installed May, 2007 showing approximate elevation in feet amsl

NOTES: Locations and elevations for TW4-23, TW4-24, and TW4-25 are approximate; Water levels for MW-02, MW-20, and MW-22 are from the fourth quarter, 2007

HYDRO GEO CHEM, INC.

KRIGED 1st QUARTER, 2008 WATER LEVELS WHITE MESA SITE

APPROVED	DATE	REFERENCE	FIGURE
SJS	5/28/08	H:/718000/may08/wl0308.srf	2

FIGURE 2

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

N
S

Legend

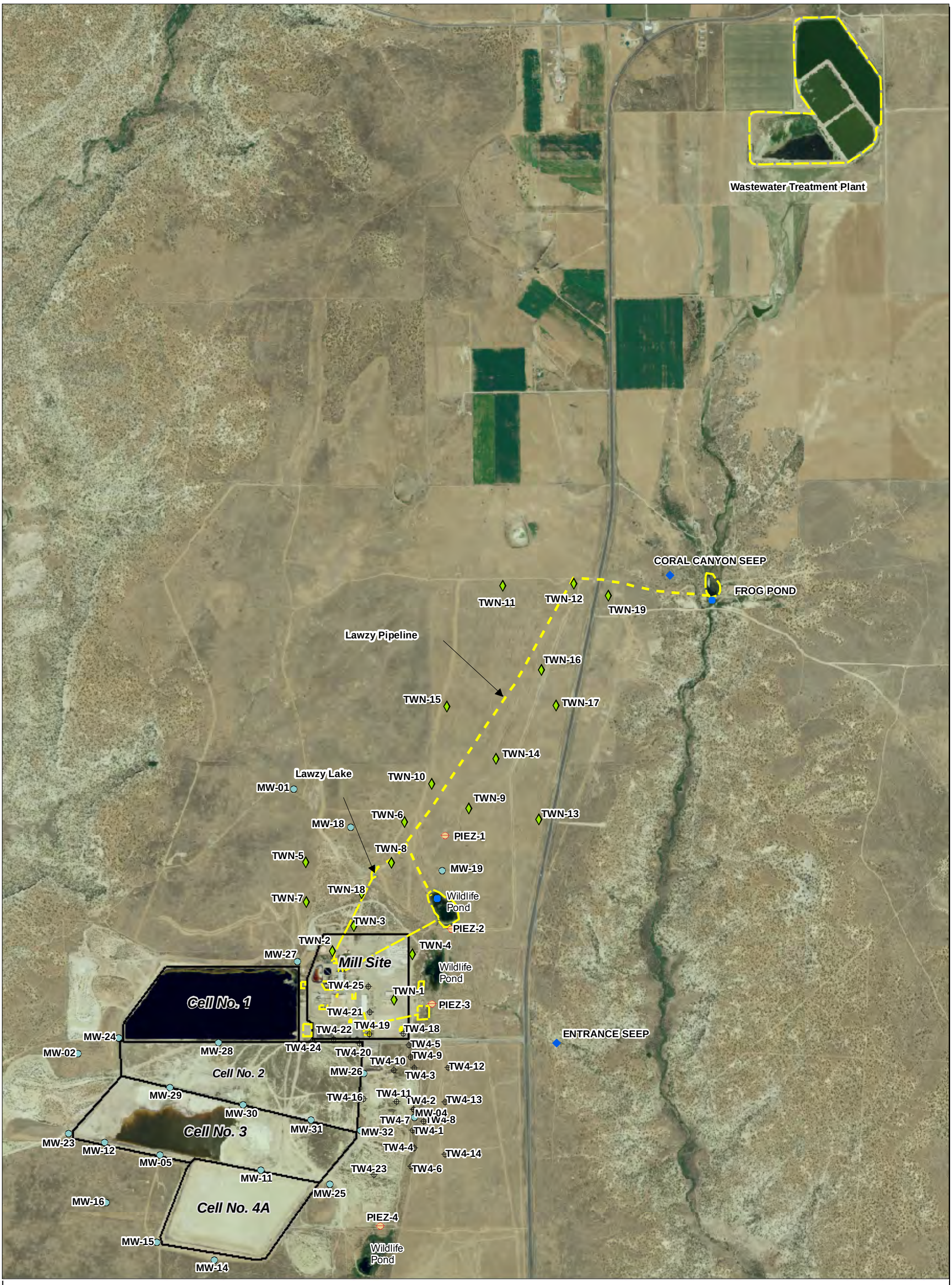
- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Potential Nitrate and Chloride Sources
- Lawzy Pipeline
- Lawzy Lake

250 125 0 250
Feet

Figure 3
Potential Nitrate and Chloride Sources at the Mill Site

INTERA

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



N
S

Legend

- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Possible Nitrate and Chloride Sources
- Lawzy Pipeline
- Lawzy Lake

1,300 650 0 1,300
Feet

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

Figure 4
Possible Sources of Nitrate and Chloride in the Vicinity of the Mill

INTERA

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

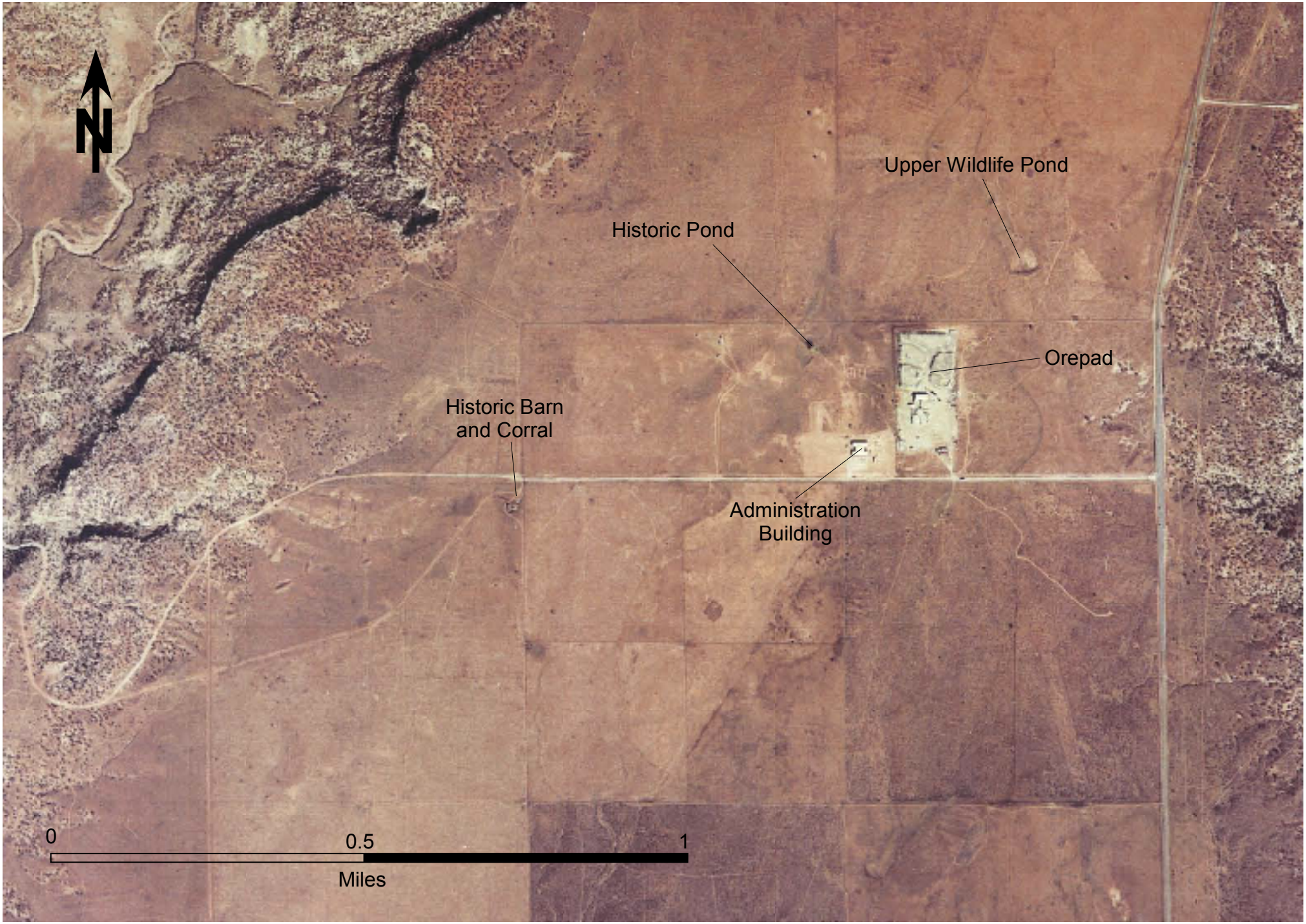


Figure 5
Historic Aerial Photograph (circa.~1979)
White Mesa Mill Site

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.

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

TABLE OF CONTENTS

Appendices

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, in accordance with specific requirements 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-of-custody records, packing lists) is correct and transmitting that information, along with the samples, to the Analytical Laboratory in accordance with this Plan;

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

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

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

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

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:

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

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):

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

Where:

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

3.3. Representativeness

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

3.4. Completeness

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

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

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

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

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.

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:

- Dedicated Bailer: 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.
- Non – Dedicated Bailer: A bailer that is used for purging and sampling at one or more well.
- Dedicated Pump: 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.
- Non – Dedicated Pump: 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 ≤ 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;

l) 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);

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

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

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

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

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

e) Purging, Where Use of Pump is Not Effective

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

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

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

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

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

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

(vi) Take field measurements referred to in paragraph 6.2.7 (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 HNO_3
    - 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

- 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) Blanks

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) Field Samples/Surrogate Compounds

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) Check Sample

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)

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	≤ 6°C
Nitrate & Nitrite (as N)	E353.2	0.1 mg/L	28 days	H_2SO_4 to pH<2	≤ 6°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	≤ 6°C
Benzene	SW8260B	1.0 µg/L	14 days	HCl to pH<2	≤ 6°C
2-Butanone	SW8260B	20 µg/L	14 days	HCl to pH<2	≤ 6°C

Contaminant	Analytical Methods to be Used	Reporting Limit[1]	Maximum Holding Times	Sample Preservation Requirements	Sample Temperature Requirements
(MEK)					
Carbon Tetrachloride	SW8260B	1.0 µg/L	14 days	HCl to pH<2	≤ 6°C
Chloroform	SW8260B	1.0 µg/L	14 days	HCl to pH<2	≤ 6°C
Chloromethane	SW8260B	1.0 µg/L	14 days	HCl to pH<2	≤ 6°C
Dichloromethane (Methylene Chloride)	SW8260B	1.0 µg/L	14 days	HCl to pH<2	≤ 6°C
Naphthalene	SW8260B	1.0 µg/L	14 days	HCl to pH<2	≤ 6°C
Tetrahydrofuran	SW8260B	1.0 µg/L	14 days	HCl to pH<2	≤ 6°C
Toluene	SW8260B	1.0 µg/L	14 days	HCl to pH<2	≤ 6°C
Xylenes (total)	SW8260B	1.0 µg/L	14 days	HCl to pH<2	≤ 6°C
Others					
Field pH (S.U.)	A4500-H B	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	≤ 6°C
General Inorganics					
Chloride	A4500-Cl B	1 mg/L	28 days	None	None
Sulfate	A4500-SO4 E	1 mg/L	28 days	None	≤ 6°C
Carbonate as CO3	A2320 B	1 mg/L	14 days	None	≤ 6°C
Bicarbonate as HCO3	A2320 B	1 mg/L	14 days	None	≤ 6°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:

a) Relative Percent Difference.

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

b) Radiologics Counting Error Term

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 trhe 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) Radiologics, 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 $\geq$ 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.

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) Reporting Limit (RL) Comparisons

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

c) Holding Time Examination

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

d) Sample Temperature Examination

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

9.4. Analytical Data

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

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

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 Ground-water 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.

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

Description of Sampling Event:_____

Location (well name)_____ Sampler Name and initials_____

Date and Time for Purging _____and Sampling (if different)_____

Well Purging Equip Used: __pump or __bailer Well Pump (if other than Bennet)_____

Sampling Event_____ Prev. Well Sampled in Sampling Event_____

pH Buffer 7.0_____ pH Buffer 4.0_____

Specific Conductance _____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._____ Ext'l 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)_____

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	**Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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
- 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

Note: 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) Laboratory Requirements

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	$\leq 6^oC$
Carbon Tetrachloride	SW8260B	1.0 µg/L	14 days	HCl to pH<2	$\leq 6^oC$
Chloroform	SW8260B	1.0 µg/L	14 days	HCl to pH<2	$\leq 6^oC$
Dichloromethane (Methylene Chloride)	SW8260B	1.0 µg/L	14 days	HCl to pH<2	$\leq 6^oC$
Chloromethane	SW8260B	1.0 µg/L	14 days	HCl to pH<2	$\leq 6^oC$
Inorganic Chloride	A4500-CI B	1 mg/L	28 days	None	$\leq 6^oC$

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
-

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:

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
- 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

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 Constituents Monitored

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 Well Purging and Depth to Groundwater

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 Well Sampling

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 H_2SO_4; 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 Copy of Laboratory Results

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 Electronic Data Files and Format (Tab G)

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 Analytical Laboratory QA/QC Procedures

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 Mill QA Manager Review

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:

Field Parameter Evaluation Table

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 Vol.-Stable Conditions not determined
TWN-2	2-6-09	Purge data not recorded	No	Only one set Parameters	Purge Vol.-Stable 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 Vol.-Stable 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 Vol.-Stable Conditions not determined
TWN-3	7-21-09	81.6 gal pumped 82 required	No	Only one set Parameters	Purge Vol.-Stable Conditions not determined

Location	Date	Field Sheet Note of Interest	2 X Casing Vol.?	Field Parameters within 10%?	QA Exception
TWN-4	7-21-09	Purge volume sufficient	Yes	Only one set Parameters	Stable Conditions not determined
TWN-5	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge Vol.- Stable Conditions not determined
TWN-6	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge Vol.-Stable Conditions not determined
TWN-7	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge Vol.-Stable Conditions not determined
TWN-8	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge Vol.-Stable Conditions not determined
TWN-9	8-27-09	Initial Test- Purge volume Unknown	No	Only one set Parameters	Purge Vol.-Stable Conditions not 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 Vol.-Stable Conditions not determined
TWN-2	9-22-09	102 gal pumped 103 required	No	Only one set Parameters	Purge Vol.-Stable Conditions not determined
TWN-3	9-22-09	Purge volume sufficient	Yes	Only one set Parameters	Stable Conditions not determined
TWN-4	9-22-09	114 gal pumped 115.44 required	No	Only one set Parameters	Purge Vol.-Stable Conditions not determined
TWN-5	9-22-09	102 gal pumped 103.6 required	No	Only one set Parameters	Purge Vol.-Stable 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 determined
TWN-8	9-22-09	108 gal pumped 108.54 required	No	Only one set Parameters	Purge Vol.-Stable Conditions not determined
TWN-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 Vol.-Stable Conditions not determined
TWN-1	10-28-09	Pumped for 14 minutes instead of 14.25 minutes	No	Only 1 Set of Parameters	Rounding Error Purge Vol.- Stable Conditions
TWN-2	10-28-09	Purge volume sufficient	Yes	4 Sets of Parameters	Conditions not stable for turbidity and turbidity exceeds 5 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. 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 Conditions for stability test not met for pH and Turbidity
TWN-6	11-3-09	Purge volume sufficient	Yes	4 Sets of Parameters	Conditions for stability test not met for Turbidity
TWN-7	11-10-09	18 gal pumped 19 gal required	No	4 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 Casing Vol.?	Field Parameters within 10%?	QA Exception
					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 4th 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

<u>July Event-Normal Sampling Event</u>
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

<u>September Event-Normal Sampling Event</u>
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.

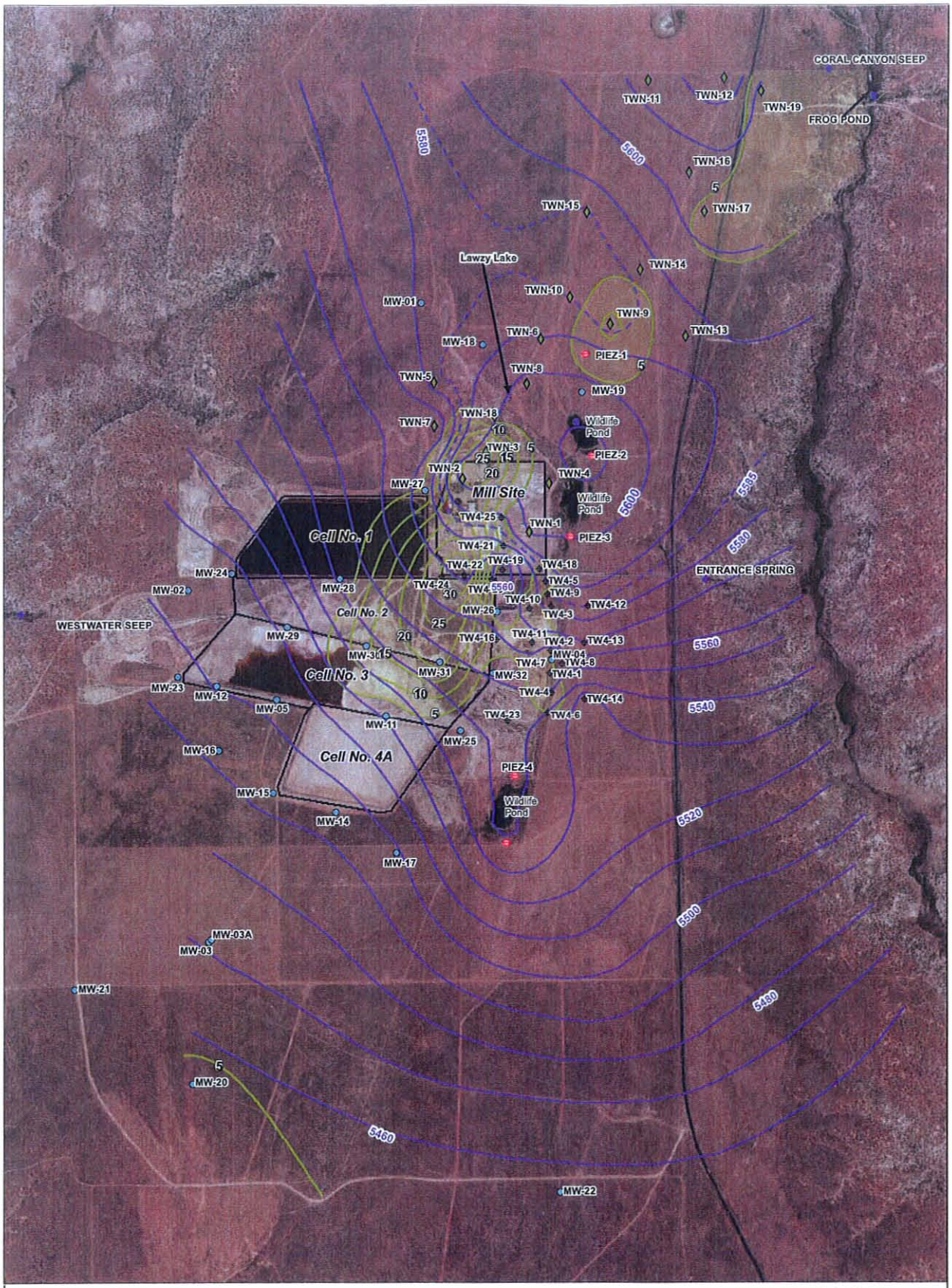
4.6 Implementing the corrective action and evaluating its effectiveness

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



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

N
S

1,200 600 0 1,200
Feet

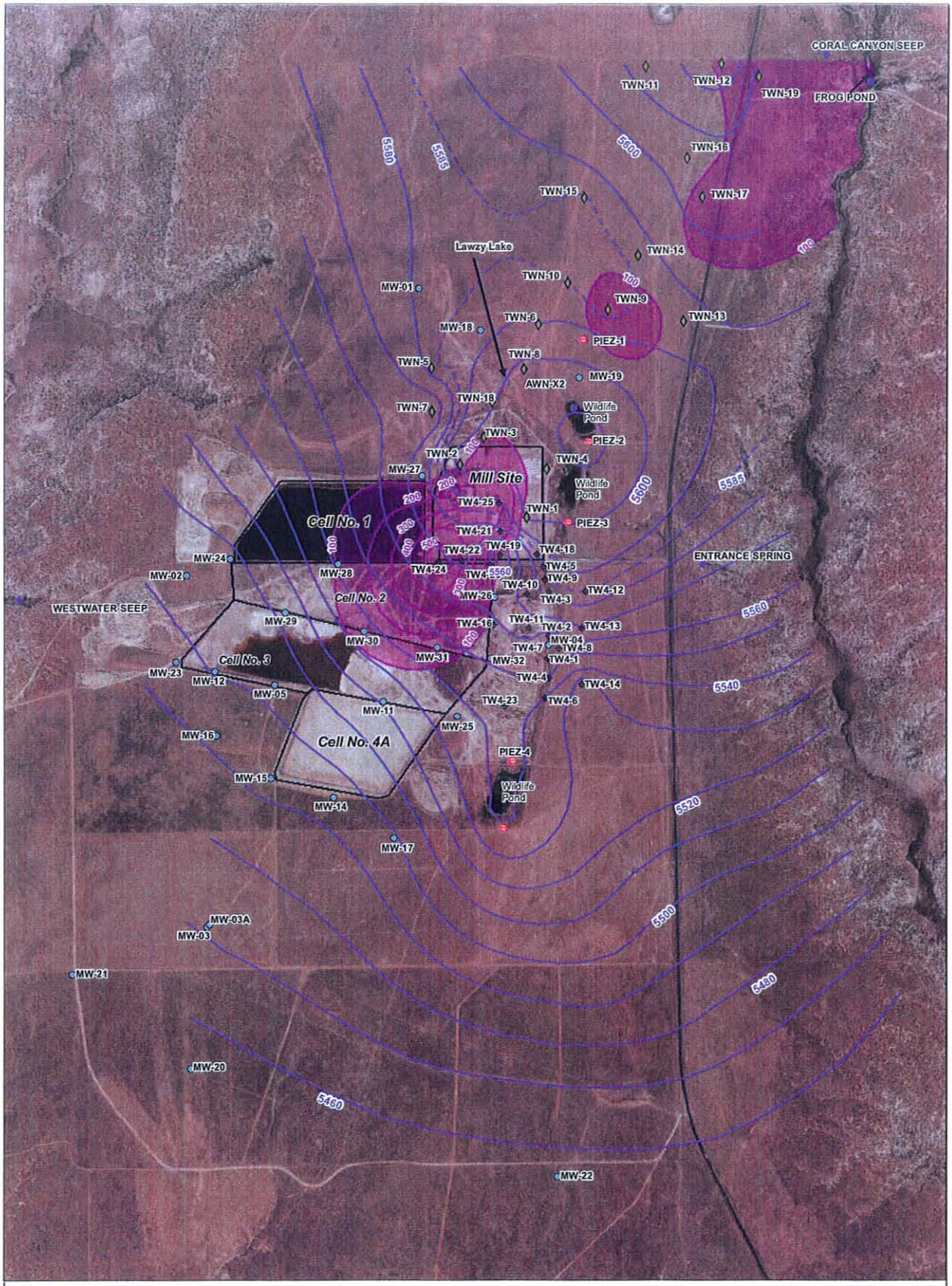
Legend

- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Nitrate Concentration (mg/L)
- Groundwater Elevation Contours 10Ft
- Groundwater Elevation Contours 5ft

Figure 3
Nitrate Concentrations with Groundwater Elevations

INTERA

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



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

N
S

1,200 600 0 1,200
Feet

Legend

- Monitoring Well
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Chloride Concentration (mg/L)
- Groundwater Elevation Contours 10Ft
- Groundwater Elevation Contours 5ft

Figure 4
Chloride Concentrations with Groundwater Elevations

INTERA

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

Tab B

February Sampling Event

also Exp 1

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

Description of Sampling Event: Nitrate & chloride

Location (well name) TWN-1 Sampler Name and initials Tanner H. Ryan P.

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 N & C Prev. Well Sampled in Sampling Event TWN-3

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

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

Weather Cond. Ext'l Amb. Temp.(prior to sampling event) 18°C

Time: Gal. Purged	Time: Gal. Purged
Conductance 732.1	Conductance
pH 7.62	pH
Temperature 14.48	Temperature
Redox Potential (Eh) 405	Redox Potential (Eh)
Turbidity 7 100	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity ___ Turbidity ___

Volume of Water Purged When Field Parameters are Measured ___

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 11 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 ___

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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 Arrive at 0930. Purge Began at 0931 Ended at 0942. Field Parameters Taken. Return Later to Sample left 0944.

47.71 Int
61.20 End Purge

Arrive to Sample at 1250. Took Depth and then Sample. Samples taken at 1305. left Site at 1314.

48.10 Sample 1305

ug = .3
paper = 1.5
Kit = 3.0

also Exp 2

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

Description of Sampling Event: Nitrate & chloride

Location (well name) TWN-2 Sampler Name and initials Tanner H. Ryan P.

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 N & C Prev. Well Sampled in Sampling Event TWN-4

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 95 90 FT

Depth to Water Before Purging 15.32 Casing Volume (V) 4" Well: 48.76 (.653h)
3" Well: — (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear, Breeze, Sunny, WARM Ext'l Amb. Temp.(prior to sampling event) 21°C

Time: 1054 Gal. Purged 84	Time: Gal. Purged
Conductance 3685	Conductance
pH 6.65	pH
Temperature 13.76	Temperature
Redox Potential (Eh) 404	Redox Potential (Eh)
Turbidity 88.9	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity — Turbidity —

Volume of Water Purged When Field Parameters are Measured —

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_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 Arrive at 1037. Purge Began at 1040 Purge 16min took one Set of parameters. Purge Ended at 1056. left site at 1059.
Arrived to Sample at 1312. Took Depth & then pulled Samples at 1320. left Site at 1326.

15.32 Depth
16.75 End purge.
Sample
16.21 1320

paper — 2 ≥ 20
11-4 5.9 6.2

Also
Exp 3

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-3 Sampler Name and initials Tanner H. Ryan P

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 N & C Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 110 90 FT ?

Depth to Water Before Purging 30.73 Casing Volume (V) 4" Well: 51.76 (.653h)
3" Well: _____ (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Overcast, Cold Ext'l Amb. Temp.(prior to sampling event) 18°C

TWN-1
TWN-2
TWN-3
TWN-4

Time: 0915 Gal. Purged 42	Time: _____ Gal. Purged _____
Conductance 2261	Conductance _____
pH 7.24	pH _____
Temperature 13.59	Temperature _____
Redox Potential (Eh) 446	Redox Potential (Eh) _____
Turbidity 112	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

Turbidity_____ Turbidity_____

Volume of Water Purged When Field Parameters are Measured_____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 13 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_____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) _____ _____ _____	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

0925 purge End.
96.8
56.19 1230

Comments Arrive at 0903. Purge Began at 0907 Purged 13 min. purge Ended at 0920. 1 Set of parameters Taken. left site. Pumped dry Right at 13 min!

Arrived to Sample at 1226 Depth Taken & Sample pulled at 1237. left site at 1240.

paper = 18

Vol - Gal 1.5

Also
Exp 4

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

Description of Sampling Event: Nitrate & chloride

Location (well name) TWN-4 Sampler Name and initials Tanner H. Ryan P.

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 N & C Prev. Well Sampled in Sampling Event TWN-3

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 136 115

Depth to Water Before Purging 40.40 Casing Volume (V) 4" Well: 48.71 (.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)

Time: 1006 Gal. Purged 36	Time: Gal. Purged
Conductance 997	Conductance
pH 7.46	pH
Temperature 14.29	Temperature
Redox Potential (Eh) 400	Redox Potential (Eh)
Days after Drilling → Turbidity 111	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity — Turbidity —

Volume of Water Purged When Field Parameters are Measured —

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

Time to evacuate two casing volumes (2V) T = 2V/Q = 16 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 —

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

40.40 Depth
41.25 End page

Comments Arrive 0954. Purge Began AT 0957 TOOK one Set of Parameters. Purge Ended at 1013. Samples Taken at 1020 Left Site 1035. Tanner H. & Ryan P. Present For Event.

paper – 1.5

Vist – Report Ready

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

Description of Sampling Event: Nitrate & chloride

Location (well name) ~~TWN~~ TWN-66 Sampler Name and initials Tanner H. Ryan P.

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) Grand Fos

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event NA

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)

Conductance (avg) — 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 _____
Conductance .6	Conductance _____
pH 6.22	pH _____
Temperature 13.09	Temperature _____
Redox Potential (Eh) 489	Redox Potential (Eh) _____
Turbidity 0.0	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

DJ

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify)	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

D.I.

Comments Arrived at 0835. Took parameters and tested for Nitrate with field Kit & Test Strip. After all this a Sample was collected from South D.I. Sink. Sample taken at 0848

Reagent = .3

D.I. = Zero out

paper Test = < 1

D T Blank

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

Description of Sampling Event: Nitrate + chloride

Location (well name) TWN-63 Sampler Name and initials Tanner H. Ryan P

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 chloride 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)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Partly cloudy, Cool Ext'l Amb. Temp.(prior to sampling event) 5° C

Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 0.1	Conductance _____
pH 5.28	pH _____
Temperature 6.87	Temperature _____
Redox Potential (Eh) 529	Redox Potential (Eh) _____
Turbidity 26	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

Turbidity_____ Turbidity_____

Volume of Water Purged When Field Parameters are Measured_____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_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 Arrived 0800 Ran Rinsate took one set parameters and Sampled. Samples taken at 0830. Finished at 0835.

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

Description of Sampling Event: Nitrate & chloride check

Location (well name) Piez 1 Sampler Name and initials Ryan Palmer

Date and Time for Purging 2.21.2009 and Sampling (if different)

Well Purging Equip Used: pump or X bailer Well Pump (if other than Bennet)

Sampling Event Exploration Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 948 uMHOS/cm Well Depth NA

Depth to Water Before Purging Casing Volume (V) 4" Well: NA (.653h)
3" Well: NA (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear, cool breeze Ext'l Amb. Temp.(prior to sampling event) 18° - Approx.

Time: Gal. Purged	Time: Gal. Purged
Conductance 2382	Conductance
pH 7.61	pH
Temperature 10.27	Temperature
Redox Potential (Eh) 374	Redox Potential (Eh)
Turbidity 103	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganics	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive at 0836, Ryan Palmer present For Sampling Event. 4" Diameter Bailer was used to Sample Well. One Set of parameters taken and the Samples pulled at 0848 left site at around 0906.

paper Read out = 3

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

Description of Sampling Event: Nitrate & chloride

Location (well name) Pier 2 Sampler Name and initials Ryan Palmer

Date and Time for Purging 2-21-09 and Sampling (if different) _____

Well Purging Equip Used: __pump or X bailer Well Pump (if other than Bennet) _____

Sampling Event Exploration Prev. Well Sampled in Sampling Event NA

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. clear, cool breeze Ext'l Amb. Temp.(prior to sampling event) 11° Approx

Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 536	Conductance _____
pH 8.93	pH _____
Temperature 10.14	Temperature _____
Redox Potential (Eh) 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) _____

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) G. Tragin	Y N	Sample volume ___	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: ___

Comments Arrive at 0805. Ryan Palmer present For Sampling Event. One Set of parameters were taken and the Samples were pulled at 0820. Left Site at 0830.

paper Read out = ND.

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

Description of Sampling Event: Nitrate & chloride

Location (well name) Piez 3 Sampler Name and initials Ryan Palmer

Date and Time for Purging 2.21.2009 and Sampling (if different) _____

Well Purging Equip Used: __pump or X bailer Well Pump (if other than Bennet) _____

Sampling Event Exploration Prev. Well Sampled in Sampling Event n/a

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance — 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. clear, bad breeze Ext'l Amb. Temp.(prior to sampling event) 10° Approx

Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 951	Conductance _____
pH 11.80	pH _____
Temperature 10.88	Temperature _____
Redox Potential (Eh) 303	Redox Potential (Eh) _____
Turbidity 5.86	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

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_____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive at 0720. Ryan Palmer present for Sampling Event a .46" Bailer was used for Sample purposes after Sample was taken Bailer was disposed of. One set of parameters were taken after which Samples were Collected at 0735. Left site at 0757.

Nitrate paper test = ND

July Sampling Event

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

Description of Sampling Event: Nitrate & chloride

Location (well name) TWN-1 Sampler Name and initials Tanner H. & 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 Fos

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event N/A 1st well

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 105

Depth to Water Before Purging 48.10 Casing Volume (V) 4" Well: 37.1537 (.653h)
3" Well: _____ (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Overcast Ext'l Amb. Temp. (prior to sampling event) 27.3°c

Time: 1009 Gal. Purged 36	Time: Gal. Purged
Conductance 752.1	Conductance
pH 6.84	pH
Temperature 17.74	Temperature
Redox Potential (Eh) 330	Redox Potential (Eh)
Turbidity 1.6	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity ____ Turbidity ____

Volume of Water Purged ~~When Field Parameters are Measured~~ 74 gallons

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 12.4 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 ____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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 Arrive at 0958 Tanner H & Ryan P present for purge & Sampling event. Purged well for 12 min. Purge Ended until [redacted] left site at 1016

Purge Began at 1000

Sample: Arrive at 1320 Bailer Used to Collect Sample
Sample was Collected at 1323

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-2 Sampler Name and initials Tanner H. & 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) Grundfos

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event TWN-1

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 95

Depth to Water Before Purging 16.06 Casing Volume (V) 4" Well: 51.54 (.653h)
3" Well: (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Overcast Ext'l Amb. Temp. (prior to sampling event) 26.6°C

Time: 1035 Gal. Purged 90	Time: Gal. Purged
Conductance 3105	Conductance
pH 6.91	pH
Temperature 15.75	Temperature
Redox Potential (Eh) 327	Redox Potential (Eh)
Turbidity 15.1	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity_____ Turbidity_____

Volume of Water Purged ~~When Field Parameters are Measured~~ 103

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
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_____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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 Arrive at 1018 Tanner H & Ryan P present for purge & sampling event. Purged well for 17 min. ~~[illegible]~~ ~~[illegible]~~ Purge Began at 1020
Purge Ended at 1037
left site 1040
Sample: Arrive at 1330 Samples taken at 1334

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-3 Sampler Name and initials Tanner H. & 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 Fos

Sampling Event Nitrate & chloride 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 95

Depth to Water Before Purging 32.13 Casing Volume (V) 4" Well: 4.054 (.653h)
3" Well: (.367h)

Conductance (avg) — pH of Water (avg)

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Overcast warm Ext'l Amb. Temp.(prior to sampling event) 31°C

Time: 1257 Gal. Purged 66	Time: Gal. Purged
Conductance 2697	Conductance
pH 6.91	pH
Temperature 15.72	Temperature
Redox Potential (Eh) 309	Redox Potential (Eh)
Turbidity 275	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity ____ Turbidity ____

Volume of Water Purged ~~When Field Parameters are Measured~~ 82

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 13.6

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 ____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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 Arrive at 1244 Tanner H & Ryan P present for purge & sampling event. Purged well for 13 min. Purge ended ~~[illegible]~~ at 1259 left site at 1302. Purged ~~well~~ Began at 1246

Sample: Arrive at 1350 Sample at: 1355

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-4 Sampler Name and initials Tanner H. & 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 Fos

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event N/A Rinsate #2 TWN-64

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 124.7

Depth to Water Before Purging 37.61 Casing Volume (V) 4" Well: 56.86 (.653h)
3" Well: _____ (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Overcast But Warm Ext'l Amb. Temp. (prior to sampling event) 31°C

Time: 1237 Gal. Purged 96 Time: _____ Gal. Purged _____

Conductance 984.3 Conductance _____

pH 6.73 pH _____

Temperature 15.46 Temperature _____

Redox Potential (Eh) 318 Redox Potential (Eh) _____

Turbidity 4.7 Turbidity _____

Time: _____ Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance _____ Conductance _____

pH _____ pH _____

Temperature _____ Temperature _____

Redox Potential (Eh) _____ Redox Potential (Eh) _____

Turbidity ✓ Turbidity ✓

Volume of Water Purged ~~When Field Parameters are Measured~~ 113

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 19 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 _____

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_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 Arrive at 1220 Tanner H & Ryan P present for purge & Sampling event. Purged well for 19 min. Purge Ended ~~[illegible]~~ ~~[illegible]~~ at 1240 left site at 1245 purge Began at 1221

Sample: Arrive at 1339 Sample at 1343

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-65 Sampler Name and initials Tanner H. & 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 Fos

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event TWN-4

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. _____ Ext'l 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) _____

Duplicate of TWN-4

Turbidity_____ Turbidity_____

Volume of Water Purged ~~When Field Parameters are Measured~~_____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) _____ _____ _____	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

Duplicate of TWN-4

Comments [redacted]

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-60 Sampler Name and initials Tanner H. & 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 Fos

Sampling Event Nitrate & Chloride 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. Overcast, Cooler Ext'l Amb. Temp. (prior to sampling event) 26.3°C

Time: ____ Gal. Purged ____	Time: ____ Gal. Purged ____
Conductance 4.8	Conductance ____
pH 7.02	pH ____
Temperature 25.56	Temperature ____
Redox Potential (Eh) 198	Redox Potential (Eh) ____
Turbidity 0	Turbidity ____
Time: ____ Gal. Purged ____	Time: ____ Gal. Purged ____
Conductance ____	Conductance ____
pH ____	pH ____
Temperature ____	Temperature ____
Redox Potential (Eh) ____	Redox Potential (Eh) ____

D.I. Blank

Turbidity_____ Turbidity_____

Volume of Water Purged ~~When Field Parameters are Measured~~_____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = =_____6_____

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_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 Arrive at 0915 Tanner H & Ryan P present for ~~[illegible]~~ Sampling event. ~~[illegible]~~ Samples were taken at 0930 left site at 0957

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-63 Sampler Name and initials Tanner H. & 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 Fos

Sampling Event Nitrate & chloride 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. Overcast Ext'l Amb. Temp.(prior to sampling event) 26.3°C

Time: Gal. Purged	Time: Gal. Purged
Conductance 20.9	Conductance
pH 6.68	pH
Temperature 26.21	Temperature
Redox Potential (Eh) 291	Redox Potential (Eh)
Turbidity 0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate

Turbidity_____ Turbidity_____

Volume of Water Purged ~~When Field Parameters are Measured~~_____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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 Arrive at 0915 Tanner H & Ryan P present for purge & sampling event. Purged well ~~[illegible]~~. Purge ended and samples were taken at 0948 left site at. Full Rinsate purge Keyser Pump. One set of parameters were taken at end of Rinsate process.

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

Description of Sampling Event: Nitrate & chloride

Location (well name) TWN-64 Sampler Name and initials Tanner H. 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 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. Overcast Ext'l Amb. Temp.(prior to sampling event) 26.6 C

Time: Gal. Purged	Time: Gal. Purged
Conductance 5.7	Conductance
pH 7.45	pH
Temperature 25.46	Temperature
Redox Potential (Eh) 273	Redox Potential (Eh)
Turbidity 0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate #2

Turbidity_____ Turbidity_____

Volume of Water Purged When Field Parameters are Measured_____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = =_____6_____

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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 Arrive at 1050 Tanner H & Ryan P present. Rinsate Ran On Pump. One Set of Parameters Pulled & then Sample Taken at 1145. Had to wait to Fill last Container of D.I. Wash Water left site At 1202

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

Description of Sampling Event: Nitrate & chloride

Location (well name) Pier 1 Sampler Name and initials Tanner H. & Ryan P.

Date and Time for Purging _____ and Sampling (if different) 7.14.09

Well Purging Equip Used: __pump or ✓ bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 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 (Eh) _____ Turbidity _____

Weather Cond. _____ Ext'l Amb. Temp. (prior to sampling event) _____

Time: 1921 Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 2427	Conductance _____
pH 7.48	pH _____
Temperature 18.95	Temperature _____
Redox Potential (Eh) 321	Redox Potential (Eh) _____
Turbidity 34.8	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_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 Arrive on Site at 0915. One Set of Parameters taken then Sample pulled at 0925. Left Site at 0934 Ryan Patner present For Sampling

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

Description of Sampling Event: Nitrate & chloride

Location (well name) Piez 2 Sampler Name and initials Tanner H. & Ryan P.

Date and Time for Purging _____ and Sampling (if different) 7.14.09

Well Purging Equip Used: ___pump or ✓ bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 997 uMHOS/cm Well Depth _____

Depth to Water Before Purging 15.81 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) _____

Time: 0940 Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 652.2	Conductance _____
pH 8.37	pH _____
Temperature 17.95	Temperature _____
Redox Potential (Eh) 273	Redox Potential (Eh) _____
Turbidity 15.8	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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 Arrive on Site at 0936. One Set of Parameters taken then Sample pulled at 0945. Left Site at 0951
Ryan Palmer present For Sampling

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

Description of Sampling Event: Nitrate & chloride

Location (well name) Piez 3 Sampler Name and initials Tanner H. & Ryan P.

Date and Time for Purging _____ and Sampling (if different) 7.14.09

Well Purging Equip Used: __pump or ✓ bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 997 uMHOS/cm Well Depth _____

Depth to Water Before Purging 36.05 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) _____

Time: 1002 Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 1219	Conductance _____
pH 12.27	pH _____
Temperature 19.78	Temperature _____
Redox Potential (Eh) 213	Redox Potential (Eh) _____
Turbidity 26.7	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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 Arrive on site at 0958. One set of Parameters taken then Sample pulled at 1010. Left site at 1014
Ryan Palmer present for Sampling

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

Description of Sampling Event: Nitrate & chloride

Location (well name) Piez 4 Sampler Name and initials Tanner H. & Ryan P.

Date and Time for Purging _____ and Sampling (if different) 7-14-09

Well Purging Equip Used: __pump or ✓ bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 997 uMHOS/cm Well Depth _____

Depth to Water Before Purging 50.74 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. clear, & slight Breeze Ext'l Amb. Temp. (prior to sampling event) _____

Time: 0804 Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 3474	Conductance _____
pH 6.82	pH _____
Temperature 24.25	Temperature _____
Redox Potential (Eh) 354	Redox Potential (Eh) _____
Turbidity 13.1	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_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 Arrive on Site at 0800. One set of Parameters taken then Sample pulled at 0807. Left Site at 0810 Ryan Palmer present For Sampling.

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

Description of Sampling Event: Nitrate & chloride

Location (well name) Pier 5 Sampler Name and initials Tanner H. & Ryan P.

Date and Time for Purging _____ and Sampling (if different) 7.14.09

Well Purging Equip Used: __pump or ✓ bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 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)

Conductance (avg) _____ pH of Water (avg) _____

Well Water Temp. (avg) _____ Redox Potential (Eh) _____ Turbidity _____

Weather Cond. _____ Ext'l Amb. Temp. (prior to sampling event) _____

Time: 0848 Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 84.3	Conductance _____
pH 7.75	pH _____
Temperature 21.32	Temperature _____
Redox Potential (Eh) 316	Redox Potential (Eh) _____
Turbidity 10.6	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_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 Arrive on Site at 0845. One Set of Parameters taken then Sample pulled at 0852. Left Site at 0900 Ryan Palmer present For Sampling

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

Description of Sampling Event: Nitrate & Chloride sampling

Location (well name) MW 18 Sampler Name and initials Tanner Holliday

Date and Time for Purging 7-14-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) QED

Sampling Event ~~0534~~ nitrate chloride Prev. Well Sampled in Sampling Event N/A

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 134

Depth to Water Before Purging 71.34 Casing Volume (V) 4" Well: 40.91 (.653h)
3" Well: N/A (.367h)

Conductance (avg) 3587 pH of Water (avg) 6.54

Well Water Temp. (avg) 14.30 Redox Potential (Eh) 171 Turbidity 0

Weather Cond. Clear Ext'l Amb. Temp. (prior to sampling event) 19.5°c

Time: 0630 Gal. Purged 6.6	Time: 0700 Gal. Purged 16.5
Conductance 3575	Conductance 3575
pH 6.54	pH 6.57
Temperature 14.10	Temperature 14.21
Redox Potential (Eh) 180	Redox Potential (Eh) 161
Turbidity 0	Turbidity 0
Time: 0730 Gal. Purged 26.4	Time: 0800 Gal. Purged 36.3
Conductance 3595	Conductance 3603
pH 6.54	pH 6.51
Temperature 14.36	Temperature 14.52
Redox Potential (Eh) 167	Redox Potential (Eh) 177
Turb. 0	Turb 0

Turbidity ——— Turbidity ———

Volume of Water Purged ~~Within Field Parameters are Stabilized~~ 396

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = .33

Time to evacuate two casing volumes (2V)
T = 2V/Q = 247 Min

Number of casing volumes evacuated (if other than two) .48

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_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 Arrived on site at 0559. Tanner Holliday present for purge and sampling event. Purge began at 0610. Purged well for 120 Minutes Purge ended at 0810. left site at 0817. Samples Taken at 0812
Water: Clear throughout Purge
Weather Mostly Clear with a few clouds (Early in the Morning).

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

Description of Sampling Event: Nitrate & Chloride sampling

Location (well name) MW 19 Sampler Name and initials Tanner Holliday

Date and Time for Purging 7-14-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) QED

Sampling Event Nitrate & Chloride Prev. Well Sampled in Sampling Event MW 18

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 149

Depth to Water Before Purging ~~149~~ 51.13 Casing Volume (V) 4" Well: 63.90 (.653h)
3" Well: N/A (.367h)

Conductance (avg) 1433 pH of Water (avg) 7.14

Well Water Temp. (avg) 15.09 Redox Potential (Eh) 293 Turbidity 1.45

Weather Cond. Sunny Ext'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

pH 7.09 pH 7.11

Temperature 15.00 Temperature 15.13

Redox Potential (Eh) 257 Redox Potential (Eh) 289

Turbidity 0 Turbidity 1.8

Time: 0930 Gal. Purged 21.45 Time: 1005 Gal. Purged 33

Conductance 1374 Conductance 1363

pH 7.15 pH 7.21

Temperature 15.18 Temperature 15.05

Redox Potential (Eh) 307 Redox Potential (Eh) 319

Turb. 3.8 Turb .2

Turbidity ——— Turbidity ———

Volume of Water Purged ~~When Field Parameters are Measured~~ 39.6

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = .33

Time to evacuate two casing volumes (2V)
T = 2V/Q = 387 Min

Number of casing volumes evacuated (if other than two) .31

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_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 Arrived on site at 0820. Tanner Holliday present for purge and sampling event. Purge began at 0825. Purged well for 120 Minutes Purge ended at 1025. left site at 1032
samples taken at 1026
Water: clear throughout purge
Weather: Sunny & Hot

August Sampling Event

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

Description of Sampling Event: 2nd Chloride / Nitrate TEST (New wells)

Location (well name) TWN-5 Sampler Name and initials Ryan Palmer

Date and Time for Purging 8-25-09 and Sampling (if different) 8-27-09

Well Purging Equip Used: __pump or ✓bailer Well Pump (if other than Bennet) Bayles Exploration Bailed

Sampling Event Initial Test Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 155.00 150.00

Depth to Water Before ~~Purging~~ Sample 70.75 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) —

Time: 0638 Gal. Purged —	Time:_____ Gal. Purged_____
Conductance 3169	Conductance
pH 6.92	pH
Temperature 14.28	Temperature
Redox Potential (Eh) 496	Redox Potential (Eh)
Turbidity 3.5	Turbidity
Time:_____ Gal. Purged_____	Time:_____ Gal. Purged_____
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

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	Sample Taken (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 Nitrate	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	(Y) N	Sample volume ____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: ____

Comments Arrive at 0635. Ryan Palmer Present For Sample with Tanner H. Well was purged two Days previous by Bayles Exploration w/ Rig Allowed to Recover then Sampled 8-27-09 at 0640. Left Site at 0644.

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

Description of Sampling Event: 2nd chloride / Nitrate Test (new well)

Location (well name) TWN-6 Sampler Name and initials Ryan Palmer

Date and Time for Purging 8-25-09 and Sampling (if different) 8-27-09

Well Purging Equip Used: __pump or ✓bailer Well Pump (if other than Bennet) Bayles Exploration Bailed

Sampling Event Initial Test Prev. Well Sampled in Sampling Event n/a

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth ~~135~~ 130.00

Depth to Water Before ~~Purging~~ Sample 75.42 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) —

Time: 0655 Gal. Purged —	Time: Gal. Purged
Conductance 1222	Conductance
pH 7.24	pH
Temperature 13.99	Temperature
Redox Potential (Eh) 458	Redox Potential (Eh)
Turbidity 16.2	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity_____ Turbidity_____

Volume of Water Purged When Field Parameters are Measured_____

Pumping Rate Calculation

Flow Rate (Q), in gpm. 7
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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 0650 Ryan P. Turner H present For Sampling Event. Sampling start at 0657, left at 0700 Purge was conducted the Days previous by Baylis Exploration w/ Eng

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

Description of Sampling Event: 2nd chloride / Nitrate Test (New wells)

Location (well name) TWN-7 Sampler Name and initials Lyon Palmer

Date and Time for Purging 8-25-09 and Sampling (if different) 8-27-09

Well Purging Equip Used: __pump or ✓ bailer Well Pump (if other than Bennet) Bayles Exploration Bailed

Sampling Event Initial Test Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth ~~120.00~~ 105.00

Depth to Water Before ~~Purging~~ Sampling 96.70 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) —

Time: 0632 Gal. Purged —	Time: Gal. Purged
Conductance 1467	Conductance
pH 7.65	pH
Temperature 15.64	Temperature
Redox Potential (Eh) 4.89	Redox Potential (Eh)
Turbidity 49	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity_____ Turbidity_____

Volume of Water Purged When Field Parameters are Measured_____

Pumping Rate Calculation

Flow Rate (Q), in gpm. 7
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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 0619 Ryan P & Tanner H present for sampling. Sample taken at 0625. Left at 0633. Purge was included two days earlier by Bayles Exploration.

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

Description of Sampling Event: 2nd Chloride / Nitrate Test (New well)

Location (well name) TWN-8 Sampler Name and initials Ryan Palmer

Date and Time for Purging 8.25.09 and Sampling (if different) 8.27.09

Well Purging Equip Used: pump or ✓ bailer Well Pump (if other than Bennet) Bayles Exploration Bailer

Sampling Event Initial Test Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth ~~[illegible]~~ 145.5

Depth to Water Before ~~Purging~~ Sample 62.47 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) —

Time: 0705 Gal. Purged — Time: Gal. Purged

Conductance 2645 Conductance

pH 7.32 pH

Temperature 14.15 Temperature

Redox Potential (Eh) 492 Redox Potential (Eh)

Turbidity 7.3 Turbidity

Time: Gal. Purged Time: Gal. Purged

Conductance Conductance

pH pH

Temperature Temperature

Redox Potential (Eh) Redox Potential (Eh)

Turbidity ____ Turbidity ____

Volume of Water Purged When Field Parameters are Measured ____

Pumping Rate Calculation

Flow Rate (Q), in gpm. 7
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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume ____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: ____

Comments Arrive at 0702 Ryan Palmer & Tanner H present 4 Sampling Sampled at 0706. left site at 0709. Well was bailed two days previous by Baylis Exploration w/ Rig

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

Description of Sampling Event: 2nd chloride / Nitrate Test (New Well)

Location (well name) TWN-9 Sampler Name and initials Ryan Palmer

Date and Time for Purging 8-25-09 and Sampling (if different) 8-27-09

Well Purging Equip Used: pump or ✓ bailer Well Pump (if other than Bennet) Bayles Capl. Baild

Sampling Event Initial Test Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 97.00

Depth to Water Before Purging 65.40 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) —

Time: 0726 Gal. Purged —	Time: Gal. Purged
Conductance 3002	Conductance
pH 6.33	pH
Temperature 14.38	Temperature
Redox Potential (Eh) 390	Redox Potential (Eh)
Turbidity 6.6	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive at 0723. Ryan P. Tanner H present for Sampling Event. Samples taken at 0727. Left site 0732.
Bayles Exploration Bailed well on 8-25-09.

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

Description of Sampling Event: 2nd Chloride / Nitrate Test (New Well)

Location (well name) TWN-10 Sampler Name and initials Ryan Palmer

Date and Time for Purging 8.25.09 and Sampling (if different) 8.27.09

Well Purging Equip Used: __pump or ✓bailer ~~Well Pump (if other than Bennet)~~ Bailer Explorer Bailed well

Sampling Event Initial Test Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 105.00

Depth to Water Before Purging 82.8 ~~105.00~~ 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) —

Time: 0713 Gal. Purged —	Time: Gal. Purged
Conductance 4054	Conductance
pH 4.73	pH
Temperature 14.18	Temperature
Redox Potential (Eh) 402	Redox Potential (Eh)
Turbidity 111.6	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 0711. Ryan P & Tanner H present. Sampled at 0715. Left site at 0721.
Well was Bailed on 8-25-09 by Boyles Exploration

September Sampling Event

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-1 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 9-21-09 and Sampling (if different) 9-22-09

Well Purging Equip Used: x pump or __ bailer Well Pump (if other than Bennet) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-1R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 106

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) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear Sunny Ext'l Amb. Temp.(prior to sampling event) 18.1 °C

Time: 0823 Gal. Purged 60	Time: Gal. Purged
Conductance 757.6	Conductance
pH 6.92	pH
Temperature 14.82	Temperature
Redox Potential (Eh) 503	Redox Potential (Eh)
Turbidity 2.1	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Purge Water Measured~~ Measured 76 gallons

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 12.6 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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Purge Comments Arrived on site at 0810. Tanner Holliday & Ryan Palmer present for the purge. Purge began at 0813. Purged 0 well for 12.6 Minutes. Purge ended at 0825. Left site at 0830.

Sample: Arrive at 1410 Sample 1412 left at 1414

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-2 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 9-21-09 and Sampling (if different) 9.22.09

Well Purging Equip Used: x pump or __ bailer Well Pump (if other than Bennet) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-R2

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 96

Depth to Water Before Purging 16.96 Casing Volume (V) 4" Well: 79.04 x (.653h) 51.61312
3" Well: N/A (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Sunny Ext'l Amb. Temp.(prior to sampling event) 18.8°C

Time: 0916 Gal. Purged 60 Time: Gal. Purged

Conductance 2911 Conductance

pH 7.01 pH

Temperature 15.87 Temperature

Redox Potential (Eh) 420 Redox Potential (Eh)

Turbidity 26.6 Turbidity

Time: Gal. Purged Time: Gal. Purged

Conductance Conductance

pH pH

Temperature Temperature

Redox Potential (Eh) Redox Potential (Eh)

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ 103 Gallons

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Purge Comments Arrived on site at 0903. Tanner Holliday & Ryan Palmer present for the purge. Purge began at 0906. Purged 0 well for 17 Minutes. Purge ended at 0923. Left site at 0926

Sample: Arrive at 1354 Sample 1356 left at 1358

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-3 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 9.21.09 and Sampling (if different) 9.22.09

Well Purging Equip Used: x pump or __ bailer Well Pump (if other than Bennet) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-3R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 96

Depth to Water Before Purging 32.16 Casing Volume (V) 4" Well: 63.84 x (.653h) 41.68752
3" Well: N/A (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear, Sunny, Windy Ext'l Amb. Temp.(prior to sampling event) 21.7 °C

Time: 1009 Gal. Purged 72	Time: Gal. Purged
Conductance 2713	Conductance
pH 6.95	pH
Temperature 14.79	Temperature
Redox Potential (Eh) 471	Redox Potential (Eh)
Turbidity 37.2	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Parameters Stabilized~~ Measured 83

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 14 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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Purge: Arrive at 0954 Ryan & Tanner Present. Purge Began at 0957 purged well for 14 mins. Purge Ended at 1011 left site at 1013

Sample: Arrive 1359 Sample 1401 left at 1403.

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

Description of Sampling Event: 3rd Quarter 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: x pump or __ bailer Well Pump (if other than Bennet) Grundfos

88.85
.653

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-4R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

11/4/16
125.70
36.85
88.85

Specific Conductance 998 uMHOS/cm Well Depth 125.7

Depth to Water Before Purging 36.85 Casing Volume (V) 4" Well: 88.85 x (.653h) 57.72
3" Well: N/A (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. clear windy Ext'l Amb. Temp. (prior to sampling event) 18.1°C

Time: 1112 Gal. Purged 92	Time: Gal. Purged
Conductance 985.0	Conductance
pH 7.09	pH
Temperature 15.57	Temperature
Redox Potential (Eh) 411	Redox Potential (Eh)
Turbidity 1.1	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

3
6
42

Turbidity ——— Turbidity ———

Volume of Water Purged ~~When Pumping Rates are Measured~~ 115.44

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 19 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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume ———	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: ———

Comments Purge - Arrive at 1053 Tamer & Ryan Present. Purge Began at 1055 Purged well for 19 min. ~~[illegible]~~ Ended at 1014. Left at 1016

Sample: Arrive at 1404 Sample 1406 Left 1408

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-5 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 9.21.09 and Sampling (if different) 9.22.09

Well Purging Equip Used: x pump or __ bailer Well Pump (if other than Bennet) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-5R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 150.00

Depth to Water Before Purging 70.67 Casing Volume (V) 4" Well: 79.33 (.653h) 51.80249
3" Well: N/A (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear, windy Ext'l Amb. Temp. (prior to sampling event) 20 °C

Time: 1435 Gal. Purged 90	Time: Gal. Purged
Conductance 3127	Conductance
pH 6.6	pH
Temperature 17.58	Temperature
Redox Potential (Eh) 358	Redox Potential (Eh)
Turbidity 1.2	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ 103

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 1418. Purge Began at 1420 Purged FOR 17 min Ended at 1437

Samples: Arrive 1340 Sample 1344 left 1346

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-6 Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 130

Depth to Water Before Purging 75.48 Casing Volume (V) 4" Well: 54.52 x (.653h) 35.60156
3" Well: NA (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear, Sunny Ext'l Amb. Temp.(prior to sampling event) 15°C

Time: 1012 Gal. Purged	Time: Gal. Purged
Conductance 1540	Conductance
pH 7.21	pH
Temperature 14.51	Temperature
Redox Potential (Eh) 458	Redox Potential (Eh)
Turbidity 6.5	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Parameters are Measured~~ 71

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 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 Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Purge Comments Arrived on site at 1000. Tanner Holliday & Ryan Palmer present for the purge. Purge began at 1002. Purged 0 well for 12 Minutes. Purge ended at 1014. Left site at 1016.

Sample: Arrive at 1318 Sampled at 1321 left at 1323

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-7 Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-7R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 105

Depth to Water Before Purging 90.92 Casing Volume (V) 4" Well: 14.08 (.653h) 9.19424
3" Well: N/A (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear & windy Ext'l Amb. Temp.(prior to sampling event) 20.1°C

Time: 1337 Gal. Purged 6	Time: Gal. Purged
Conductance 1382	Conductance
pH 7.37	pH
Temperature 18.87	Temperature
Redox Potential (Eh) 353	Redox Potential (Eh)
Turbidity 17.3	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity _____ Turbidity _____

Volume of Water Purged ~~Where Parameters are Measured~~ 18

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 3 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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 1332. Turner & Ryan Present. Purge Begun at 1336 Purged For 3 min. Ended at 1337.

Arrive 1347 Sample 1349 left 1351

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-8 Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-8R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 145.5

Depth to Water Before Purging 62.38 Casing Volume (V) 4" Well: 83.12 (.653h) 54.27736
3" Well: NA (.367h)

Conductance (avg) — pH of Water (avg) _____

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Clear, Windy Ext'l Amb. Temp.(prior to sampling event) 21°C

Time: 1534 Gal. Purged 96	Time: _____ Gal. Purged _____
Conductance 2426	Conductance _____
pH 7.47	pH _____
Temperature 15.27	Temperature _____
Redox Potential (Eh) 321	Redox Potential (Eh) _____
Turbidity 62	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Parameters are Measured~~ 108

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 18 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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrived on site at 1516. Tanner Holliday & Ryan Palmer present for the purge. Purge began at 1518. Purged 6 well for 18 Minutes. Purge ended at 1536. Left site at 1538

urge

Arrive 1314 Sampled at 1317 left 1318

mple:

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-9 Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-9R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 97

Depth to Water Before Purging 65.36 Casing Volume (V) 4" Well: 31.64 x (.653h) 20.66 gal
3" Well: N/A (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear, Sunny Ext'l Amb. Temp.(prior to sampling event) 14.1°C

Time: 0802 Gal. Purged 30	Time: Gal. Purged
Conductance 2662	Conductance
pH 6.94	pH
Temperature 14.18	Temperature
Redox Potential (Eh) 452	Redox Potential (Eh)
Turbidity 109.2	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity _____ Turbidity _____

Volume of Water Purged [redacted] 41

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

urge Comments Arrived on site at 0754. Tanner Holliday & Ryan Palmer present for the purge. Purge began at 0757. Purged 0 well for 7 Minutes. Purge ended at 0804. Left site at 0807.

ample: Arrive 1331 Sample 1334 left 1336

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN - 10 Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-10R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 105

Depth to Water Before Purging 82.58 Casing Volume (V) 4" Well: 22.42 x (.653h) 14.64026
3" Well: N/A (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear, Sunny Ext'l Amb. Temp. (prior to sampling event) 14.7 °C

Time: 0911 Gal. Purged 18	Time: Gal. Purged
Conductance 4066	Conductance
pH 3.20	pH
Temperature 14.30	Temperature
Redox Potential (Eh) 545	Redox Potential (Eh)
Turbidity 19.4	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity _____ Turbidity _____

Volume of Water Purged [redacted] 29

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 5 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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrived on site at 0905. Tanner Holliday & Ryan Palmer present for the purge. Purge began at 0908. Purged 8 well for 5 Minutes. Purge ended at 0913. Left site at 0915.

Purge

Sample: Arrive 1325 Sample 1328 left 1330

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-O Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-9

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth N.A. D.T.

Depth to Water Before Purging 5 Casing Volume (V) 4" Well: (.653h)
3" Well: N/A (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Clear, Sunny Ext'l Amb. Temp.(prior to sampling event) 14.°C

Time: 0818 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)

D. I. Blank.

Turbidity_____ Turbidity_____

Volume of Water Purged [redacted]_____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = =____6____

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____N/A____

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume ____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: ____

[redacted] Comments [redacted] Minutes.

[redacted] Arrive at 0816 took parameters & Pulled D.T. Blank
Sample taken AT 0820

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN - 1R Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth N/A

Depth to Water Before Purging N/A Casing Volume (V) 4" Well: N/A (.653h)
3" Well: N/A (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Sunny Ext'l Amb. Temp.(prior to sampling event) 12.5

Time: 0748 Gal. Purged	Time: Gal. Purged
Conductance 58.4	Conductance
pH 6.04	pH
Temperature 17.65	Temperature
Redox Potential (Eh) 490	Redox Potential (Eh)
Turbidity .6	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate Prior to TWN-1

Turbidity ——— Turbidity ———

Volume of Water Purged ~~When Parameters Stabilized~~ Measured 165

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = N/A

Number of casing volumes evacuated (if other than two) N/A

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume ———	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: ———

Comments Started purge at 0735. 1 set of parameters were taken. Rinsate sample Taken at 0750. Left site at 0757

Rinsate

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN - R2 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 9-21-09 and Sampling (if different) 9-21-09

Well Purging Equip Used: x pump or __ bailer Well Pump (if other than Bennet) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-1

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth N/A

Depth to Water Before Purging ____ Casing Volume (V) 4" Well: N/A (.653h)
3" Well: N/A (.367h)

Conductance (avg) ____ pH of Water (avg) ____

Well Water Temp. (avg) ____ Redox Potential (Eh) ____ Turbidity ____

Weather Cond. Sunny Ext'l Amb. Temp.(prior to sampling event) 17.6

Time: 0855 Gal. Purged ____ Time: ____ Gal. Purged ____

Conductance 12.8 Conductance ____

pH 7.77 pH ____

Temperature 17.74 Temperature ____

Redox Potential (Eh) 396 Redox Potential (Eh) ____

Turbidity 0.0 Turbidity ____

Time: ____ Gal. Purged ____ Time: ____ Gal. Purged ____

Conductance ____ Conductance ____

pH ____ pH ____

Temperature ____ Temperature ____

Redox Potential (Eh) ____ Redox Potential (Eh) ____

Rinsate Prior to TWN 2

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ 165

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = N/A

Number of casing volumes evacuated (if other than two) N/A

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrived at 0830. Rinsate began at 0831. 1 set of parameters were taken at 0855. Samples taken at 0857. Left site at 0901.

Rinsate

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN - 3R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 9-21-09 and Sampling (if different) N/A

Well Purging Equip Used: x pump or __ bailer Well Pump (if other than Bennet) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-2

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth Rinsate

Depth to Water Before Purging ____ Casing Volume (V) 4" Well: N/A (.653h)
3" Well: N/A (.367h)

Conductance (avg) ____ pH of Water (avg) ____

Well Water Temp. (avg) ____ Redox Potential (Eh) ____ Turbidity ____

Weather Cond. Sunny Ext'l Amb. Temp.(prior to sampling event) 18.6°C

Time: 0945 Gal. Purged ____ Time: ____ Gal. Purged ____

Conductance 10.1 Conductance ____

pH 6.67 pH ____

Temperature 18.88 Temperature ____

Redox Potential (Eh) 409 Redox Potential (Eh) ____

Turbidity 0.0 Turbidity ____

Time: ____ Gal. Purged ____ Time: ____ Gal. Purged ____

Conductance ____ Conductance ____

pH ____ pH ____

Temperature ____ Temperature ____

Redox Potential (Eh) ____ Redox Potential (Eh) ____

Rinsate Prior to TWN-3

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ 165

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = N/A

Number of casing volumes evacuated (if other than two) N/A

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 0927 Ryan & Tanner present for Rinsate. Rinsate began at 0929. 1 set of parameters were taken at 0945. Rest samples were taken at 0947. Rinsate ended at 0949. Left site at 0950

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN - 4R Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-3

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth NA - Rinsate

Depth to Water Before Purging NA Casing Volume (V) 4" Well: _____ (.653h)
3" Well: NA (.367h)

Conductance (avg) _____ pH of Water (avg) _____

Well Water Temp. (avg) _____ Redox Potential (Eh) _____ Turbidity _____

Weather Cond. Sunny Ext'l Amb. Temp.(prior to sampling event) 19.3°C

Time: 1042 Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 4.5	Conductance _____
pH 7.82	pH _____
Temperature 17.85	Temperature _____
Redox Potential (Eh) 383	Redox Potential (Eh) _____
Turbidity 0	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

Rinsate prior to TWN-4

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Parameters are Measured~~ 165 Gal.

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = N/A

Number of casing volumes evacuated (if other than two) N/A

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 1016 Tanner & Ryan Present For Purge & Sample. Purge Begun at 1018 Purge & Winsate Completed at 1045 Sample Taken at 1044

Dinsate Prior to TWN-4

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-5R Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-7

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth NA Perched

Depth to Water Before Purging NA Casing Volume (V) 4" Well: (.653h)
3" Well: NA (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. cloudy, windy Ext'l Amb. Temp.(prior to sampling event) 21.°C

Time: 1400 Gal. Purged	Time: Gal. Purged
Conductance 4.8	Conductance
pH 7.68	pH
Temperature 22.25	Temperature
Redox Potential (Eh) 219	Redox Potential (Eh)
Turbidity 0.0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Purging Was Completed~~ 165

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = N/A

Number of casing volumes evacuated (if other than two) N/A

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 1346. Tanner & Ryan Present STARTED Purge at 1347. Completed Purge and took Sample at 1412

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-6R Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-10

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 NA Casing Volume (V) 4" Well: (.653h)
3" Well: N/A (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. clear, Sunny Ext'l Amb. Temp. (prior to sampling event) 14.7°C

Time: 0948 Gal. Purged	Time: Gal. Purged
Conductance 9.7	Conductance
pH ~~5.34~~ 5.43	pH
Temperature 14.07	Temperature
Redox Potential (Eh) 496	Redox Potential (Eh)
Turbidity 0.0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate prior to TWN-6

Turbidity _____ Turbidity _____

Volume of Water Purged ~~Water Level Measured~~ _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Purge

Comments Arrived on site at 0924. Tanner Holliday & Ryan Palmer present for the purge. Purge began at 0926. ~~[illegible]~~. Purge ended at 0950. Left site at 0952

Sample: Rinsate Sample Collected at 0950

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-7R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 9-21-2009 and Sampling (if different) N/A

Well Purging Equip Used: x pump or __ bailer Well Pump (if other than Bennet) Grundfos

Sampling Event Quarterly Nitrate/Chloride Prev. Well Sampled in Sampling Event TWN-4

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth N/A

Depth to Water Before Purging — Casing Volume (V) 4" Well: N/A (.653h)
3" Well: N/A (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Sunny & Windy Ext'l Amb. Temp.(prior to sampling event) 22.3°C

Time: 1317 Gal. Purged N/A	Time: Gal. Purged
Conductance 3.4	Conductance
pH 7.75	pH
Temperature 22.31	Temperature
Redox Potential (Eh) 306	Redox Potential (Eh)
Turbidity 0.0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate Prior to TWN-7

Turbidity _____ Turbidity _____

Volume of Water Purged W[redacted] 165

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = N/A

Number of casing volumes evacuated (if other than two) N/A

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrived on site at 1236. Tanner Holliday & Ryan Palmer present for Rinsate and sample. Rinsate began at 1240. 1 set of parameters were taken at 1317. Samples were taken at 1320. Left site at 1324.

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-8R Sampler Name and Initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-5

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 27 Rinsate

Depth to Water Before Purging NA Casing Volume (V) 4" Well: (.653h)
3" Well: NA (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. clear, windy Ext'l Amb. Temp (prior to sampling event) 21 C

Time: Gal. Purged	Time: Gal. Purged
Conductance 3.2	Conductance
pH 7.91	pH
Temperature 21.92	Temperature
Redox Potential (Eh) 228	Redox Potential (Eh)
Turbidity 0.0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate prior to TWN-8

Turbidity _____ Turbidity _____

Volume of Water Purged [redacted] _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrived on site at 1443. Tanner Halliday & Ryan Palmer present for the Purge. Purge began at 1445. [redacted]. Purge ended at 1508. Left site at 1511.

urge

Samples were Taken AT 1510

ample:

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-9R Sampler Name and Initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 9-22-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-8

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth N/A

Depth to Water Before Purging N/A Casing Volume (V) 4" Well: N/A (.653h)
3" Well: N/A (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Sunny & Cool Ext'l Amb. Temp (prior to sampling event)

Time: 0742 Gal. Purged	Time: Gal. Purged
Conductance 3.4	Conductance
pH 7.86	pH
Temperature 14.98	Temperature
Redox Potential (Eh) 409	Redox Potential (Eh)
Turbidity 0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate Prior to TWN-9

Turbidity _____ Turbidity _____

Volume of Water Purged ~~[illegible]~~ 165

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = N/A

Number of casing volumes evacuated (if other than two) N/A

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs: N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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	1000 ml	Y N	H_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrived on site at 0714. Tanner Holliday & Ryan Palmer present for the Purge. Purge began at 0716. Purged 0 ~~[illegible]~~ for 27 Minutes. Purge ended at 0743. Left site at 0746.

urge

ample: Sampled Rinsate at 0743

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-10R Sampler Name and initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-9

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth N/A

Depth to Water Before Purging N/A Casing Volume (V) 4" Well: N/A (.653h)
3" Well: N/A (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Sunny Ext'l Amb. Temp. (prior to sampling event) 12°C

Time: 0850 Gal. Purged	Time: Gal. Purged
Conductance 2.7	Conductance
pH 5.27	pH
Temperature 14.48	Temperature
Redox Potential (Eh) 484	Redox Potential (Eh)
Turbidity 0.0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity_____ Turbidity_____

Volume of Water Purged _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrived on site at 0825. Tanner Holliday & Ryan Palmer present for the purge. Purge began at 0832. Purged 0 for 27 Minutes. Purge ended at 0852. Left site at 0854.

Rinsate Sample taken at 0851

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

Description of Sampling Event: 3rd Quarter Nitrate/Chloride

Location (well name) TWN-6D Sampler Name and Initials Tanner Holliday & Ryan Palmer

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) Grundfos

Sampling Event Quarterly nitrate/chloride Prev. Well Sampled in Sampling Event TWN-

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 130

Depth to Water Before Purging 75.48 Casing Volume (V) 4" Well: _____ (.653h)
3" Well: N/A (.367h)

Conductance (avg) _____ pH of Water (avg) _____

Well Water Temp. (avg) _____ Redox Potential (Eh) _____ Turbidity _____

Weather Cond. Clear, Sunny Ext'l Amb. Temp (prior to sampling event) 17°C

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) _____

Duplicate of TWN-6D

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Parameters were stabilized~~ measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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 N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Purge Comments Arrived on site at 1000. Tanner Holliday & Ryan Palmer present for the purge. Purge began at 1002. Purged 0 well for 12 Minutes. Purge ended at 1014. Left site at 1016.

Sample: Arrive 1318 Sample 1321 left 1323

Duplicate of TWN-6

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

Description of Sampling Event: 3rd Quarter Nitrate & chloride 09

Location (well name) Piez 1 Sampler Name and initials Tanner Holliday, Ryan Palmer

Date and Time for Purging 9 and Sampling (if different) 9-22-09

Well Purging Equip Used: __pump or X bailer Well Pump (if other than Bennet)

Sampling Event Nitrate & chloride 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 63.02 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. Clear, Sunny Ext'l Amb. Temp.(prior to sampling event) 22°C

Time: 1109 Gal. Purged	Time: Gal. Purged
Conductance 2376	Conductance
pH 7.27	pH
Temperature 14.10	Temperature
Redox Potential (Eh) 372	Redox Potential (Eh)
Turbidity 30.2	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic (Chloride)	(Y) N	Sample volume	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive at 1100 Tanner to Sign Permit For Sampling Event. One Set of Parameters taken, Samples Collected at 1110 Left site at 1113.

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

Description of Sampling Event: 3rd Quarter Nitrate & chloride 09

Location (well name) Piez 2 Sampler Name and initials Tanner Holliday, Ryan Palmer

Date and Time for Purging _____ and Sampling (if different) 9-22-09

Well Purging Equip Used: __pump or X bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event Piez 1

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth _____

Depth to Water Before Purging 15.24 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. clear, Sunny Ext'l Amb. Temp. (prior to sampling event) 22°C

Time: 1148 Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 616.4	Conductance _____
pH 8.02	pH _____
Temperature 16.61	Temperature _____
Redox Potential (Eh) 337	Redox Potential (Eh) _____
Turbidity 14.7	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic (Chloride)	(Y) N	Sample volume	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive at 1126 Tanner & Ryan Present For Sampling Event. One Set of Parameters taken, Samples Collected AT 1150 left site at 1152

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

Description of Sampling Event: 3rd Quarter Nitrate & chloride 09

Location (well name) Piez 3 Sampler Name and initials Tanner Holliday, Ryan Palmer

Date and Time for Purging _____ and Sampling (if different) 9.22.09

Well Purging Equip Used: __pump or X bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event Piez 2

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth _____

Depth to Water Before Purging 36.59 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. Clear, Sunny Ext'l Amb. Temp.(prior to sampling event) 22°C

Time: 1203 Gal. Purged —	Time: _____ Gal. Purged _____
Conductance 2042	Conductance _____
pH 12.5	pH _____
Temperature 15.94	Temperature _____
Redox Potential (Eh) 252	Redox Potential (Eh) _____
Turbidity 16.6	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic (Chloride)	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 1153 Tanner to Report Present For Sampling Event. One Set of Parameters taken, Samples Collected at 1205 left site at 1209

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

Description of Sampling Event: 3rd Quarter Nitrate & chloride 09

Location (well name) MW PU

Sampler Name and initials Tanner Holliday, Ryan Palmer

Date and Time for Purging 9/22/09 and Sampling (if different) 9.22.09

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Peristaltic pump

Sampling Event Nitrate & chloride Prev. Well Sampled in Sampling Event NA

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 NA 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. Clear, Sunny Ext'l Amb. Temp (prior to sampling event) 22.1 °C

Time: 1052 Gal. Purged —	Time: Gal. Purged
Conductance 199.1	Conductance
pH 9.4	pH
Temperature 15.32	Temperature
Redox Potential (Eh) 379	Redox Potential (Eh)
Turbidity 0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) General Inorganic (Chloride)	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 1044 Tanner to Ryan Present For Sampling Event. One Set of Parameters Taken, Samples Collected AT 1055 left site at 1059.

October/November Sampling Event

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

Description of Sampling Event: 4th Quarter Nitrate & chloride

Location (well name) TWN-1 Sampler Name and initials Ryan Palmer R.P.

Date and Time for Purging 10.28.09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 112.5

Depth to Water Before Purging 46.99 Casing Volume (V) 4" Well: 65.51 (.653h) 42.77803
3" Well: (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Snowing Ext'l Amb. Temp.(prior to sampling event)

Time: Gal. Purged	Time: Gal. Purged
Conductance 711.6	Conductance
pH 7.07	pH
Temperature 9.42	Temperature
Redox Potential (Eh) 462	Redox Potential (Eh)
Turbidity 2.0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity — Turbidity —

Volume of Water Purged When Field Parameters are Measured 84

34
6
84

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 14.25

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrived on Site at 0830. Ryan Palmer ~~[illegible]~~ Present. Purge Began at 0839. Purged Well for 14 min One Set of parameters Taken. ~~[illegible]~~

Sample: Arrive at 1315 Ryan P. & Tanner H. Present
Sample Taken 1320.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-2 Sampler Name and initials Turner Halliday & Ryan Palmer

Date and Time for Purging 11-2-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 96'

Depth to Water Before Purging 19.61 Casing Volume (V) 4" Well: 76.39 (.653h) 49.88267
3" Well: (.367h)

Conductance (avg) 2703.5 pH of Water (avg) 6.6

Well Water Temp. (avg) 15.2 Redox Potential (Eh) 401 Turbidity 13.5

Weather Cond. clear, Warm Nice Day Ext'l Amb. Temp (prior to sampling event) 16 °C

Time: 1119 Gal. Purged 12	Time: 1128 Gal. Purged 66
Conductance 2703	Conductance 2702
pH 6.74	pH 6.50
Temperature 14.30	Temperature 15.79
Redox Potential (Eh) 430	Redox Potential (Eh) 366
Turbidity 6.7	Turbidity 11.4
Time: 1123 Gal. Purged 36	Time: 1132 Gal. Purged 90
Conductance 2709	Conductance 2700
pH 6.64	pH 6.62
Temperature 15.4	Temperature 15.38
Redox Potential (Eh) 424	Redox Potential (Eh) 385
Turb 7.8	Turb 28.2

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ 99.76534

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 16.6

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 _____

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1113 Tanner H. & Ryan P. Present For Event. Purge Began At 1117. Purged well For 17 Min Purge Ended AT 1134. Samples Taken 1134. left Site AT 1138.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-3 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-2-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 96'

Depth to Water Before Purging 31.90 Casing Volume (V) 4" Well: 64.1 (.653h) 41.8573
3" Well: (.367h)

Conductance (avg) 2612 pH of Water (avg) 7.17

Well Water Temp. (avg) 14.3 Redox Potential (Eh) 442 Turbidity 29.3

Weather Cond. clear, warm Ext'l Amb. Temp. (prior to sampling event) 21°C

Time: 1012 Gal. Purged 12 Time: 1019 Gal. Purged 34

Conductance 2704 Conductance 2604

pH 7.12 pH 7.14

Temperature 13.88 Temperature 14.50

Redox Potential (Eh) 462 Redox Potential (Eh) 437

Turbidity 3.9 Turbidity 76.0

Time: 1016 Gal. Purged 36 Time: 1022 Gal. Purged 72

Conductance 2486 Conductance 2654

pH 7.29 pH 7.10

Temperature 14.36 Temperature 14.52

Redox Potential (Eh) 437 Redox Potential (Eh) 433

Turb 4.5 Turb 32.7

Turbidity ____ Turbidity ____

Volume of Water Purged When ~~Field Parameters are Measured~~ 83

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

Time to evacuate two casing volumes (2V) T = 2V/Q = 14 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 —

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 1007 Tanner H. & Ryan P. Present For Event. Purge Began AT 1000 Purged Well For 14 min Purge Ended ~~[illegible]~~ Well Pumped Dry About 20-30 Seconds Short of full purge. Will Allow It Recharge & Sample With Bailer later

Sample: Arrive at 1549 Sample at 1400
Depth 37.66

801 816 9999

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

Description of Sampling Event: 4th Qtr Nitrate & Chloride

Location (well name) TWN-4 Sampler Name and initials Ryan Palmer

Date and Time for Purging 10.28.09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN-4R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 125.7

Depth to Water Before Purging 36.0 Casing Volume (V) 4" Well: 89.7 (.653h) 585741
3" Well: (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Snowing Ext'l Amb. Temp. (prior to sampling event)

Time: 1036 Gal. Purged	Time: Gal. Purged
Conductance 927	Conductance
pH 6.87	pH
Temperature 12.08	Temperature
Redox Potential (Eh) 456	Redox Potential (Eh)
Turbidity 9	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity ——— Turbidity ———

Volume of Water Purged When Field Parameters are Measured 117

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

Time to evacuate two casing volumes (2V) T = 2V/Q = 19.5

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive at 1015. Ryan P. & Jennifer N. present for purge. Purge began at 1018. Purged for 19 min. Ended at 1037.

Sample: Arrive at 1305. Sampled at 1310.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-5 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-10-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grand Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN-5R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 150

Depth to Water Before Purging 70.64 Casing Volume (V) 4" Well: 51.82 (.653h)
3" Well: (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. clear, Sunny, warm Amb. Temp (prior to sampling event) 20°C

Time: 1304 Gal. Purged 12	Time: 1308 Gal. Purged 36
Conductance 3070	Conductance 3068
pH 7.22	pH 7.46
Temperature 15.44	Temperature 14.71
Redox Potential (Eh) 441	Redox Potential (Eh) 405
Turbidity 2.9	Turbidity 1.3
Time: 1312 Gal. Purged 60	Time: 1317 Gal. Purged
Conductance 2905	Conductance 3064
pH 6.15	pH 7.21
Temperature 14.63	Temperature 14.59
Redox Potential (Eh) 435	Redox Potential (Eh) 399
Turb .6	Turb 0

Turbidity _____ Turbidity _____

Volume of Water Purged [redacted] 102

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
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 –

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume _____	Y N	Y N
				If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1258 Tanner H. & Ryan P. Present For Event. Purge began at 1302. Purged well for 17 Minutes Purge ended at 1319. Sample taken at 1319 left site at 1321. Was was clear throughout purge.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-6 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11.3.09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 130

Depth to Water Before Purging 75.33 Casing Volume (V) 4" Well: 54.67 (.653h) 35.69951
3" Well: (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Clear, Sunny Ext'l Amb. Temp. (prior to sampling event) 17°C

Time: 1452 Gal. Purged 12
Conductance 1250
pH 7.15
Temperature 14.98
Redox Potential (Eh) 313
Turbidity 11.8

Time: 1458 Gal. Purged 48
Conductance 1449
pH 7.12
Temperature 14.59
Redox Potential (Eh) 323
Turbidity 3.5

Time: 1455 Gal. Purged 30
Conductance 1362
pH 7.11
Temperature 14.64
Redox Potential (Eh) 319
Turb 7.7

Time: 1500 Gal. Purged 60
Conductance 1480
pH 7.03
Temperature 14.48
Redox Potential (Eh) 324
Turb 3.3

Turbidity ____ Turbidity ____

Volume of Water Purged When Field Parameters are Measured 71

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 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 Energy Labs ____

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	(Y) N	Sample volume ____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: ____

Comments Arrive at 1447 Tanner H. & Ryan P. Present for event. Purge Began at 1450. Purged well for 12 min. Purge Ended at 1502 Sample Collected at 1502

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN - 7 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11·10·09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN-7R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 105

Depth to Water Before Purging 90.44 Casing Volume (V) 4" Well: 9.50 (.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) 19.4°C

Time: 1411	Gal. Purged 6	Time: 1412	Gal. Purged 12
Conductance	2.1	Conductance	1214
pH	7.41	pH	7.35
Temperature	16.12	Temperature	14.87
Redox Potential (Eh)	297	Redox Potential (Eh)	316
Turbidity	.9	Turbidity	2.1
Time: 1412	Gal. Purged 14	Time: 1413	Gal. Purged 18
Conductance	1194	Conductance	1166
pH	7.42	pH	7.47
Temperature	14.78	Temperature	14.93
Redox Potential (Eh)	309	Redox Potential (Eh)	366
Turb	4.7	Turb	16.6

Turbidity _____ Turbidity _____

Volume of Water Purged [redacted] 18

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6 Time to evacuate two casing volumes (2V) T = 2V/Q = 3 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 –

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume	Y N	Y N

If a preservative is used, Specify Type and Quantity of Preservative

Comments Arrive AT 1407 Tanner H. & Ryan P. Present For Event. Purge began at 1410. Purged well for 3 Minutes. Purge ended at 1413. Samples Taken at 1413. Left Site at 1415. Water was clear throughout purge

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TW4-8 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-3-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TW4-8R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 145.5

Depth to Water Before Purging 62.39 Casing Volume (V) 4" Well: 83.11 (.653h) 54.27083

3" Well: (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. clear Sunny, windy Amb. Temp. (prior to sampling event) 17°C

Time: 1330 Gal. Purged 18	Time: 1339 Gal. Purged 72
Conductance 2303	Conductance 2305
pH 6.96	pH 7.52
Temperature 15.52	Temperature 14.76
Redox Potential (Eh) 358	Redox Potential (Eh) 221
Turbidity 9.9	Turbidity 1.6
Time: 1334 Gal. Purged 42	Time: 1343 Gal. Purged 96
Conductance 2309	Conductance 2296
pH 7.48	pH 7.53
Temperature 14.85	Temperature 14.68
Redox Potential (Eh) 271	Redox Potential (Eh) 215
Turb 39	Turb 0.3

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured 108

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 18 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 _____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 1324 Tanner H. & Ryan P. Present For Event. Purge Began AT 1327 Purged well 4 18 min. Purge Ended & Sample Collected AT 1345.

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

Description of Sampling Event: Nitrate & Chloride

Sampler

Location (well name) TWN 9 Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-10-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 9R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 97

Depth to Water Before Purging 65.18 Casing Volume (V) 4" Well 20.77 (.653h)

3" Well (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Hot Clouds Ext'l Amb. Temp (prior to sampling event) 18°C

Time: 1203 Gal. Purged 6 Time: 1205 Gal. Purged 18

Conductance 3247 Conductance 2609

pH 6.72 pH 6.73

Temperature 15.05 Temperature 14.65

Redox Potential (Eh) 502 Redox Potential (Eh) 489

Turbidity 11.4 Turbidity 10

Time: 1206 Gal. Purged 24 Time: 1208 Gal. Purged 36

Conductance 2475 Conductance 2479

pH 6.80 pH 6.81

Temperature 14.55 Temperature 14.54

Redox Potential (Eh) 479 Redox Potential (Eh) 475

Turb 72 Turb 29

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ 42

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

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

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume	Y N	Y N

If a preservative is used, Specify Type and Quantity of Preservative.

Comments Arrive At 1200 Tanner H. & Bryan P. Present For Event. Purge began at 1202. Purged well for 7 Minutes. Purge ended at 1209. Samples taken at 1201. Left site at 1211. Water was slightly Murky throughout purge.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TW-10 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11·10·09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TW4-10R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 105

Depth to Water Before Purging 82.37 Casing Volume (V) 4" Well 22.63 (.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) 15°C

Time: 1016 Gal. Purged 6	Time: 1017 Gal. Purged 12
Conductance 3861	Conductance 3896
pH 4.38	pH 3.54
Temperature 13.79	Temperature 14.24
Redox Potential (Eh) 490	Redox Potential (Eh) 516
Turbidity 9.1	Turbidity 3.9
Time: 1019 Gal. Purged 24	Time: 1021 Gal. Purged
Conductance 3851	Conductance 3896
pH 4.01	pH 4.07
Temperature 14.37	Temperature 14.55
Redox Potential (Eh) 489	Redox Potential (Eh) 462
Turb 129	Turb 20

Turbidity _____ Turbidity _____

Volume of Water Purged [redacted] 42

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume ____ ml	Y N	Y N
				If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 1013 Tamar H. & Ryan P. present for event. Purge began at 1015. Purged Well for 7 Minutes. Purge ended at 1022. Samples taken at 1022. Left site at 1024. Water was slightly Murky throughout purge.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-11 Sampler Name and initials Turner Holliday & Ryan Palmer

Date and Time for Purging 11.3.09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN-11R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 142'

Depth to Water Before Purging 71.53 Casing Volume (V) 4" Well: 70.47 (.653h) 46.01691
3" Well: (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond clear, Sunny, warm Ext'l Amb. Temp. (prior to sampling event) 16°C

Time: 0840 Gal. Purged 12	Time: 0848 Gal. Purged 60
Conductance 2771	Conductance 2742
pH 6.77	pH 7.13
Temperature 13.77	Temperature 14.40
Redox Potential (Eh) 497	Redox Potential (Eh) 464
Turbidity 12.7	Turbidity 13.0
Time: 0844 Gal. Purged 36	Time: 0851 Gal. Purged 78
Conductance 2757	Conductance 2748
pH 6.93	pH 6.9
Temperature 14.11	Temperature 14.47
Redox Potential (Eh) 479	Redox Potential (Eh) 438
Turb 9.2	Turb 17.7

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured 92

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

Time to evacuate two casing volumes (2V) T = 2V/Q = 15 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 _____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 0834 Tanner H. & Ryan P. Present for event. Purge Began at 0838. Purged well 15 min. Purge Ended at 0853. Samples collected at 0853

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-12 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11.3.09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0 0

Specific Conductance 998 uMHOS/cm Well Depth 110.00

Depth to Water Before Purging 39.91 Casing Volume (V) 4" Well: 70.09 (.653h) 45.76877
3" Well: (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. clear, warm sunny Est'l Amb. Temp (prior to sampling event) 16°C

Time: 1017 Gal. Purged 12	Time: 1022 Gal. Purged 66
Conductance 2520	Conductance 2456
pH 7.18	pH 7.35
Temperature 13.78	Temperature 14.18
Redox Potential (Eh) 302	Redox Potential (Eh) 186
Turbidity 69.0	Turbidity 15.0
Time: 1021 Gal. Purged 36	Time: 1028 Gal. Purged 78
Conductance 2452	Conductance 2432
pH 7.14	pH 7.21
Temperature 14.24	Temperature 14.12
Redox Potential (Eh) 200	Redox Potential (Eh) 172
Turb 9.7	Turb 17.9

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured 91.5

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 15 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 _____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 1010 Tanner H. & Ryan P. Present For Event. Purge Began AT 1015. Purged well 15 min. Purge Ended & Samples were taken at 1030.

Water was dirty to start out Seems to be clearing up As it goes.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 13 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-4-09 and Sampling (if different)

Well Purging Equip Used: X pump or ___ bailer Well Pump (if other than Bennet) Grand Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 13R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 120

Depth to Water Before Purging 47.37 Casing Volume (V) 4" Well: 47.42 (.653h)
3" Well: N/A (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Clear / Sunny Ext. Amb. Temp (prior to sampling event) 19.5°C

Time: 1258	Gal. Purged 12	Time: 1301	Gal. Purged 36
Conductance 1380		Conductance 1343	
pH 7.46		pH 7.72	
Temperature 15.14		Temperature 14.68	
Redox Potential (Eh) 388		Redox Potential (Eh) 370	
Turbidity 76.1		Turbidity 13.9	
Time: 1305	Gal. Purged 54	Time: 1309	Gal. Purged 78
Conductance 1328		Conductance 1352	
pH 7.72		pH 7.68	
Temperature 14.76		Temperature 14.7	
Redox Potential (Eh) 360		Redox Potential (Eh) 367	
Turb 13.8		Turb 45.5	

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured 90

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

Time to evacuate two casing volumes (2V) T = 2V/Q = 15 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 –

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1254 Tanner H. & Ryan P. Present For Event. Purge began at 1256. Purged Well for 15 Minutes Purge ended at 1311 set of samples taken at 1311. Left site at 1314. Water Was dirty but slowly cleared

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 14 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-4-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grand Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 14 R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 135

Depth to Water Before Purging 63.35 Casing Volume (V) 4" Well: 46.78 (.653h)
2" Well: (.367h)

Conductance (avg) 1308 pH of Water (avg) 7.53

Well Water Temp. (avg) 14.74 Redox Potential (Eh) 357 Turbidity 592

Weather Cond: Clear & Sunny Ext Amb Temp (prior to sampling event) 19 °C

Time: 1405 Gal. Purged 0.12	Time: 1417 Gal. Purged 30
Conductance 1317	Conductance 1321
pH 7.56	pH 7.54
Temperature 14.75	Temperature 14.81
Redox Potential (Eh) 370	Redox Potential (Eh) 368
Turbidity 21.8	Turbidity 13.9
Time: 1421 Gal. Purged 54	Time: 1425 Gal. Purged 78
Conductance 1355	Conductance 1238
pH 7.43	pH 7.61
Temperature 14.79	Temperature 14.62
Redox Potential (Eh) 368	Redox Potential (Eh) 364
Turb 1032	Turb 98.0

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ 90

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 15 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 –

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 1409 Tanner H. & Ryan P. Present For Event. Purge began at 1412. Purged well for 15 Minutes Purge ended at 1420. Samples taken at 1427. Left site at 1431. Water Dirty & Murky

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 15 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-10-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 15 R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 155

Depth to Water Before Purging 92.63 Casing Volume (V) 4" Well: 40.72 (.653h)
3" Well: — (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Hazy Clouds Ext'l Amb. Temp. (prior to sampling event) 10°c

Time: 0831 Gal. Purged 6
Conductance 2183
pH 7.43
Temperature 12.96
Redox Potential (Eh) 449
Turbidity 11.5

Time: 0834 Gal. Purged 24
Conductance 2282
pH 6.94
Temperature 13.67
Redox Potential (Eh) 458
Turbidity 217.2

Time: 0836 Gal. Purged 36
Conductance 2342
pH 6.81
Temperature 14.06
Redox Potential (Eh) 451
Turb. 30.5

Time: 0851 Gal. Purged 66
Conductance 2346 2407
pH 6.82 6.71
Temperature 14.01 14.03
Redox Potential (Eh) 445 437
Turb. 56.5 34.2

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Stabilized~~ 78

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 13 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 —

Type of Sample	Sample Taken (circle)	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	2x40 ml	Y N	HCL Y N
Nutrients	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume _____	Y N	Y N

If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 0828 Tanner H. & Ryan P. Present For Event. Purge began at 0830. Purged Well for 8 Minutes Then Well started to Sputter and we shut off pump. Let well Recharge for 10 Minutes. started Well back up at 0848 and purged remainder of 5 Minutes. Samples Taken at 0853 Left site at 0856. Water was Murky Throughout purge.

Beginning Depth 92.63

Pump placement 100 FT

Total Depth 155 FT

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 16 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-4-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 100

Depth to Water Before Purging 49.36 Casing Volume (V) 4" Well: 33.06 (.653h)
3" Well: (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond Sunny & Clear Ext'l Amb. Temp. (prior to sampling event) 13.2°C

Time: 0800 Gal. Purged 12 Time: 0806 Gal. Purged 24

Conductance 1999 Conductance 1913

pH 6.79 pH 7.06

Temperature 13.83 Temperature 14.04

Redox Potential (Eh) 487 Redox Potential (Eh) 478

Turbidity 42 Turbidity 38.3

Time: 0810 Gal. Purged 36 Time: 0813 Gal. Purged 54

Conductance 1884 Conductance 1869

pH 7.03 pH 7.09

Temperature 14.21 Temperature 14.36

Redox Potential (Eh) 475 Redox Potential (Eh) 472

Turb 49 Turb 125

Turbidity ____ Turbidity ____

Volume of Water Purged When Field Parameters are Measured 66

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 11 Min

Number of casing volumes evacuated (if other than two) N/A

If well evacuated to dryness, number of gallons evacuated ____

Name of Certified Analytical Laboratory if Other Than Energy Labs ____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume ____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: ____

Comments Arrive AT 0800 Tanner H. & Ryan P. Present For Event. Purge began at 0804. Purged well for 11 Minutes Purge ended at 0815. Samples Taken at 0815. Left site at 0820 Water slowly cleared Throughout Purge.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 17 Sampler Name and Initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-4-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 17 R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 110

Depth to Water Before Purging 35.59 Casing Volume (V) 4" Well: 48.58 (.653h)
3" Well: N/A (.367h)

Conductance (avg) 1081 pH of Water (avg) 7.49

Well Water Temp. (avg) 13.98 Redox Potential (Eh) 433 Turbidity 631

Weather Cond. Clear & Sunny Ext'l Amb. Temp. (prior to sampling event) 14.5°C

Time: 0900 Gal. Purged 12	Time: 0915 Gal. Purged 42
Conductance 925.3	Conductance 912.9
pH 7.18	pH 7.33
Temperature 13.65	Temperature 14.24
Redox Potential (Eh) 445	Redox Potential (Eh) 442
Turbidity 157	Turbidity 73.1
Time: 0918 Gal. Purged 60	Time: 0922 Gal. Purged 84
Conductance 990.5	Conductance 1499
pH 7.52	pH 7.94
Temperature 13.98	Temperature 14.05
Redox Potential (Eh) 428	Redox Potential (Eh) 417
Turb 236	Turb 2058

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ 96

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 16 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 —

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 0906 Tanner H. & Ryan P. Present For Event. Purge began at 0908. Purged Well for 16 Minutes Purge ended at 0924. Samples Taken at 0924. Left site at 0927. Water Was dirty & Murky, never cleared. Pump when pulled had 1 clay on Bottom

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 18 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-2-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 145

Depth to Water Before Purging 58.6 Casing Volume (V) 4" Well: 56.41 (.653h)
3" Well: (.367h)

Conductance (avg) 2088 pH of Water (avg) 6.96

Well Water Temp. (avg) 14.63 Redox Potential (Eh) 425 Turbidity 41.02

Weather Cond. Clear & Warm Ext'l Amb. Temp. (prior to sampling event) 21°C

Time: 1517 Gal. Purged 12 Time: 1522 Gal. Purged 42

Conductance 2074 Conductance 2060

pH 6.96 pH 6.93

Temperature 14.84 Temperature 14.93

Redox Potential (Eh) 426 Redox Potential (Eh) 430

Turbidity 79.8 Turbidity 71.9

Time: 1526 Gal. Purged 66 Time: 1530 Gal. Purged 90

Conductance 2101 Conductance 2117

pH 6.96 pH 6.98

Temperature 14.43 Temperature 14.33

Redox Potential (Eh) 422 Redox Potential (Eh) 414

Turb 82 Turb 42

Turbidity ____ Turbidity ____

Volume of Water Purged When Field Parameters are Measured 108

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

Time to evacuate two casing volumes (2V) T = 2V/Q = 18 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 —

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 1511 Tamar H. & Ryan P. Present For Event Purge began at 1515. Purged Well for 18 Minutes. Purge ended at 1533. Samples Taken at 1533 Left site at 1535.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-19 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-2-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event NA TWN-19R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 110

Depth to Water Before Purging 55.19 Casing Volume (V) 4" Well: 54.81 (.653h) 35.7907
3" Well: (.367h)

Conductance (avg) pH of Water (avg)

Well Water Temp. (avg) Redox Potential (Eh) Turbidity

Weather Cond. Clear warm Ext'l Amb. Temp (prior to sampling event)

Time: 1332 Gal. Purged 12
Conductance 2040
pH 6.99
Temperature 15.20
Redox Potential (Eh) 416
Turbidity 46.0

Time: 1338 Gal. Purged 48
Conductance 2038
pH 7.19
Temperature 14.90
Redox Potential (Eh) 392
Turbidity 38

Time: 1335 Gal. Purged 30
Conductance 2044
pH 7.3
Temperature 14.86
Redox Potential (Eh) 403
Turb 7.01

Time: 1340 Gal. Purged 60
Conductance 2057
pH 7.29
Temperature 14.81
Redox Potential (Eh) 376
Turb 28.5

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured 71.5

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 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 Energy Labs _____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1327 Tanner H. & Ryan P. Present For Event. Purge Began 1330. purged well 4 12 min purge Ended at 1342 / Samples taken at 1342.

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

Description of Sampling Event: 4th Quarter Nitrate & chloride

Location (well name) Piez 1 Sampler Name and initials Ryan Palmer R.P.

Date and Time for Purging _____ and Sampling (if different) 10-27-2009

Well Purging Equip Used: ___pump or X bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate 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 62.32 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. Cloud Cover Moving In. poss of storm. Est'l Amb. Temp (prior to sampling event) _____

Time: 0934 Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 2236	Conductance _____
pH 7.88	pH _____
Temperature 11.23	Temperature _____
Redox Potential (Eh) 216	Redox Potential (Eh) _____
Turbidity 7.09	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume ___	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: ___

Comments: Arrived on site at 0923. Ryan Palmer & Ravaje Nieves present. One set of parameters taken & samples collected at 0935. Left site at 0939.

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

Description of Sampling Event: 4th Quarter Nitrate & chloride

Location (well name) Piez 2 Sampler Name and Initials Ryan Palmer R.P.

Date and Time for Purging _____ and Sampling (if different) 10-27-09

Well Purging Equip Used: __pump or X bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate 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 14.93 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. Cloudy, 35 Deg Ext'l Amb. Temp. (prior to sampling event) _____
Morning Fog

Time: 10:10 Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance 581.5 Conductance _____

pH 8.52 pH _____

Temperature 13.40 Temperature _____

Redox Potential (Eh) 139 Redox Potential (Eh) _____

Turbidity 17.3 Turbidity _____

Time: _____ Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance _____ Conductance _____

pH _____ pH _____

Temperature _____ Temperature _____

Redox Potential (Eh) _____ Redox Potential (Eh) _____

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume ———	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: ———

Comments: Arrived on site at 0958. Ryan Palmer & Ramie Nieves present. One set of parameters taken. Samples collected at ~~0000~~ 1020. Left site at 1022.

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

Description of Sampling Event: 4th Quarter Nitrate & chloride

Location (well name) Piez 3 Sampler Name and initials Ryan Palmer R.P.

Date and Time for Purging _____ and Sampling (if different) 10.27.09

Well Purging Equip Used: __pump or __bailer Well Pump (if other than Bennet) _____

Sampling Event Nitrate 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 37.43 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. Storm clouds out of S.W. Ext'l Amb. Temp (prior to sampling event) _____

Time: 10.38 Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance 2264 Conductance _____

pH 13.39 pH _____

Temperature 9.19 Temperature _____

Redox Potential (Eh) 94 Redox Potential (Eh) _____

Turbidity 4.58 Turbidity _____

Time: _____ Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance _____ Conductance _____

pH _____ pH _____

Temperature _____ Temperature _____

Redox Potential (Eh) _____ Redox Potential (Eh) _____

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 ____

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume ____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: ____

Comments: Arrived on Site at 1024. Ryan Palmer & Ramiro Nieves Present. One Set of Parameters Taken. Samples Collected AT 1030. left Site at 1035.

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

Description of Sampling Event: 4th Quarter Nitrate & chloride

Location (well name) UWLP Sampler Name and initials Ryan Palmer R.P.

Date and Time for Purging _____ and Sampling (if different) 10.27.09

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Peristaltic

Sampling Event Nitrate Prev. Well Sampled in Sampling Event NA

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth NP

Depth to Water Before Purging NP 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. cloudy, cool Ext'l Amb. Temp.(prior to sampling event) _____

Time: 0917 Gal. Purged NA	Time: Gal. Purged
Conductance 254.3	Conductance
pH 7.71	pH
Temperature 9.34	Temperature
Redox Potential (Eh) 408	Redox Potential (Eh)
Turbidity 5.48	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments: Arrived on Site at 0850. Ryan Palmer & Ronnie Nieves Present. Set up Generator & Pump along with other Equipment. One Set of Parameters were taken & Samples Collected At 0910. Left Site at 0914

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN O Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-4-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 17 R

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth 110

Depth to Water Before Purging 35.59 Casing Volume (V) 4" Well: 48.58 (.653h)
3" Well: — (.367h)

Conductance (avg) 1081 pH of Water (avg) 7.49

Well Water Temp. (avg) 13.98 Redox Potential (Eh) 433 Turbidity 631

Weather Cond. Clear & Sunny Ext'l Amb. Temp. (prior to sampling event) 14.5°c

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)

Duplicate of TWN 17

Turbidity ____ Turbidity ____

Volume of Water Purged When Field Parameters are Measured 96

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = 16

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume ____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments ~~Arrive at Tanner H. & Ryan P. Present for Event.~~

Duplicate of TWN 17

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

Description of Sampling Event: 4th Quarter Nitrate & chloride

Location (well name) TWN-1R Sampler Name and Initials Ryan Palmer R.P.

Date and Time for Purging _____ and Sampling (if different) 10.28.09

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grand Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event NA

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 NA 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. Snowing Ext'l Amb. Temp. (prior to sampling event) 3°C

Time: 0817 Gal. Purged ~~0~~ Est 125	Time: Gal. Purged
Conductance 131.4	Conductance
pH 6.53	pH
Temperature 4.56	Temperature
Redox Potential (Eh) 445	Redox Potential (Eh)
Turbidity 0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate B4 TWN-1

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume ———	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: ———

Comments: Arrived on Site at 0754. Ryan Palmer & Ramie Nieves present. Rinsate are pumps before going to MW-1. Sample of Rinsate process taken at 0820.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-2R Sampler Name and Initials Tanner Holliday & Ryan Palmer

Date and Time for Purging _____ and Sampling (if different) _____

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 NA 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. Clear, warm Ext'l Amb. Temp. (prior to sampling event) 21°C

Time: 1115 Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance 3.4 Conductance _____

pH 8.1 pH _____

Temperature 10.53 Temperature _____

Redox Potential (Eh) 375 Redox Potential (Eh) _____

Turbidity 0 Turbidity _____

Time: _____ Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance _____ Conductance _____

pH _____ pH _____

Temperature _____ Temperature _____

Redox Potential (Eh) _____ Redox Potential (Eh) _____

Rinsate B4 TWN-2

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6 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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1040 Tanner H. & Ryan P. Present For Event. Rinsate Performed & Sample Collected AT 1105

Rinsate B4 TWN-2

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-35 Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-2-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 NA 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. Clear Cool Sunny Ext'l Amb. Temp. (prior to sampling event) ___

Time: 0952 Gal. Purged ___	Time: ___ Gal. Purged ___
Conductance 2.5	Conductance ___
pH 7.64	pH ___
Temperature 8.25	Temperature ___
Redox Potential (Eh) 408	Redox Potential (Eh) ___
Turbidity 1.1	Turbidity ___
Time: ___ Gal. Purged ___	Time: ___ Gal. Purged ___
Conductance ___	Conductance ___
pH ___	pH ___
Temperature ___	Temperature ___
Redox Potential (Eh) ___	Redox Potential (Eh) ___

Rinsate B4 TWN-3

Turbidity ____ Turbidity ____

Volume of Water Purged When Field Parameters are Measured ____

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume ____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: ____

Comments Arrive AT 0930 James H. & Ryan P. Present For EVENT. No Sample Collected at 0954

Rinsate B4 TWN-3

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

Description of Sampling Event: 4th Quarter Nitrate & chloride

Location (well name) TW4-4R Sampler Name and initials Ryan Palmer R.P.

Date and Time for Purging _____ and Sampling (if different) 10.28.09

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grundfos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event ~~TW4-1~~ TW4-1

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 NA 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. Snowing Ext'l Amb. Temp.(prior to sampling event) ___

Time: 1017 Gal. Purged ___	Time: ___ Gal. Purged ___
Conductance 14.3	Conductance ___
pH 7.61	pH ___
Temperature 6.33	Temperature ___
Redox Potential (Eh) 414	Redox Potential (Eh) ___
Turbidity 0	Turbidity ___
Time: ___ Gal. Purged ___	Time: ___ Gal. Purged ___
Conductance ___	Conductance ___
pH ___	pH ___
Temperature ___	Temperature ___
Redox Potential (Eh) ___	Redox Potential (Eh) ___

Rinsate 125.7

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume ____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: ____

Comments Arrive at 0930 Ryan Palmer & Rosario N. Prepare for Rinsate B4 TWN-4. Sample will be collected at 1010 labeled As TWN-4R

Rinsate TWN-4R B4 TWN-4

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-5R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-10-09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN-9

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 NA 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. Clear, Sunny Est'l Amb. Temp (hrly) in sampling event 19°C

Time: 1243 Gal. Purged ___ Time: ___ Gal. Purged ___

Conductance 1.5 Conductance ___

pH 6.95 pH ___

Temperature 17.21 Temperature ___

Redox Potential (Eh) 397 Redox Potential (Eh) ___

Turbidity 0.0 Turbidity ___

Time: ___ Gal. Purged ___ Time: ___ Gal. Purged ___

Conductance ___ Conductance ___

pH ___ pH ___

Temperature ___ Temperature ___

Redox Potential (Eh) ___ Redox Potential (Eh) ___

Rinsate B 4 TWN-5

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N

If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1210 Tanner H. & Ryan P. Present For Event. Rinsate was Completed & Sample Collected AT 1245.

Rinsate B4 TWN-5

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-6R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11.3.09 and Sampling (if different) _____

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 NA 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 Clear, Sunny Ext'l Amb. Temp (prior to sampling event) 17°C

Time: 14:55 Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance ~~668~~ 655	Conductance _____
pH 7.8	pH _____
Temperature 14.8	Temperature _____
Redox Potential (Eh) 244	Redox Potential (Eh) _____
Turbidity 0	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

Rinsate B4 TWN-6

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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 Preservatives Added
Gross Alpha	Y N	1,000 ml	Y N	H_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1400 Tanner H. & Ryan P. Present For Event. Began Rinsate process AT 1404. Rinsate Sample was taken at 1435

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-7R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11.10.09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN-5

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 NA 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. clear, Sunny Est'd Amb. Temp (prior to sampling event) 18°C

Time 1357 Gal. Purged	Time: Gal. Purged
Conductance 23	Conductance
pH 7.50	pH
Temperature 14.64	Temperature
Redox Potential (Eh) 301	Redox Potential (Eh)
Turbidity 0.0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate B 4 TWN-7

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6 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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1327 Tanner H. & Ryan P. Present For Event. Rinsate Ended & Sample Collected AT 1400.

Rinsate B 4 TWN-7

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-8R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-3-09 and Sampling (if different) _____

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 NA 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) _____

Time: 1308 Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance 67 Conductance _____

pH 7.35 pH _____

Temperature 19.39 Temperature _____

Redox Potential (Eh) 229 Redox Potential (Eh) _____

Turbidity 4 Turbidity _____

Time: _____ Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance _____ Conductance _____

pH _____ pH _____

Temperature _____ Temperature _____

Redox Potential (Eh) _____ Redox Potential (Eh) _____

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 1230 Tanner H. & Ryan P. present for event. Purge Began at 1232. Purge Sample was Collected at 1310

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-9R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11.10.09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN-10

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 NA 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. clear, Sunny Bkt Amb. Temp (prior to sampling event) 18.5°C

Time: ___ Gal. Purged ___	Time: ___ Gal. Purged ___
Conductance 6.1	Conductance ___
pH 6.18	pH ___
Temperature 14.82	Temperature ___
Redox Potential (Eh) 467	Redox Potential (Eh) ___
Turbidity 0	Turbidity ___
Time: ___ Gal. Purged ___	Time: ___ Gal. Purged ___
Conductance ___	Conductance ___
pH ___	pH ___
Temperature ___	Temperature ___
Redox Potential (Eh) ___	Redox Potential (Eh) ___

Rinsate B4 TWN-9

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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

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	Sample Taken (circle)	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3 x 40 ml	Y N	HCl Y N
Nutrients	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N

If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments: Arrive at 1034 Tanner H. & Ryan P. Sargent for event. Rinsate was completed & sample collected at 1105.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-10R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11.10.09 and Sampling (if different) _____

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN-15

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 NA 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. Hazy, Sunny, warm Ext'l Amb. Temp (prior to sampling event) 15.2 °C

Time: 1968 Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance 9.0 Conductance _____

pH 8.0 pH _____

Temperature 10.75 Temperature _____

Redox Potential (Eh) 365 Redox Potential (Eh) _____

Turbidity 0 Turbidity _____

Time: _____ Gal. Purged _____ Time: _____ Gal. Purged _____

Conductance _____ Conductance _____

pH _____ pH _____

Temperature _____ Temperature _____

Redox Potential (Eh) _____ Redox Potential (Eh) _____

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N

If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive at 0910. Tanner H. & Ryan P. present for event. Started Rinsate & Hose Conversion Broke Hose to repair Middle of Rinsate. Started Rinsate Back up at 0955. Rinsate Finished & Sample Collected at 1010.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-11R Sampler Name and initials James Holliday & Ryan Palmer

Date and Time for Purging 11.3.09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN-18

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth ~~[illegible]~~ NA

Depth to Water Before Purging NA 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. clear, cool Ext'l Amb. Temp. (prior to sampling event) 13 °C

Time: 0818 Gal. Purged	Time: Gal. Purged
Conductance 13.6	Conductance
pH 6.39	pH
Temperature 9.45	Temperature
Redox Potential (Eh) 484	Redox Potential (Eh)
Turbidity 0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Turbidity ___ Turbidity ___

Volume of Water Purged When Field Parameters are Measured ___

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume ___	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: ___

Comments Arrive at 0740 Tamer H. & Ryan P. present for event. Rinsate process was run. Sample was collected at 0820.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 12R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-3-09 and Sampling (if different) —

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 11

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 Clear & Warm Ext'l Amb. Temp (prior to sampling event) 17°c

Time: 0945 Gal. Purged	Time: Gal. Purged
Conductance 3.3	Conductance
pH 8.08	pH
Temperature 9.94	Temperature
Redox Potential (Eh) 349	Redox Potential (Eh)
Turbidity 0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate B4 TWN 12

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ – 165

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

Time to evacuate two casing volumes (2V) T = 2V/Q = – 165

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 0915 Tanner H. & Ryan P. Present For Event. Rinsate began at 0920. Rinsate Pump for 27 Minutes and Samples were taken at 0947.

Rinsate B4 TWN 12

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 13R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-4-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grand Fos

Sampling Event Nitrate 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. Clear & Sunny Ext'l Amb. Temp (prior to sampling event) 19°C

Time: 1241 Gal. Purged Time: Gal. Purged

Conductance: 2.5 Conductance

pH: 8.15 pH

Temperature: 16.21 Temperature

Redox Potential (Eh): 343 Redox Potential (Eh)

Turbidity: 0 Turbidity

Time: Gal. Purged Time: Gal. Purged

Conductance Conductance

pH pH

Temperature Temperature

Redox Potential (Eh) Redox Potential (Eh)

Rinsate B4 TWN 13

Turbidity _____ Turbidity _____

Volume of Water Purged ~~When Field Parameters are Measured~~ 165

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

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	Sample Taken (circle)	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3 x 40 ml	Y N	HCL Y N
Nutrients	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N

If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1213 Tanner H. & Ryan P. Present For Event. Rinsate began at 1215. Rinsate ended at 1243 sample taken at 1243.

Rinsate B4 TWN 13

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 14 R Sampler Name and Initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-4-09 and Sampling (if different) –

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 13

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. 19°C Sunny Bat'l Amb. Temp (prior to sampling event) 19°C

Time: 1355 Gal. Purged	Time: Gal. Purged
Conductance 3.7	Conductance
pH 8.75	pH
Temperature 15.01	Temperature
Redox Potential (Eh) 331	Redox Potential (Eh)
Turbidity 0	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate B4 TWN 14

Turbidity _____ Turbidity _____

Volume of Water Purged ~~Where Purge Water Measured~~ 165

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6

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	Sample Taken (circle)	Sample Volume (indicate if other than as specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3 x 40 ml	Y N	HCL Y N
Nutrients	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 1324. Tanner H. & Ryan P. present for Event. Rinsate began at 1330. Rinsate ended at 1357. Samples taken at 1357.

Rinsate B4 TWN 14

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-15R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11.10.09 and Sampling (if different) _____

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event NA

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 NA 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. Hazy, Cool Ext'l Amb. Temp. (prior to sampling event) 90 C

Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance 169	Conductance _____
pH 7.37	pH _____
Temperature 10.48	Temperature _____
Redox Potential (Eh) 432	Redox Potential (Eh) _____
Turbidity 0	Turbidity _____
Time: _____ Gal. Purged _____	Time: _____ Gal. Purged _____
Conductance _____	Conductance _____
pH _____	pH _____
Temperature _____	Temperature _____
Redox Potential (Eh) _____	Redox Potential (Eh) _____

Rinsate B 4 TWN-15

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm. S/60 = = 6 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	Sample Taken (circle)	Sample Volume (indicate if other than specified below)	Filtered (circle)	Preservative Added (circle)
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) Chloride	Y N	Sample volume _____	Y N	Y N
				If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 0735 Tanner H. & Ryan P. Present For Event. Purge, process on well. Begin at 0735. Purged Sample was taken at 0825.

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 16 R Sampler Name and Initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-4-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 6

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. clear Ext'l Amb. Temp (prior to sampling event) 61°c

Time: 1045 Gal. Purged	Time: Gal. Purged
Conductance 3	Conductance
pH 7.93	pH
Temperature 10.20	Temperature
Redox Potential (Eh) 434	Redox Potential (Eh)
Turbidity .8	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate B4 TWN 16

Turbidity ____ Turbidity ____

Volume of Water Purged ~~When Field Parameters Are Measured~~ 165

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = ____ = 6

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	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume ____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: ____

Comments Arrive AT 0714 Tanner H. & Ryan P. present for Event. Rinsate Began at 0720. Samples were taken at 0747

Rinsate B4 TWN 16

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 17 R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11-4-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 16

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. Clear & Sunny Ext'l Amb. Temp (prior to sampling event) 14°C

Time: 0856 Gal. Purged Time: Gal. Purged

Conductance 2.9 Conductance

pH 8.35 pH

Temperature 10.06 Temperature

Redox Potential (Eh) 407 Redox Potential (Eh)

Turbidity 0 Turbidity

Time: Gal. Purged Time: Gal. Purged

Conductance Conductance

pH pH

Temperature Temperature

Redox Potential (Eh) Redox Potential (Eh)

Rinsate B4 TWN 17

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured 165

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume _____	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 0829 Tanner H. & Ryan P. Present For Event. Rinsate Began at 0830. Rinsate ended at 0858. Samples were taken at 0858. Left site at 0900

Rinsate B4 TWN 17

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN 18R Sampler Name and initials Turner Holliday & Ryan Palmer

Date and Time for Purging 11-2-09 and Sampling (if different) N/A

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate Prev. Well Sampled in Sampling Event TWN 19

pH Buffer 7.0 7.0 pH Buffer 4.0 4.0

Specific Conductance 998 uMHOS/cm Well Depth N/A

Depth to Water Before Purging N/A Casing Volume (V) 4" Well: N/A (.653h)
3" Well: (.367h)

Conductance (avg) — pH of Water (avg) —

Well Water Temp. (avg) — Redox Potential (Eh) — Turbidity —

Weather Cond. Sunny & Warm Ext'l Amb. Temp. (prior to sampling event)

Time: Gal. Purged	Time: Gal. Purged
Conductance 1413	Conductance
pH 7.93	pH
Temperature 19.51	Temperature
Redox Potential (Eh) 363	Redox Potential (Eh)
Turbidity 1.4	Turbidity
Time: Gal. Purged	Time: Gal. Purged
Conductance	Conductance
pH	pH
Temperature	Temperature
Redox Potential (Eh)	Redox Potential (Eh)

Rinsate B4 TWN 18

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

Time to evacuate two casing volumes (2V)
T = 2V/Q = N/A

Number of casing volumes evacuated (if other than two) N/A

If well evacuated to dryness, number of gallons evacuated N/A

Name of Certified Analytical Laboratory if Other Than Energy Labs N/A

Type of Sample	Sample Taken (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	(Y) N	100 ml	Y (N)	H_2SO_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_2SO_4 Y N
Other (specify) chloride	(Y) N	Sample volume	Y (N)	Y (N) If a preservative is used, Specify Type and Quantity of Preservative:

Comments Arrive AT 1420 Tamar H. & Ryan P. present for EVENT. Rinsate began at 1430. Tamar & Ryan Samples were taken at 1500.

Rinsate B4 TWN-18

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

Description of Sampling Event: Nitrate & Chloride

Location (well name) TWN-19R Sampler Name and initials Tanner Holliday & Ryan Palmer

Date and Time for Purging 11.2.09 and Sampling (if different)

Well Purging Equip Used: X pump or __ bailer Well Pump (if other than Bennet) Grund Fos

Sampling Event Nitrate 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 NA 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. clear, warm Ext'l Amb. Temp. (prior to sampling event)

Time: 1338 Gal. Purged Time: Gal. Purged

Conductance 52 Conductance

pH 7.81 pH

Temperature 16.03 Temperature

Redox Potential (Eh) 292 Redox Potential (Eh)

Turbidity 0 Turbidity

Time: Gal. Purged Time: Gal. Purged

Conductance Conductance

pH pH

Temperature Temperature

Redox Potential (Eh) Redox Potential (Eh)

Rinsate B4 TWN-19

Turbidity _____ Turbidity _____

Volume of Water Purged When Field Parameters are Measured _____

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = = 6

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 _____

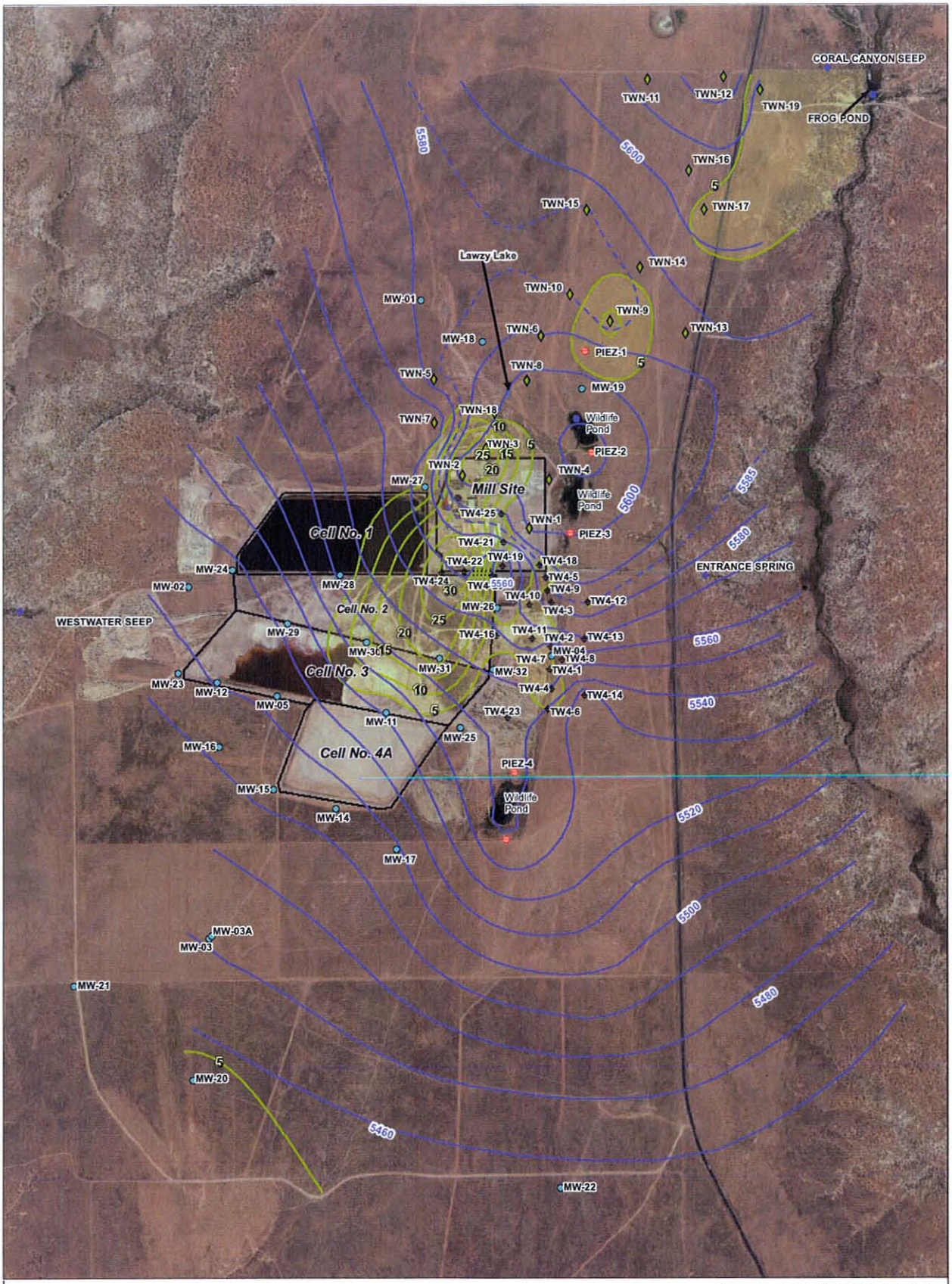
Name of Certified Analytical Laboratory if Other Than Energy Labs _____

Type of Sample	Sample Taken (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	Y N	100 ml	Y N	H_2SO_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_2SO_4 Y N
Other (specify) chloride	Y N	Sample volume _____	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: _____

Comments Arrive AT 1247 Tanner H. & Ryan P. Present For Event. Rinsate Was performed & then Sample at 1320

Rinsate B4 TWN-19

Tab C



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

N
S

1,200 600 0 1,200
Feet

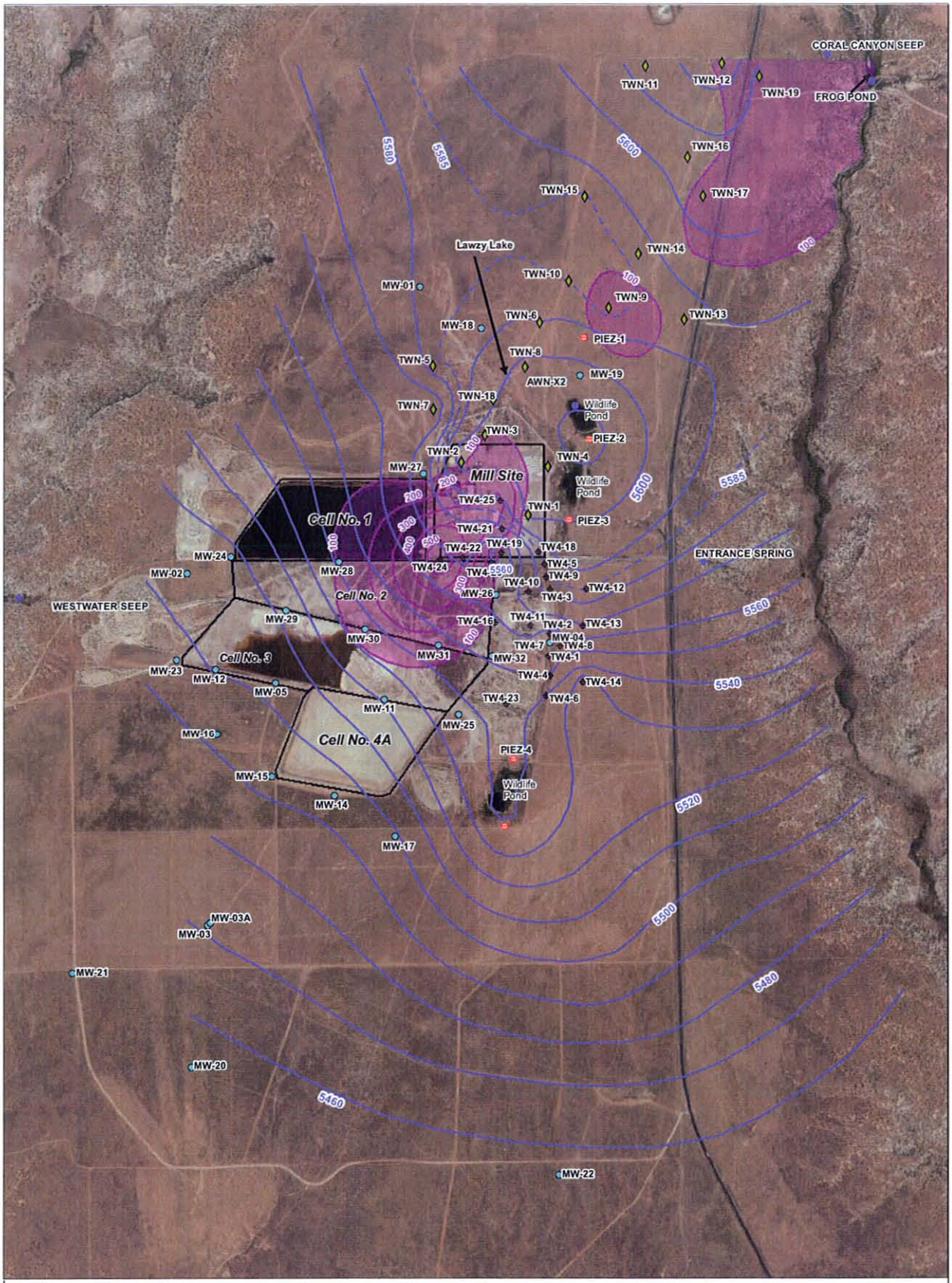
Legend

- Monitoring Well (MW)
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Nitrate Concentration (mg/L)
- Groundwater Elevation Contours 10Ft
- Groundwater Elevation Contours 5ft

Figure 3
Nitrate Concentrations with Groundwater Elevations

INTERA

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



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

N
S

1,200 600 0 1,200
Feet

Legend

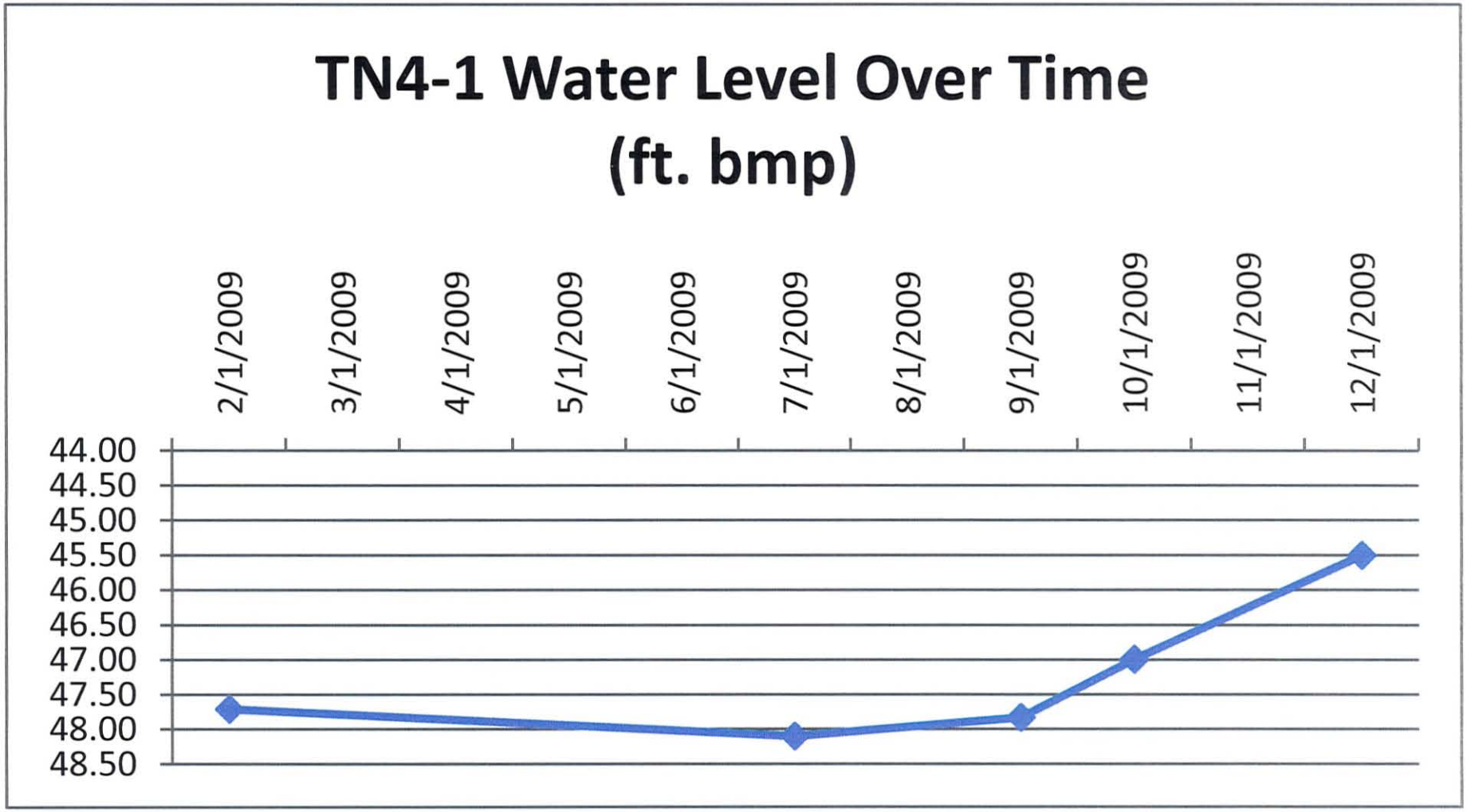
- Monitoring Well
- Piezometer
- Seep
- Spring
- Surface Water
- Chloroform MW
- Nitrate MW
- Chloride Concentration (mg/L)
- Groundwater Elevation Contours 10Ft
- Groundwater Elevation Contours 5ft

Figure 4
Chloride Concentrations with Groundwater Elevations

INTERA

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

Tab D


TN4-1 Water Level Over Time
(ft. bmp)
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009
11/1/2009
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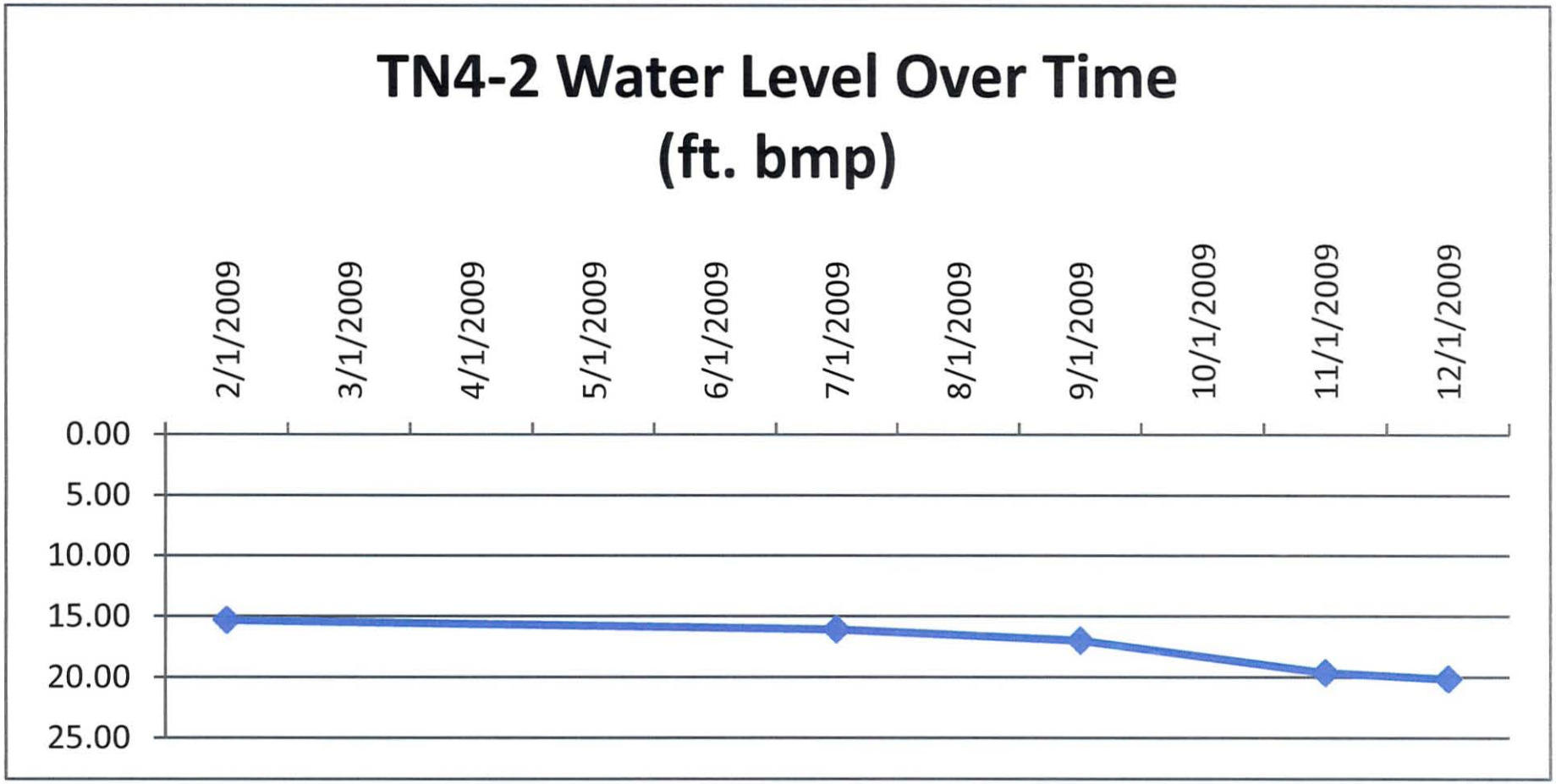
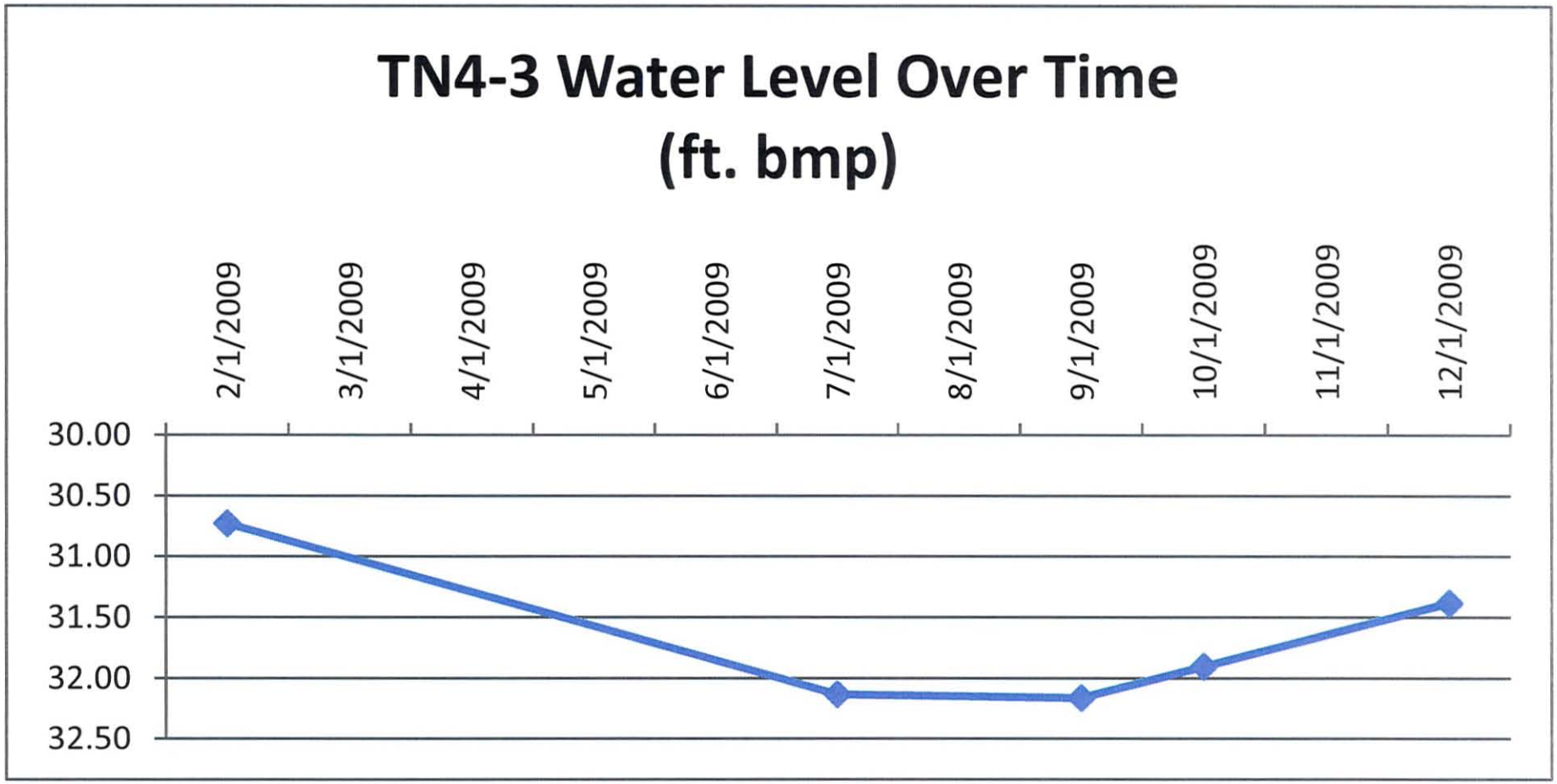
46.00
46.50
47.00
47.50
48.00
48.50


TN4-2 Water Level Over Time
(ft. bmp)
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009
11/1/2009
12/1/2009
0.00
5.00
10.00
15.00
20.00
25.00


TN4-3 Water Level Over Time
(ft. bmp)
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
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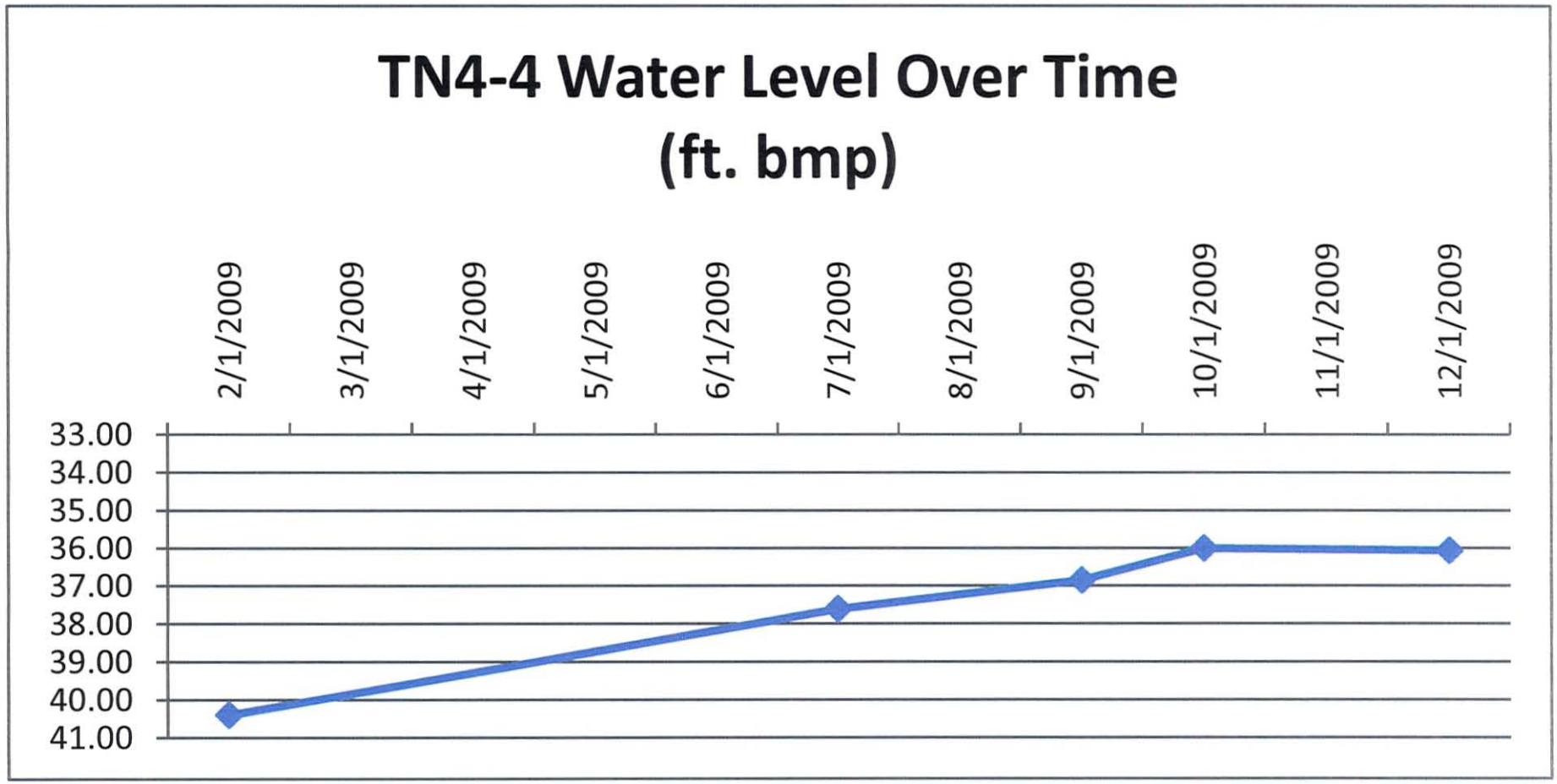
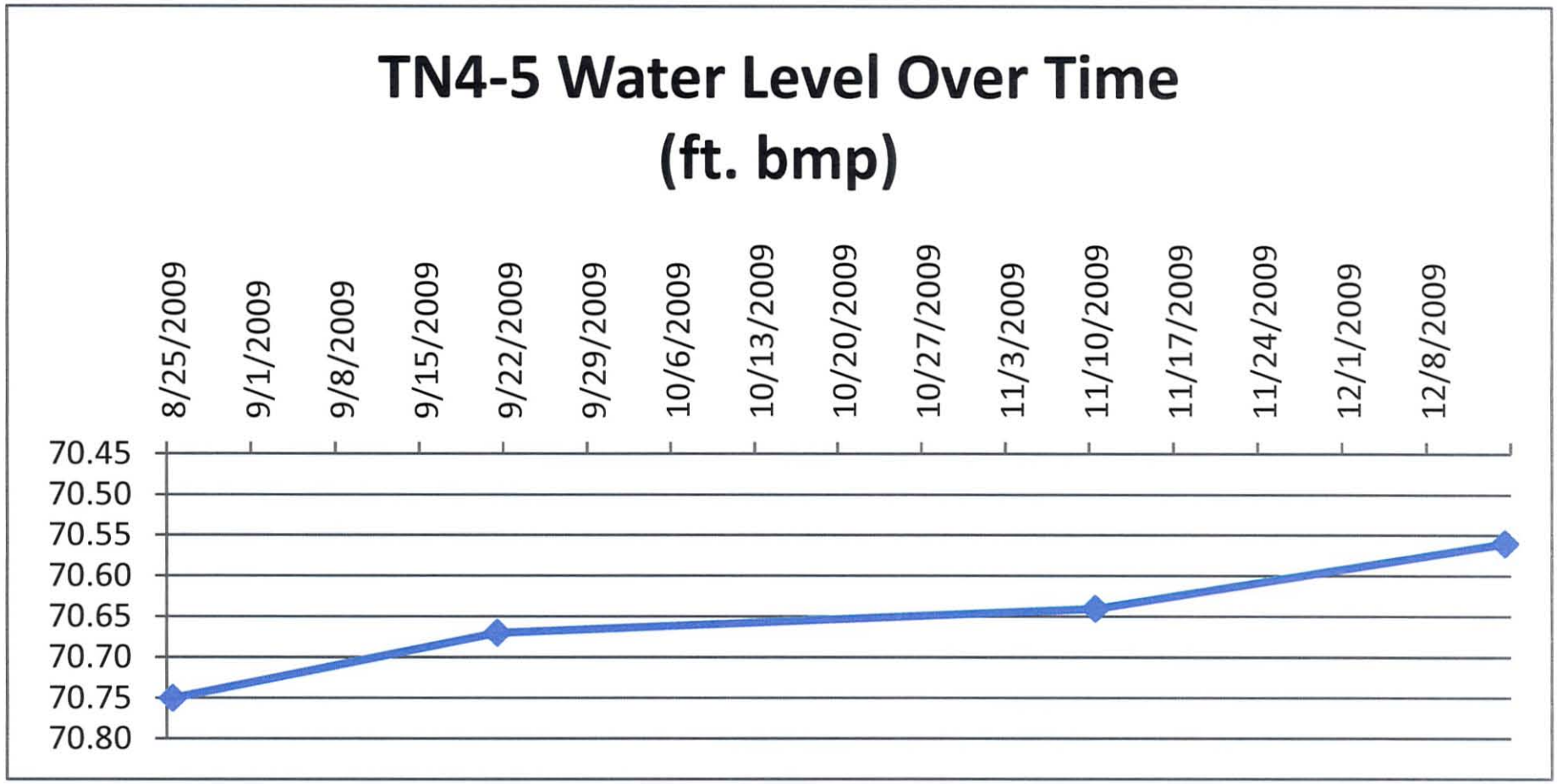
30.00
30.50
31.00
31.50
32.00
32.50


TN4-4 Water Level Over Time
(ft. bmp)
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009
11/1/2009
12/1/2009
33.00
34.00
35.00
36.00
37.00
38.00
39.00
40.00
41.00


TN4-5 Water Level Over Time
(ft. bmp)
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009
11/17/2009
11/24/2009
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12/8/2009
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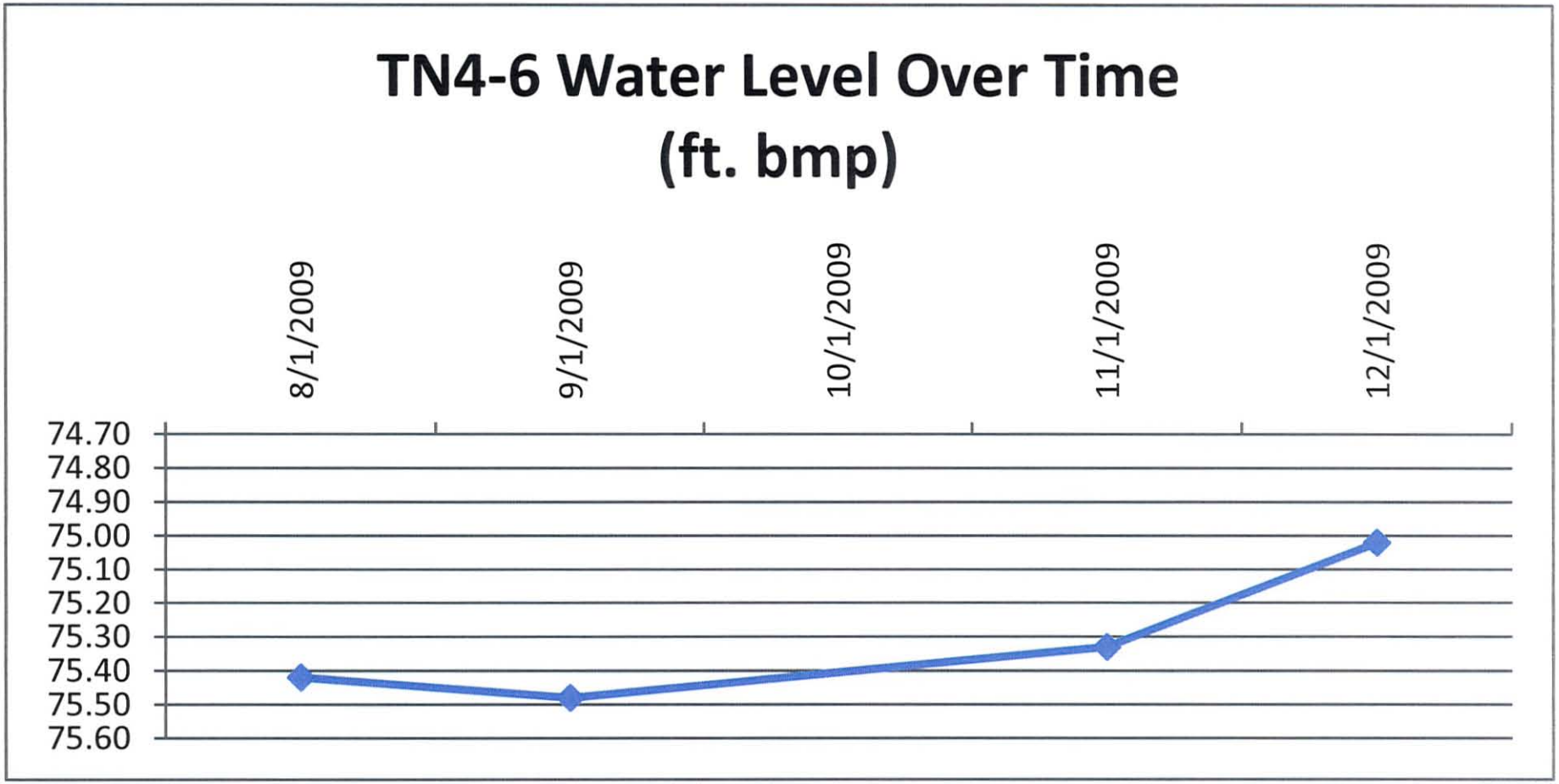
70.55
70.60
70.65
70.70
70.75
70.80


TN4-6 Water Level Over Time
(ft. bmp)
8/1/2009
9/1/2009
10/1/2009
11/1/2009
12/1/2009
74.70
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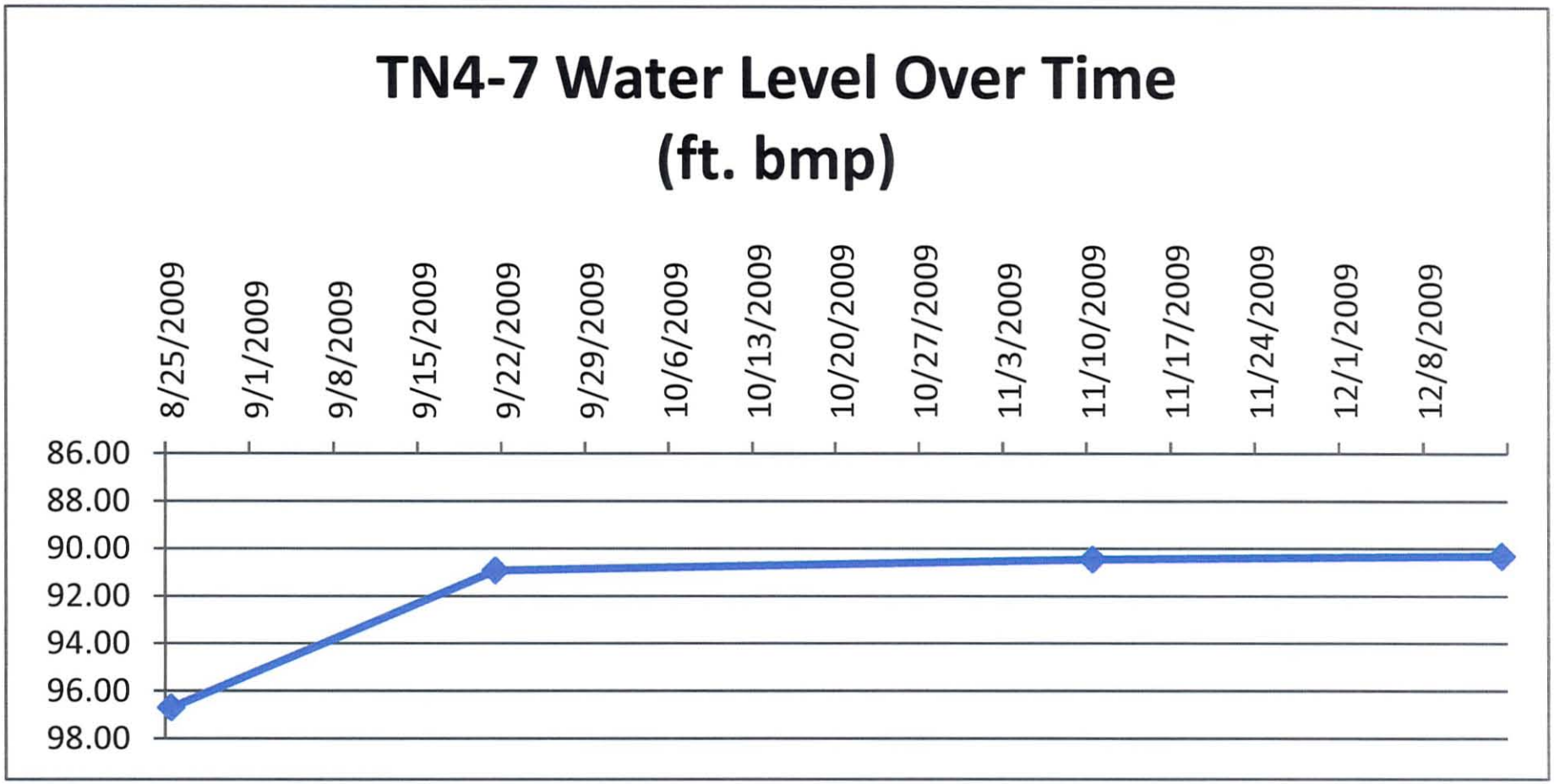
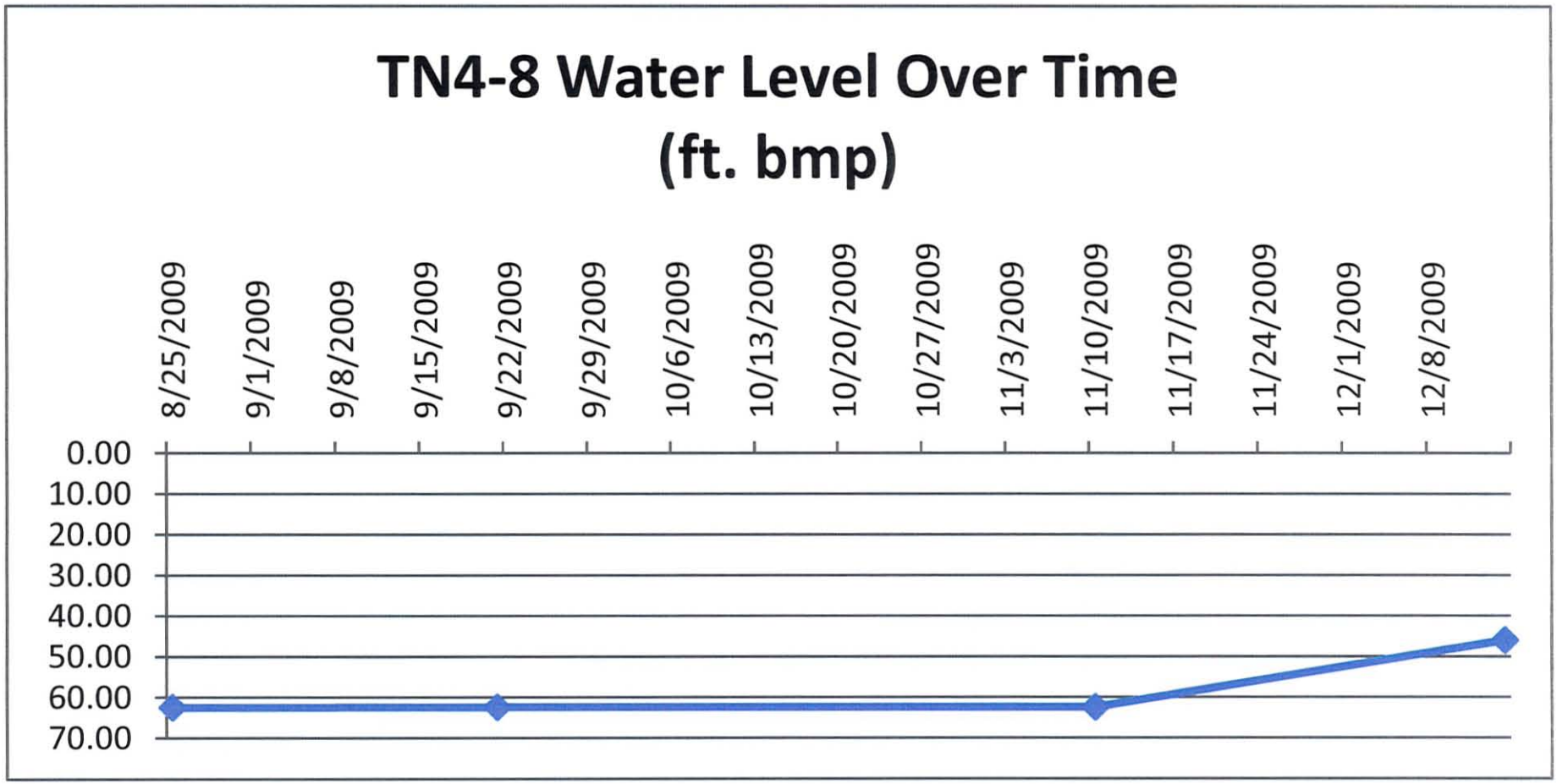
75.10
75.20
75.30
75.40
75.50
75.60


TN4-7 Water Level Over Time
(ft. bmp)
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009
11/17/2009
11/24/2009
12/1/2009
12/8/2009
86.00
88.00
90.00
92.00
94.00
96.00
98.00


TN4-8 Water Level Over Time
(ft. bmp)
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009
11/17/2009
11/24/2009
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12/8/2009
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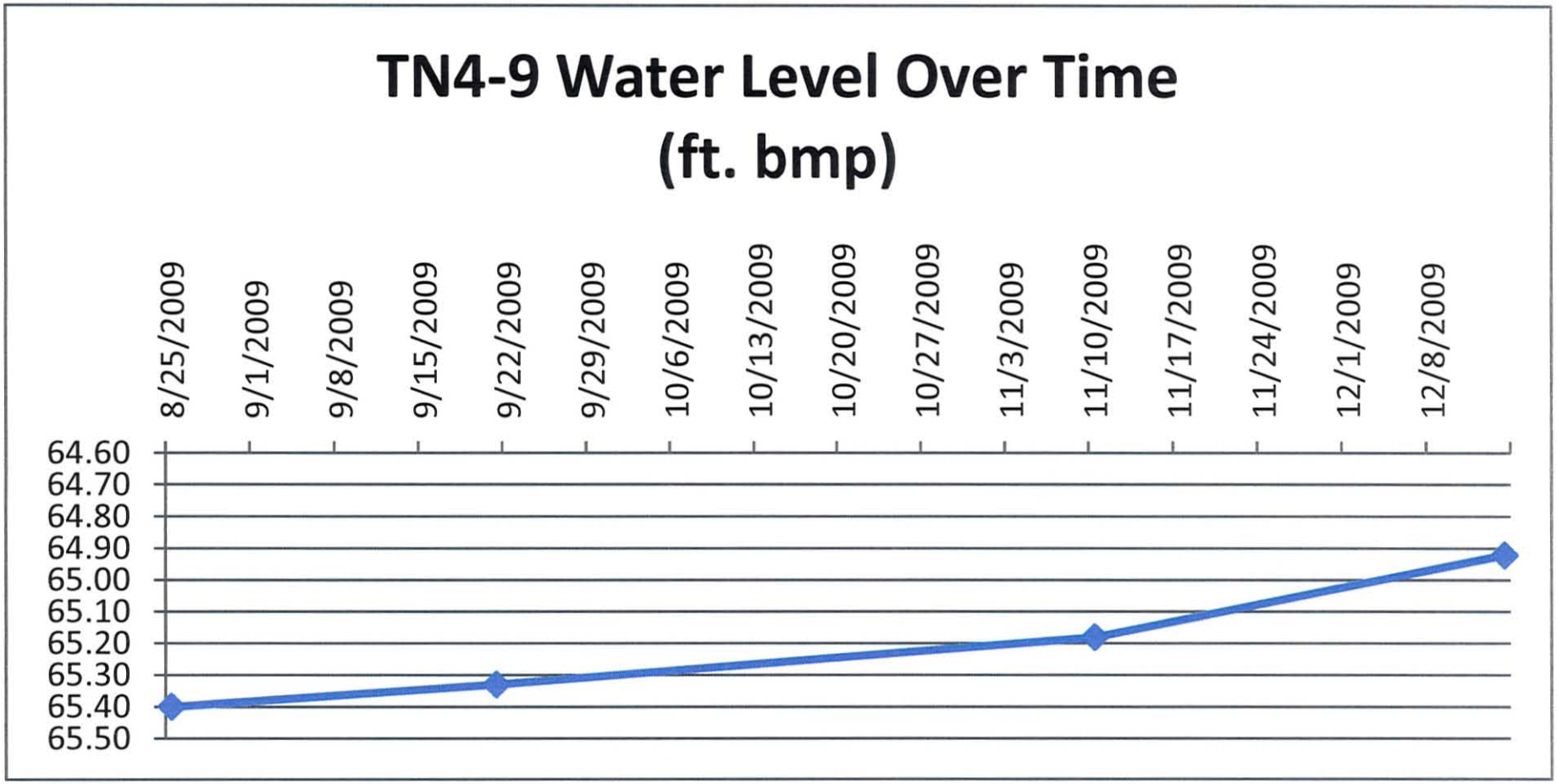
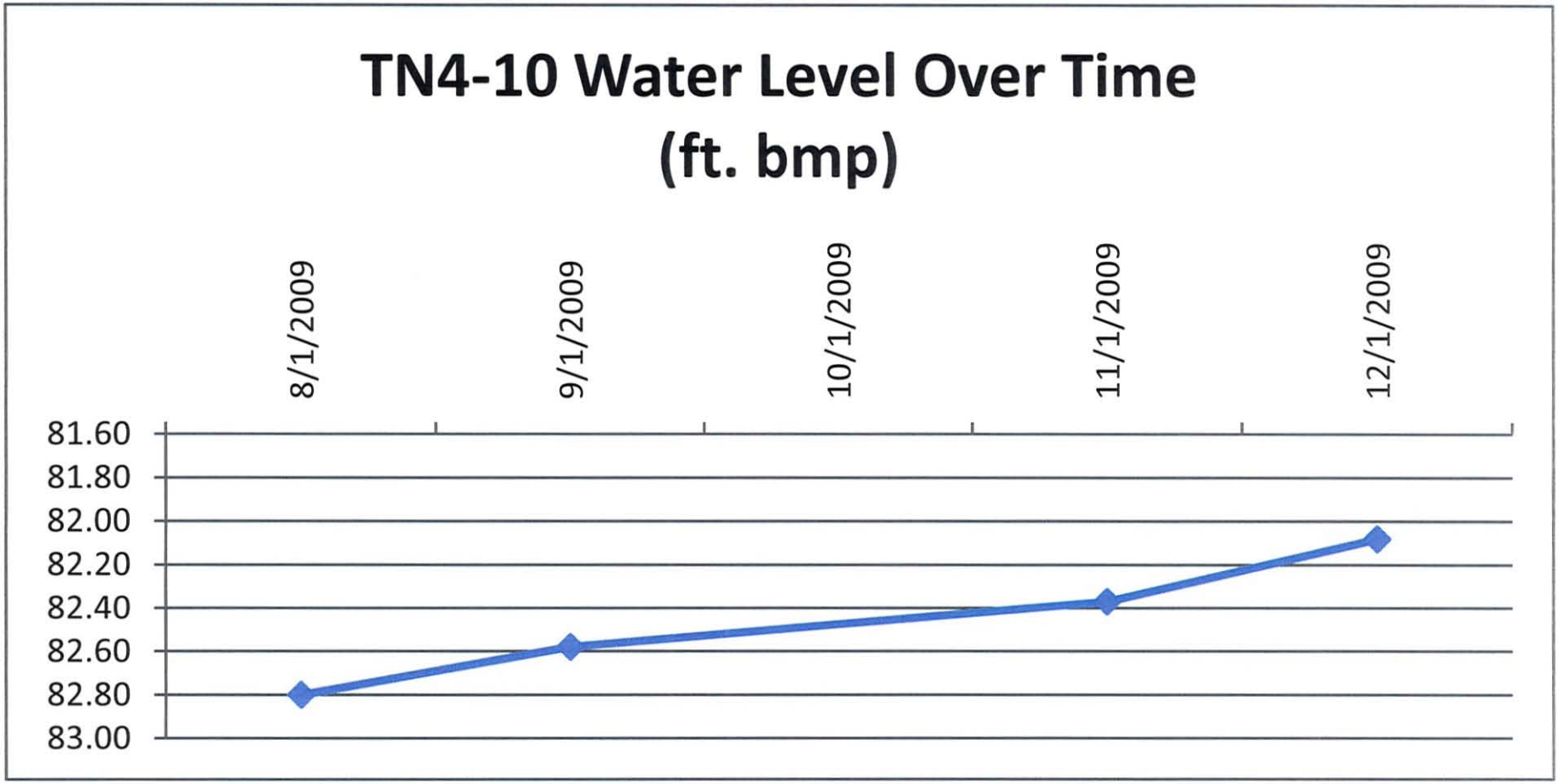
20.00
30.00
40.00
50.00
60.00
70.00


TN4-9 Water Level Over Time
(ft. bmp)
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009
11/17/2009
11/24/2009
12/1/2009
12/8/2009
64.60
64.70
64.80
64.90
65.00
65.10
65.20
65.30
65.40
65.50


TN4-10 Water Level Over Time
(ft. bmp)
8/1/2009
9/1/2009
10/1/2009
11/1/2009
12/1/2009
81.60
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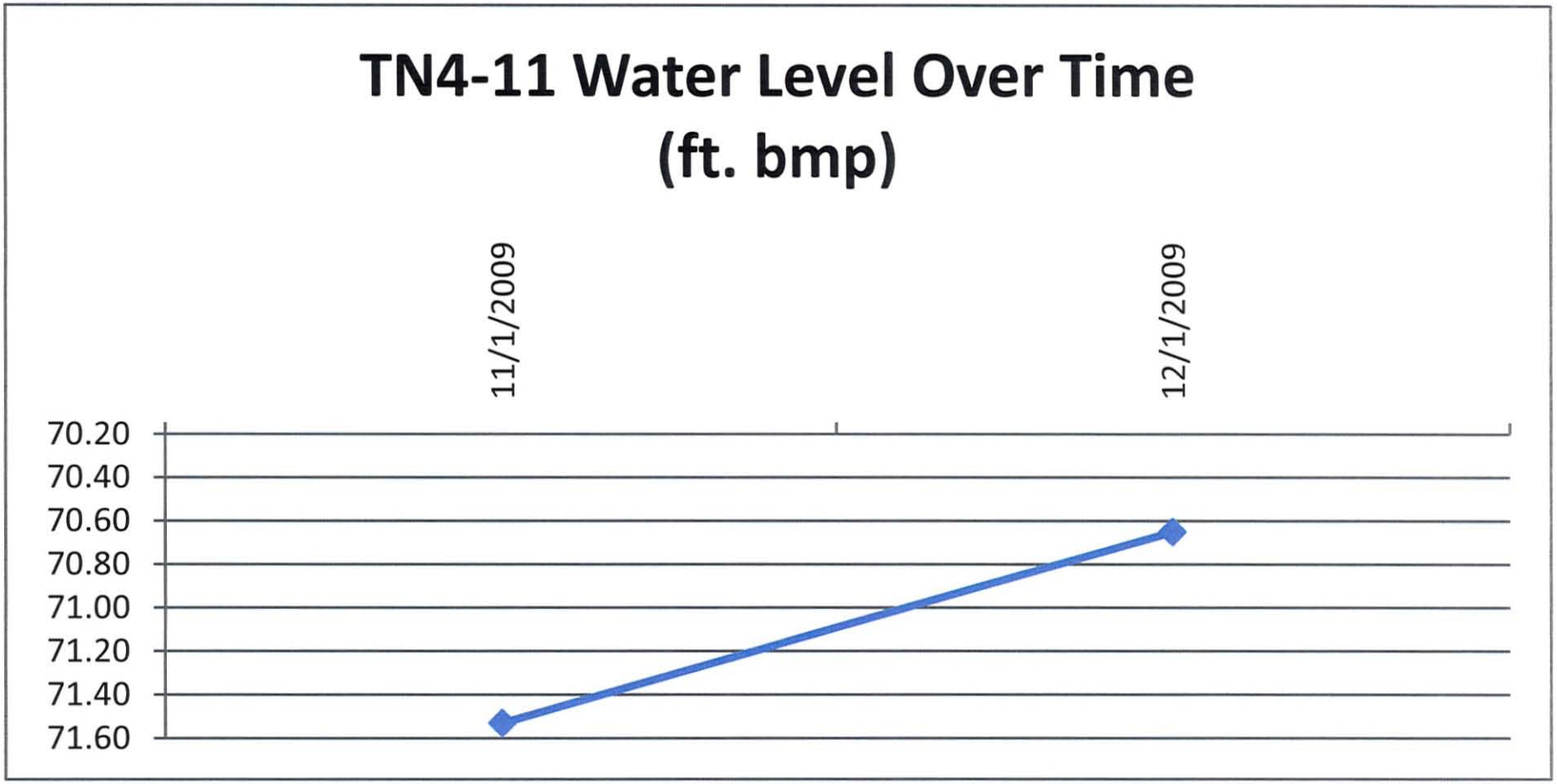
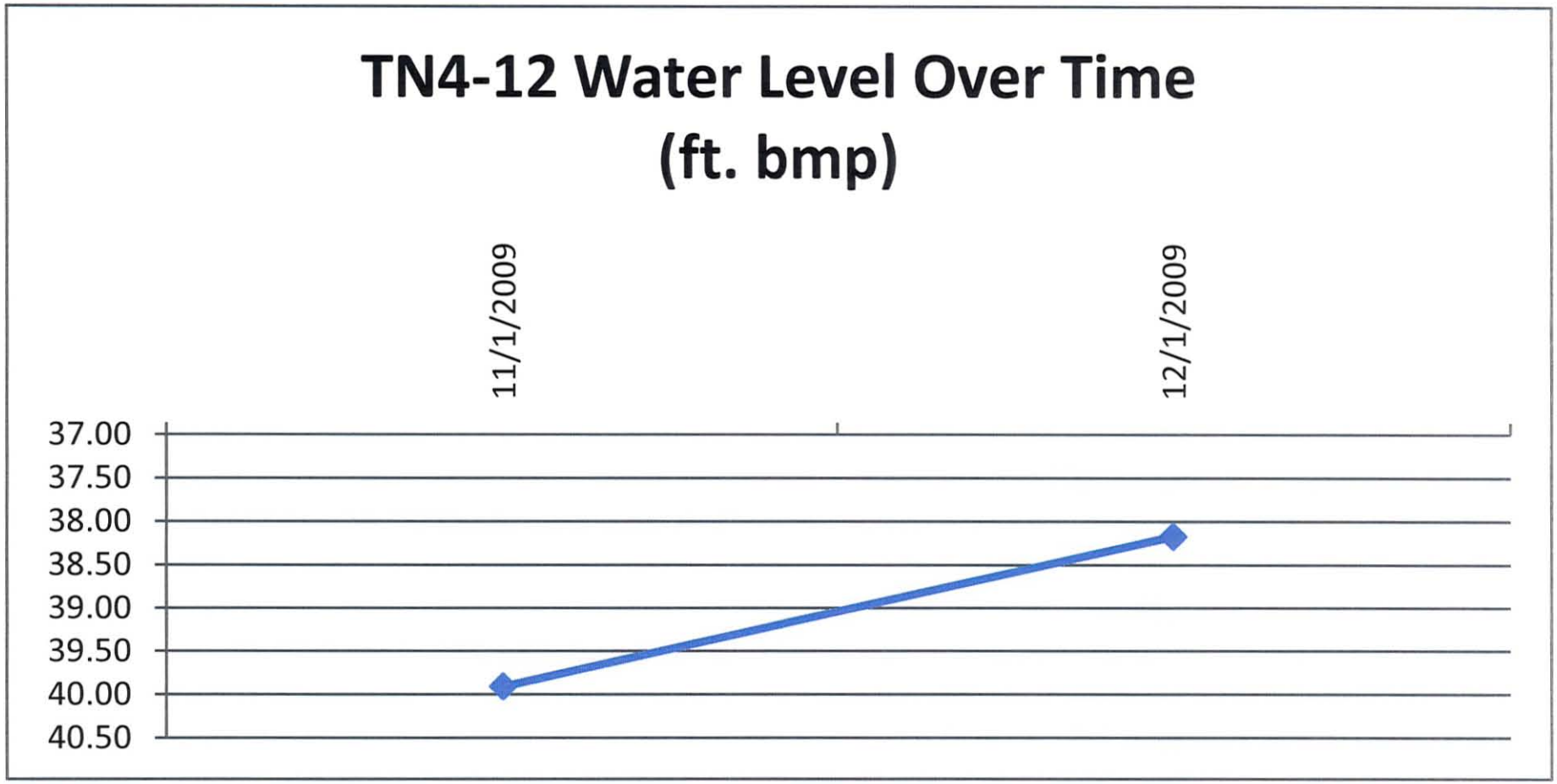
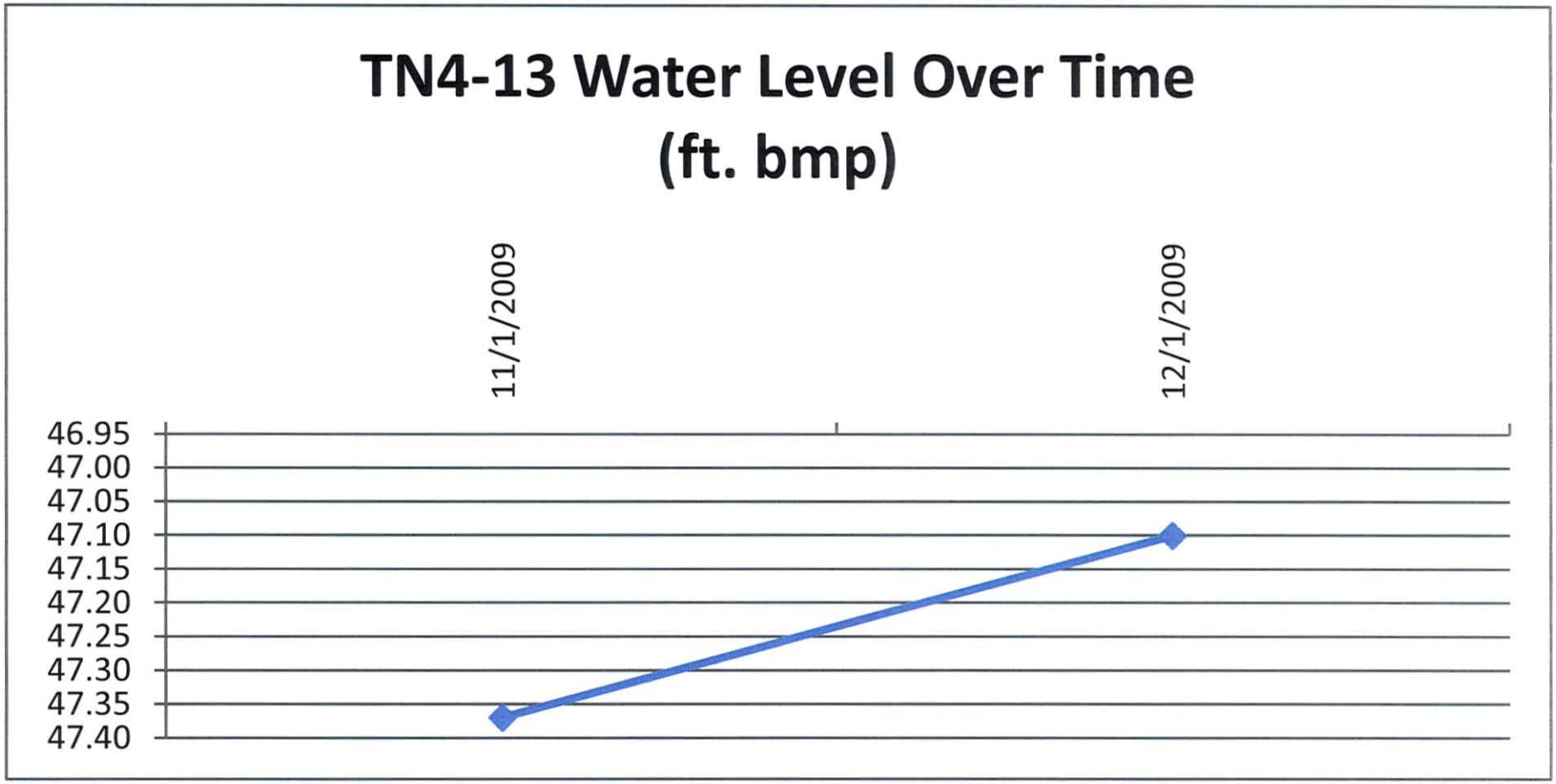
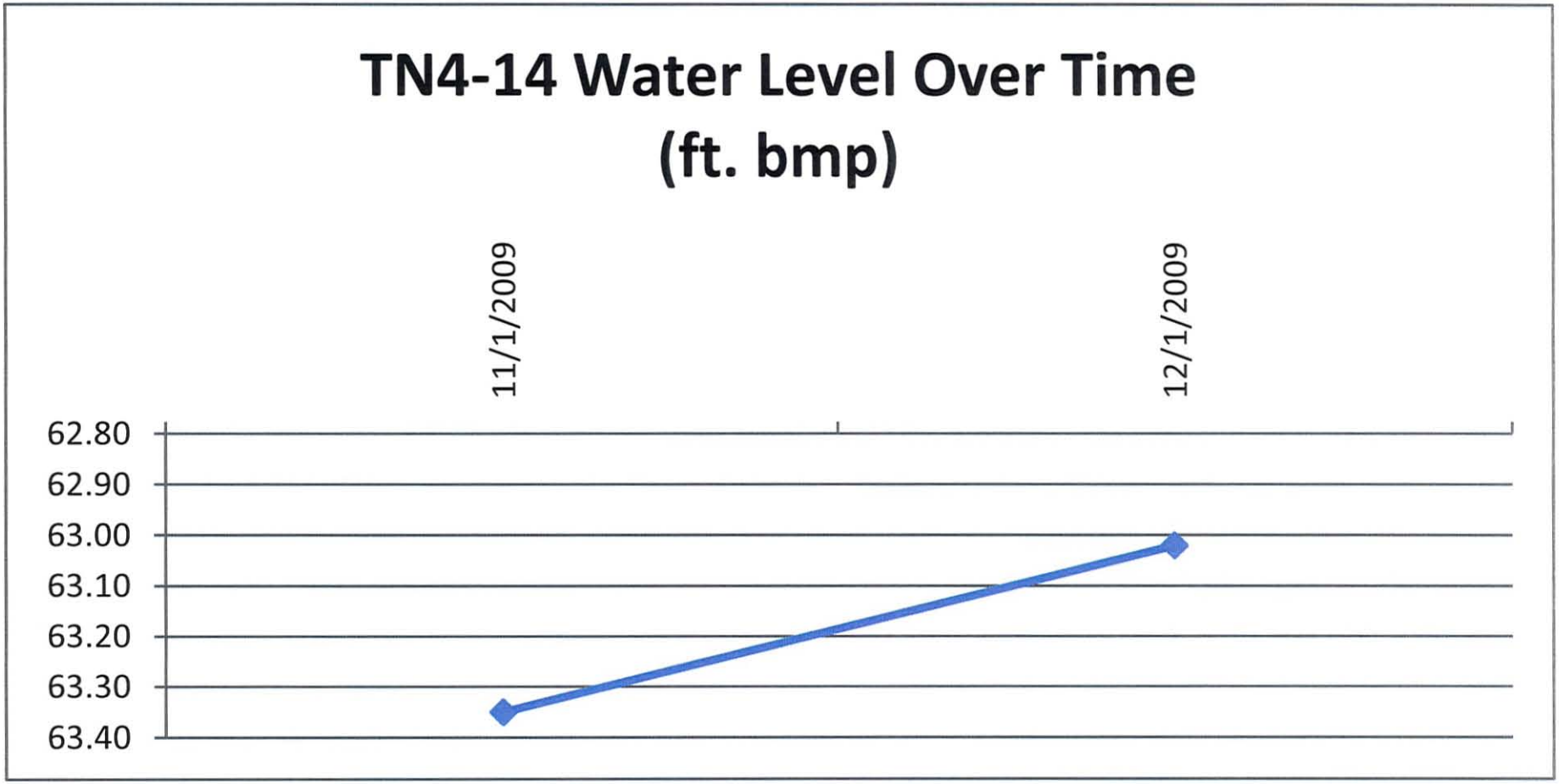
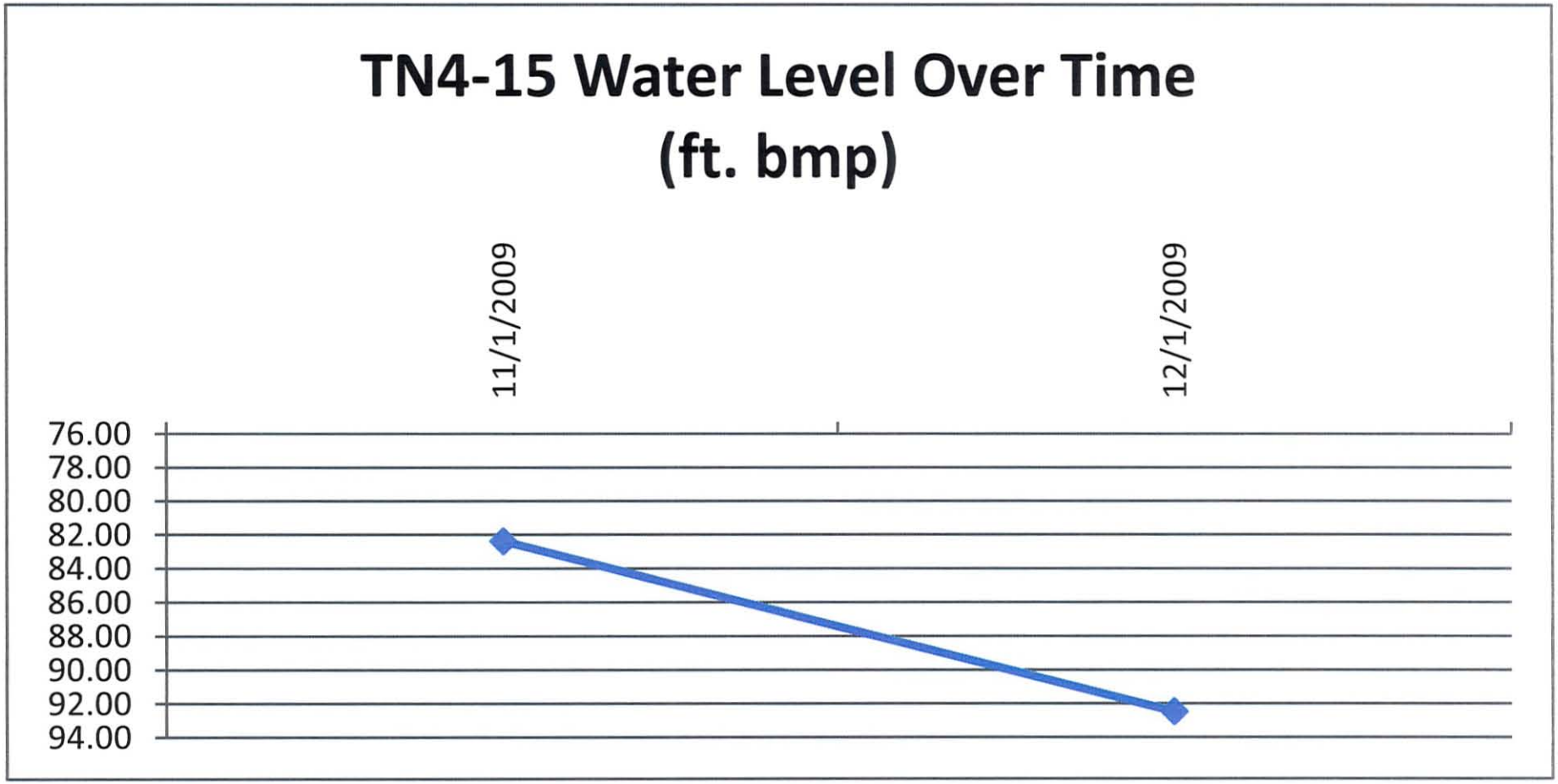
82.00
82.20
82.40
82.60
82.80
83.00

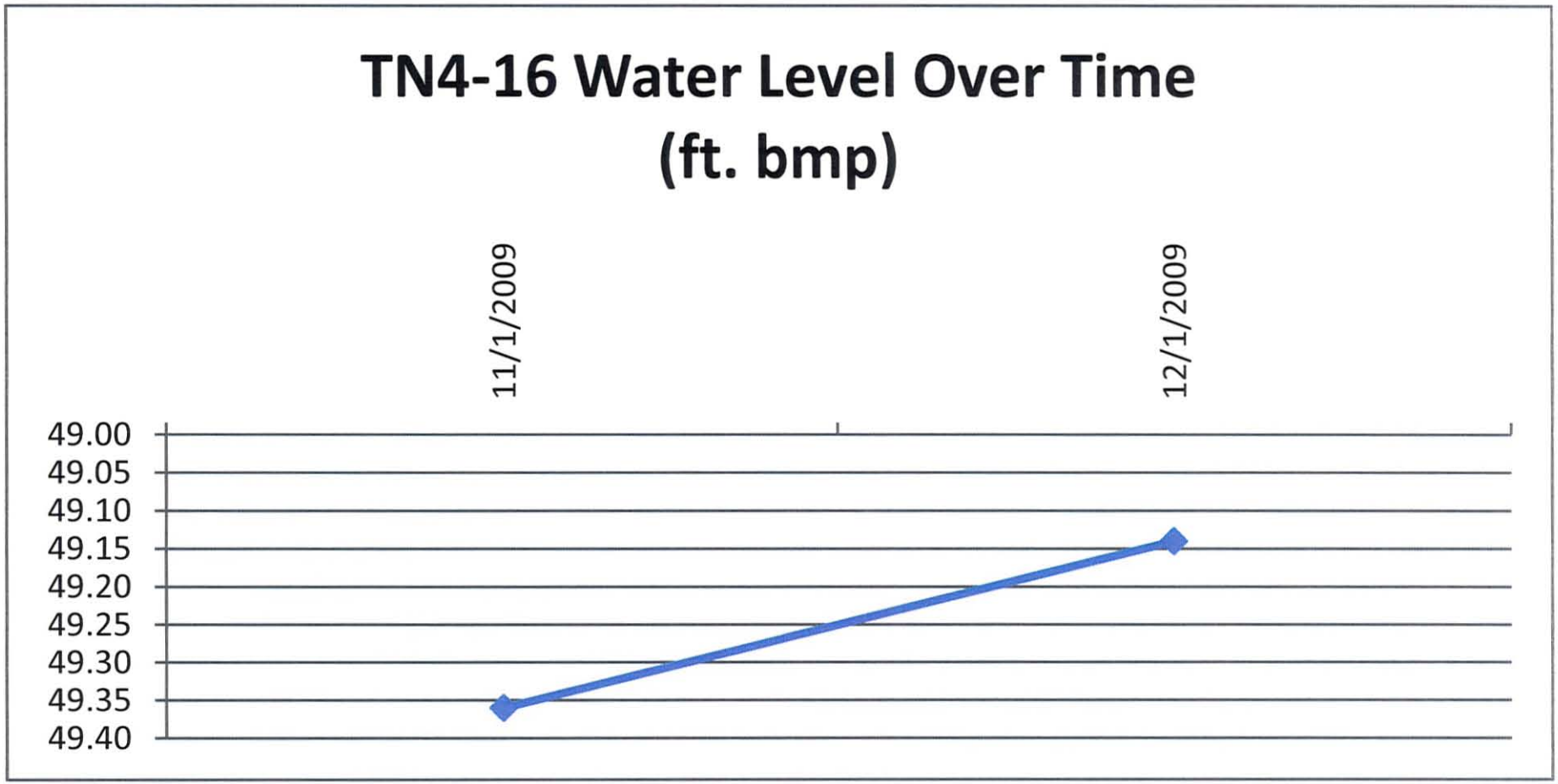

TN4-11 Water Level Over Time
(ft. bmp)
11/1/2009
12/1/2009
70.20
70.40
70.60
70.80
71.00
71.20
71.40
71.60

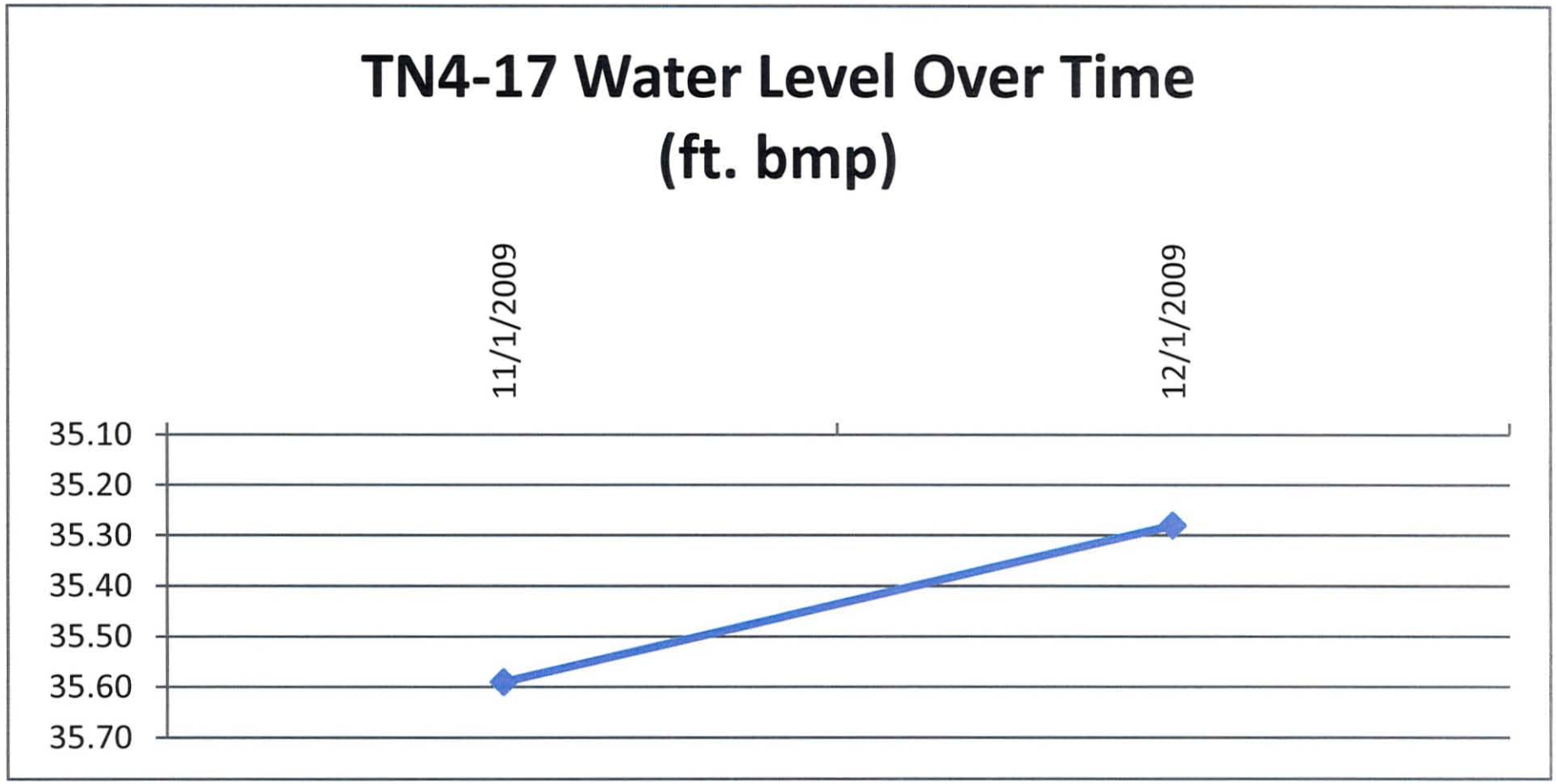

TN4-12 Water Level Over Time
(ft. bmp)
11/1/2009
12/1/2009
37.00
37.50
38.00
38.50
39.00
39.50
40.00
40.50

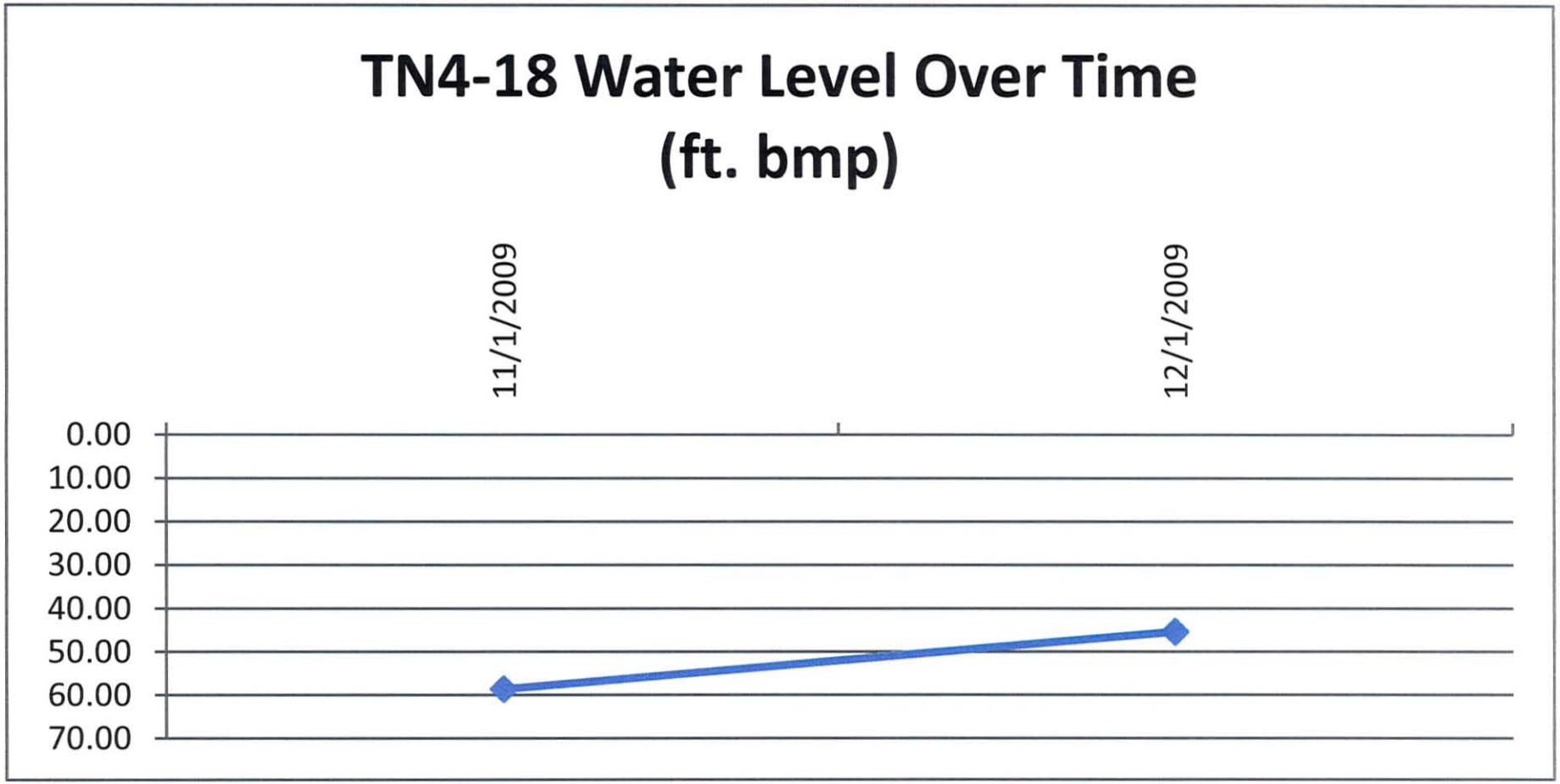

TN4-13 Water Level Over Time
(ft. bmp)
11/1/2009
12/1/2009
46.95
47.00
47.05
47.10
47.15
47.20
47.25
47.30
47.35
47.40

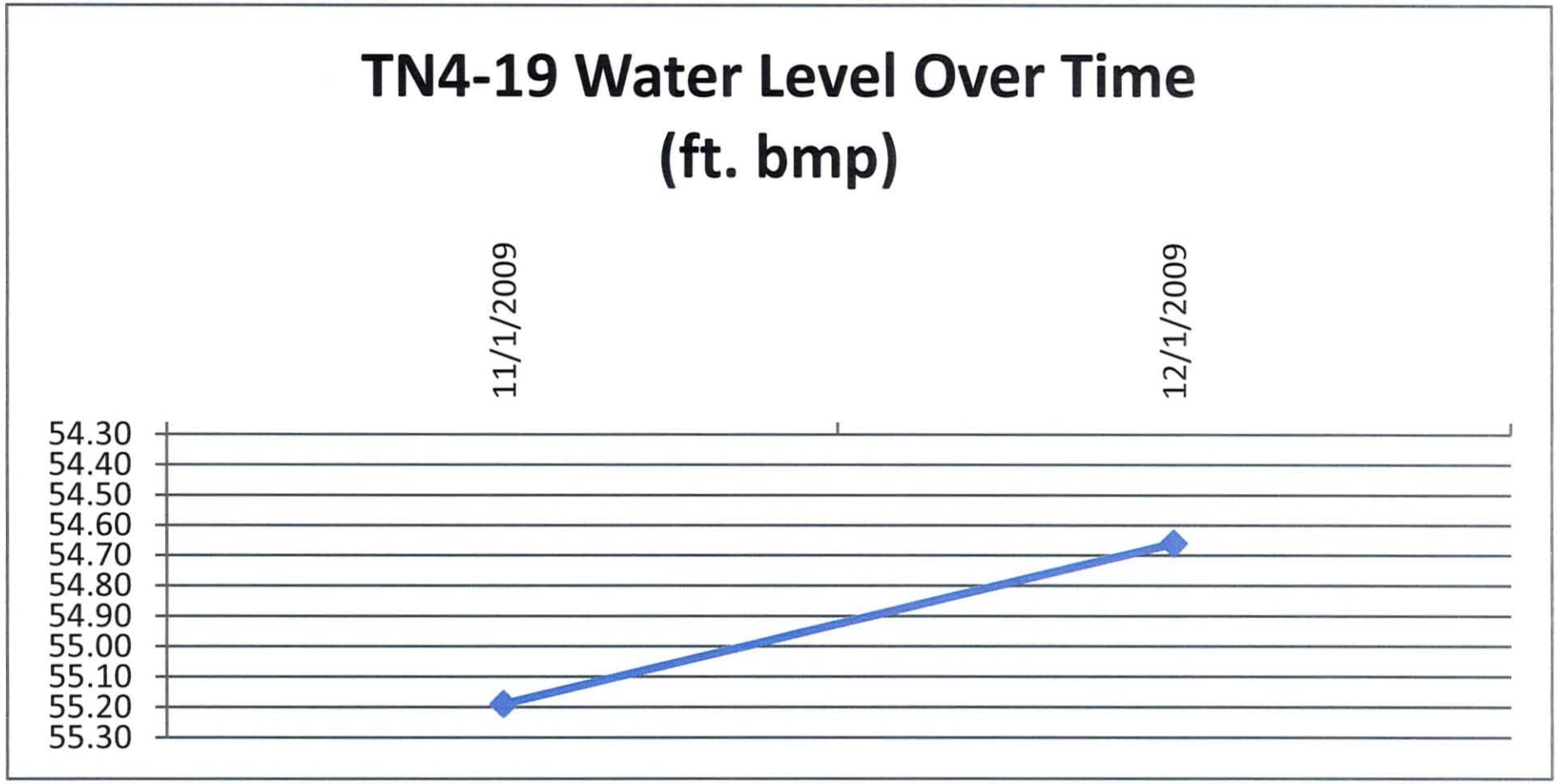

TN4-14 Water Level Over Time
(ft. bmp)
11/1/2009
12/1/2009
62.80
62.90
63.00
63.10
63.20
63.30
63.40


TN4-15 Water Level Over Time
(ft. bmp)
11/1/2009
12/1/2009
76.00
78.00
80.00
82.00
84.00
86.00
88.00
90.00
92.00
94.00


TN4-16 Water Level Over Time
(ft. bmp)
11/1/2009
12/1/2009
49.00
49.05
49.10
49.15
49.20
49.25
49.30
49.35
49.40


TN4-17 Water Level Over Time
(ft. bmp)
11/1/2009
12/1/2009
35.10
35.20
35.30
35.40
35.50
35.60
35.70


TN4-18 Water Level Over Time
(ft. bmp)
11/1/2009
12/1/2009
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00


TN4-19 Water Level Over Time
(ft. bmp)
11/1/2009
12/1/2009
54.30
54.40
54.50
54.60
54.70
54.80
54.90
55.00
55.10
55.20
55.30

Tab E

Water Levels and Data over Time
White Mesa Mill - Well TN4-1

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 Levels and Data over Time
White Mesa Mill - Well TN4-2

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 Levels and Data over Time
White Mesa Mill - Well TN4-3

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 Levels and Data over Time
White Mesa Mill - Well TN4-4

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 Levels and Data over Time
White Mesa Mill - Well TN4-5

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 Levels and Data over Time
White Mesa Mill - Well TN4-6

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 Levels and Data over Time
White Mesa Mill - Well TN4-7

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 Levels and Data over Time
White Mesa Mill - Well TN4-8

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 Levels and Data over Time
White Mesa Mill - Well TN4-9

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 Levels and Data over Time
White Mesa Mill - Well TN4-10

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 Levels and Data over Time
White Mesa Mill - Well TN4-11

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
	5,683.16	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 Levels and Data over Time
White Mesa Mill - Well TN4-12

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 Levels and Data over Time
White Mesa Mill - Well TN4-13

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 Levels and Data over Time
White Mesa Mill - Well TN4-14

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 Levels and Data over Time
White Mesa Mill - Well TN4-15

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
	5,675.01	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 Levels and Data over Time
White Mesa Mill - Well TN4-16

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 Levels and Data over Time
White Mesa Mill - Well TN4-17

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
	5,639.73	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 Levels and Data over Time
White Mesa Mill - Well TN4-18

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
	5,643.95	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 Levels and Data over Time
White Mesa Mill - Well TN4-19

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: Stephanie Waldrop

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

LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Initial Nitrate
Report Date: 02/11/09

Lab ID: C09020370-001
Client Sample ID: TWN-1
Matrix: Aqueous
Collection Date: 02/06/09 12:25
DateReceived: 02/10/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.7	mg/L		0.1		E353.2	02/11/09 10:59 / jal

Lab ID: C09020370-002
Client Sample ID: TWN-2
Matrix: Aqueous
Collection Date: 02/06/09 13:20
DateReceived: 02/10/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	25.4	mg/L	D	0.2		E353.2	02/11/09 11:09 / jal

Lab ID: C09020370-003
Client Sample ID: TWN-3
Matrix: Aqueous
Collection Date: 02/06/09 12:37
DateReceived: 02/10/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	23.6	mg/L	D	0.2		E353.2	02/11/09 11:12 / jal

Lab ID: C09020370-004
Client Sample ID: TWN-4
Matrix: Aqueous
Collection Date: 02/06/09 10:20
DateReceived: 02/10/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	1.0	mg/L		0.1		E353.2	02/11/09 11:14 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Initial Nitrate
Report Date: 02/11/09

Lab ID: C09020370-005
Client Sample ID: TWN-60
Matrix: Aqueous
Collection Date: 02/06/09 08:45
DateReceived: 02/10/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	02/11/09 11:17 / jal

Lab ID: C09020370-006
Client Sample ID: TWN-63
Matrix: Aqueous
Collection Date: 02/06/09 08:30
DateReceived: 02/10/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	02/11/09 11:19 / jal

Lab ID: C09020370-007
Client Sample ID: Temp Blank
Matrix: Aqueous
Collection Date: Not Provided
DateReceived: 02/10/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Temperature	2	°C				E170.1	02/10/09 09:25 / sdw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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: R114584
Sample ID: MBLK-1	Method Blank				Run: TECHNICON_090211A				02/11/09 10:07
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_090211A				02/11/09 10:09
Nitrogen, Nitrate+Nitrite as N	2.25	mg/L	0.10	90	90	110			
Sample ID: C09020370-001AMS	Sample Matrix Spike				Run: TECHNICON_090211A				02/11/09 11:02
Nitrogen, Nitrate+Nitrite as N	2.83	mg/L	0.10	108	90	110			
Sample ID: C09020370-001AMSD	Sample Matrix Spike Duplicate				Run: TECHNICON_090211A				02/11/09 11:04
Nitrogen, Nitrate+Nitrite as N	2.91	mg/L	0.10	112	90	110	2.8	10	S

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
Denison Mines	Initial Nitrate	State: UT	Yes ☐ No ☐
Report Mail Address:	**Contact Name:** Phone/Fax:	**Email:**	**Sampler: (Please Print)**
P.O. Box 809 Blanding UT 84511	Ryan Palmer 6782221		Tannee H. & Ryan P.
Invoice Address:	**Invoice Contact & Phone:**	**Purchase Order:**	**Quote/Bottle Order:**
SAME	David Turk		

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ A2LA
☐ GSA ☐ EDD/EDT(Electronic Data)
☐ POTW/WWTP Format:_____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: UPS
Cooler ID(s): client
Receipt Temp 2 °C
On Ice: (Yes) No
Custody Seal (Y) N
Bottles/Coolers B (C)
Intact (Y) N
Signature Match (Y) N

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O; Air Water Soils/Solids Vegetation Bioassay Other)	Nitrate								SEE ATTACHED	Normal Turnaround (TAT)	RUSH
1	TWN-1	2·6·09	1250	1-W	/										/
2	TWN-2	2·6·09	1320	1-W	/										/
3	TWN-3	2·6·09	1237	1-W	/										/
4	TWN-4	2·6·09	1020	1-W	/										/
5	TWN-60	2·6·09	0845	1-W	/										/
6	TWN-63	2·6·09	0830	1-W	/										/
7															
8	Temp Blank														
9															
10															

LABORATORY USE ONLY C09020370

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ryan Palmer	2-9-09 1030	Ryan Palmer			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory:	Date/Time:	Signature:
			P. Bathurst	2-10-09 9:25	

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

C09020370

Denison Mines (USA) Corp

Login completed by: Edith McPike

Date and Time Received: 2/10/2009 9:25 AM

Reviewed by:

Received by: pb

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

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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

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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: Stephanie Waldrop

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Chloride Exploration
Report Date: 02/12/09

Lab ID: C09020365-001
Client Sample ID: TWN-1
Matrix: Aqueous
Collection Date: 02/06/09 12:50
DateReceived: 02/10/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	19	mg/L		1		E300.0	02/11/09 20:05 / ljl

Lab ID: C09020365-002
Client Sample ID: TWN-2
Matrix: Aqueous
Collection Date: 02/06/09 13:20
DateReceived: 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 / ljl

Lab ID: C09020365-003
Client Sample ID: TWN-3
Matrix: Aqueous
Collection Date: 02/06/09 12:37
DateReceived: 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 / ljl

Lab ID: C09020365-004
Client Sample ID: TWN-4
Matrix: Aqueous
Collection Date: 02/06/09 10:20
DateReceived: 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 / ljl

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Chloride Exploration
Report Date: 02/12/09

Lab ID: C09020365-005
Client Sample ID: TWN-60
Matrix: Aqueous
Collection Date: 02/06/09 08:45
DateReceived: 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: C09020365-006
Client Sample ID: TWN-63
Matrix: Aqueous
Collection Date: 02/06/09 08:30
DateReceived: 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 21:53 / ljl

Lab ID: C09020365-007
Client Sample ID: Temp Blank
Matrix: Aqueous
Collection Date: Not Provided
DateReceived: 02/10/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Temperature	3.0	°C				E170.1	02/10/09 09:25 / pb

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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 Control 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						
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	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

Page 1 of 1

PLEASE PRINT- Provide as much information as possible.

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: Chloride Exploration	Sample Origin State: UT	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: P.O. Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 678-2221	Email:	Sampler: (Please Print) Tamara H. Ryan P.
Invoice Address: Same	Invoice Contact & Phone: David Turk 678 2221	Purchase Order:	Quote/Bottle Order:

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ A2LA
☐ GSA ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

Number of Containers
Sample Type: A W S V B O
Air Water Soils/Solids Vegetation Bioassay Other

ANALYSIS REQUESTED

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: UPS
Cooler ID(s): Client
Receipt Temp 3 °C
On Ice: Yes No
Custody Seal Y N
Bottles/Coolers B C
Intact Y N
Signature Match Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Chloride									SEE ATTACHED	Normal Turnaround (TAT)	RUSH	
1	TWN-1	2-6-09	1250	1-W	/											/	
2	TWN-2		1320	1-W	/											/	
3	TWN-3		1237	1-W	/											/	
4	TWN-4		1020	1-W	/											/	
5	TWN-60		0845	1-W	/											/	
6	TWN-63	2-6-09	0830	1-W	/											/	
7																	
8	Temp Blank																
9																	
10																	

C09020365

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print): Ryan Palmer	Date/Time: 1030 02-9-09	Signature: Ryan Palmer	Received by (print):	Date/Time:	Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Sample Disposal: Return to Client: _____	Lab Disposal: _____		Received by Laboratory: P. Baldwin	Date/Time: 2-10-09 9:25	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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

C09020365

Denison Mines (USA) Corp

Login completed by: Kimberly Humiston

Date and Time Received: 2/10/2009 9:25 AM

Reviewed by:

Received by: pb

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:	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

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CLIENT: Denison Mines (USA) Corp
Project: 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

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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
C09020752-001	Piez 1	02/19/09 08:48	02/20/09	Aqueous	Nitrogen, Nitrate + Nitrite
C09020752-002	Piez 2	02/19/09 08:20	02/20/09	Aqueous	Same As Above
C09020752-003	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 Waldrop

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

LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Nitrate
Report Date: 02/25/09

Lab ID: C09020752-001
Client Sample ID: Piez 1
Matrix: Aqueous
Collection Date: 02/19/09 08:48
DateReceived: 02/20/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	6.8	mg/L	D	0.2		E353.2	02/25/09 13:58 / jal

Lab ID: C09020752-002
Client Sample ID: Piez 2
Matrix: Aqueous
Collection Date: 02/19/09 08:20
DateReceived: 02/20/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	02/25/09 14:01 / jal

Lab ID: C09020752-003
Client Sample ID: Piez 3
Matrix: Aqueous
Collection Date: 02/19/09 07:35
DateReceived: 02/20/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.7	mg/L		0.1		E353.2	02/25/09 14:11 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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QA/QC Summary Report

Client: Denison Mines (USA) Corp
Project: Nitrate

Report Date: 02/25/09
Work Order: C09020752

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Batch: R115175
Sample ID: MBLK-1	Method Blank				Run: TECHNICON_090225A				02/25/09 13:04
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_090225A				02/25/09 13:07
Nitrogen, Nitrate+Nitrite as N	2.42	mg/L	0.10	94	90	110			
Sample ID: C09020752-002AMS	Sample Matrix Spike				Run: TECHNICON_090225A				02/25/09 14:03
Nitrogen, Nitrate+Nitrite as N	2.32	mg/L	0.10	90	90	110			
Sample ID: C09020752-002AMSD	Sample Matrix Spike Duplicate				Run: TECHNICON_090225A				02/25/09 14:06
Nitrogen, Nitrate+Nitrite as N	2.35	mg/L	0.10	92	90	110	1.3	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
Denison Mines	Nitrate	State: UT	Yes ☐ No ☐
Report Mail Address:	**Contact Name:**	**Phone/Fax:**	**Email:**	**Sampler: (Please Print)**
P.O. Box 809 Blanding UT 84511	Ryan Palmer	678 2221		Ryan Palmer
Invoice Address:	**Invoice Contact & Phone:**	**Purchase Order:**	**Quote/Bottle Order:**
Same	Same		

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ A2LA
☐ GSA ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: UPS
Cooler ID(s): 3181
Receipt Temp 3 °C
On Ice: Yes No
Custody Seal Y N
Bottles/Coolers B C
Intact Y N
Signature Match Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O; Air Water Soils/Solids Vegetation Bioassay Other)	Nitrate									SEE ATTACHED	Normal Turnaround (TAT)	RUSH
1	Piez 1	2-19-09	0848	1-W	X											
2	Piez 2	2-19-09	0820	1-W	X											
3	Piez 3	2-19-09	0735	1-W	X											
4																
5																
6																
7																
8																
9																
10																

LABORATORY USE ONLY 0902 0752

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ryan Palmer	2-19-09 1100	Ryan Pal			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory:	Date/Time:	Signature:
			P. Baldwin	2-20-09 9:30	

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

Denison Mines (USA) Corp

C09020752

Login completed by: Edith McPike

Date and Time Received: 2/20/2009 9:30 AM

Reviewed by:

Received by: pb

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:	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

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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

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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:

Stephanie D. Waldrop

Stephanie D. Waldrop
Reporting Supervisor

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Nitrate
Report Date: 07/30/09

Lab ID: C09070693-001
Client Sample ID: MW-18
Matrix: Aqueous
Collection Date: 07/14/09 08:12
DateReceived: 07/17/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	07/22/09 13:28 / jal

Lab ID: C09070693-002
Client Sample ID: MW-19
Matrix: Aqueous
Collection Date: 07/14/09 10:26
DateReceived: 07/17/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	2.2	mg/L		0.1		E353.2	07/22/09 13:31 / jal

Lab ID: C09070693-003
Client Sample ID: Piez-1
Matrix: Aqueous
Collection Date: 07/14/09 09:25
DateReceived: 07/17/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	6.8	mg/L		0.2		E353.2	07/22/09 13:33 / jal

Lab ID: C09070693-004
Client Sample ID: Piez-2
Matrix: Aqueous
Collection Date: 07/14/09 09:45
DateReceived: 07/17/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	07/22/09 13:36 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Nitrate
Report Date: 07/30/09

Lab ID: C09070693-005
Client Sample ID: Piez-3
Matrix: Aqueous
Collection Date: 07/14/09 10:10
DateReceived: 07/17/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.8	mg/L		0.1		E353.2	07/22/09 13:46 / jal

Lab ID: C09070693-006
Client Sample ID: Piez-4
Matrix: Aqueous
Collection Date: 07/14/09 08:07
DateReceived: 07/17/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	1.8	mg/L		0.1		E353.2	07/22/09 13:48 / jal

Lab ID: C09070693-007
Client Sample ID: Piez-5
Matrix: Aqueous
Collection Date: 07/14/09 08:52
DateReceived: 07/17/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.7	mg/L		0.1		E353.2	07/22/09 13:51 / jal

Lab ID: C09070693-008
Client Sample ID: Temp Blank
Matrix: Aqueous
Collection Date: 07/14/09 10:10
DateReceived: 07/17/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Temperature	2.0	°C				E170.1	07/17/09 09:15 / sec

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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									Batch: R121253
Sample ID: MBLK-1	Method Blank				Run: TECHNICON_090722A				07/22/09 12:43
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_090722A				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: TECHNICON_090722A				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: TECHNICON_090722A				07/22/09 13:41
Nitrogen, Nitrate+Nitrite as N	2.47	mg/L	0.10	100	90	110	3.3	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: Nitrate	Sample Origin State: UT	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: P.O. Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 678 2221	Email:	Sampler: (Please Print) Tanner H. & Ryan P.
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ A2LA
☐ GSA ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: one temp Blank per container

Shipped by: UPS ARS

Cooler ID(s): Client

Receipt Temp: 2 °C

On Ice: (Yes) No

Custody Seal (Y) N

Bottles/Coolers B (C)

Intact (Y) N

Signature Match (Y) N

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O; Air Water Soils/Solids Vegetation Bioassay Other)	Nitrate								SEE ATTACHED	Normal Turnaround (TAT)	RUSH
1 MW-18	7-14-09	0812	1-W	X										
2 MW-19		1026		X										
3 Piez-1		0925		X										
4 Piez-2		0945		X										
5 Piez-3		1010		X										
6 Piez-4		0807		X										
7 Piez-5	7-14-09	0852	1-W	X										
8														
9														
10														

LABORATORY USE ONLY: 0907076653

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ryan Palmer	7-16-09 1045	[signature]			
			Received by Laboratory: Andrew Larsen	7/17/09 915	[signature]

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

C09070693

Denison Mines (USA) Corp

Login completed by: Edith McPike

Date and Time 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

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CLIENT: Denison Mines (USA) Corp
Project: Nitrate
Sample Delivery Group: C09070693

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

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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	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

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

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

LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Nitrate
Report Date: 08/03/09

Lab ID: C09070903-001
Client Sample ID: TWN-1
Matrix: Aqueous
Collection Date: 07/21/09 13:23
DateReceived: 07/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.4	mg/L		0.1		E353.2	07/24/09 11:23 / jal

Lab ID: C09070903-002
Client Sample ID: TWN-2
Matrix: Aqueous
Collection Date: 07/21/09 13:34
DateReceived: 07/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	25.0	mg/L	D	0.3		E353.2	07/24/09 11:25 / jal

Lab ID: C09070903-003
Client Sample ID: TWN-3
Matrix: Aqueous
Collection Date: 07/21/09 13:55
DateReceived: 07/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	25.3	mg/L	D	0.3		E353.2	07/31/09 14:36 / jal

Lab ID: C09070903-004
Client Sample ID: TWN-4
Matrix: Aqueous
Collection Date: 07/21/09 13:43
DateReceived: 07/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	07/31/09 14:39 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Nitrate
Report Date: 08/03/09

Lab ID: C09070903-005
Client Sample ID: TWN-60
Matrix: Aqueous
Collection Date: 07/21/09 09:30
DateReceived: 07/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	07/31/09 14:41 / jal

Lab ID: C09070903-006
Client Sample ID: TWN-63
Matrix: Aqueous
Collection Date: 07/21/09 09:48
DateReceived: 07/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	07/31/09 14:44 / jal

Lab ID: C09070903-007
Client Sample ID: TWN-64
Matrix: Aqueous
Collection Date: 07/21/09 11:45
DateReceived: 07/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	07/31/09 14:54 / jal

Lab ID: C09070903-008
Client Sample ID: TWN-65
Matrix: Aqueous
Collection Date: 07/21/09 13:43
DateReceived: 07/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	07/31/09 14:56 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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: TECHNICON_090724A				07/24/09 10:13
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_090724A				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: TECHNICON_090724A				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: TECHNICON_090724A				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 Control Sample				Run: TECHNICON_090731A				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: TECHNICON_090731A				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: TECHNICON_090731A				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: TECHNICON_090731A				07/31/09 15:24
Nitrogen, Nitrate+Nitrite as N	2.21	mg/L	0.10	103	90	110	2.7	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
Denison Mines	Nitrate	State: UT	Yes ☐ No ☐
Report Mail Address:	**Contact Name:**	**Phone/Fax:**	**Email:**	**Sampler: (Please Print)**
P.O. Box 809 Blanding UT 84511	Ryan Palmer	678-2221		Tanner H Ryan P.
Invoice Address:	**Invoice Contact & Phone:**	**Purchase Order:**	**Quote/Bottle Order:**
Same	Same		

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

- ☐ DW
- ☐ GSA
- ☐ POTW/WWTP
- ☐ State: _____
- ☐ Other: _____
- ☐ A2LA
- ☐ EDD/EDT (Electronic Data) Format: _____
- ☐ LEVEL IV
- ☐ NELAC

Number of Containers / Sample Type: A W S V B O / Air Water Soils/Solids Vegetation Bioassay Other

ANALYSIS REQUESTED

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: UPS

Cooler ID(s): client

Receipt Temp 2 °C

On Ice: (Yes) No

Custody Seal (Y) N

Bottles/Coolers B (C)

Intact (Y) N

Signature Match (Y) N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Nitrate								SEE ATTACHED	Normal Turnaround (TAT)	RUSH	Comments
1	TWN-1	7.21.09	1323	2-W	X											
2	TWN-2		1334	1-W	X											
3	TWN-3		1355	1-W	X											
4	TWN-4		1343	1-W	X											
5	TWN-60		0930	1-W	X											
6	TWN-63		0948	1-W	X											C09070903
7	TWN-64		1145	1-W	X											
8	TWN-65	7.21.09	1343	2-W	X											
9	~~One trip blank per cooler container~~															
10																

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ryan Palmer	7.22.09 1040				
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory:	Date/Time:	Signature:
			Andrew Larsen	9:30 7/23/09	

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

C09070903

Denison Mines (USA) Corp

Login completed by: Corinne Wagner

Date and Time Received: 7/23/2009 9:30 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

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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

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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

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Chloride
Report Date: 07/30/09

Lab ID: C09070691-001
Client Sample ID: MW 18
Matrix: Aqueous
Collection Date: 07/14/09 08:12
DateReceived: 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 / ljl

Lab ID: C09070691-002
Client Sample ID: MW 19
Matrix: Aqueous
Collection Date: 07/14/09 10:26
DateReceived: 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 / ljl

Lab ID: C09070691-003
Client Sample ID: Piez-1
Matrix: Aqueous
Collection Date: 07/14/09 09:25
DateReceived: 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 / ljl

Lab ID: C09070691-004
Client Sample ID: Piez-2
Matrix: Aqueous
Collection Date: 07/14/09 09:45
DateReceived: 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 / ljl

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Chloride
Report Date: 07/30/09

Lab ID: C09070691-005
Client Sample ID: Piez-3
Matrix: Aqueous
Collection Date: 07/14/09 10:10
DateReceived: 07/17/09

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 / ljl

Lab ID: C09070691-006
Client Sample ID: Piez-4
Matrix: Aqueous
Collection Date: 07/14/09 08:07
DateReceived: 07/17/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	46	mg/L		1		E300.0	07/22/09 01:50 / ljl

Lab ID: C09070691-007
Client Sample ID: Piez-5
Matrix: Aqueous
Collection Date: 07/14/09 08:52
DateReceived: 07/17/09

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

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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 Control 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.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
Denison Mines	Chloride	State: UT	Yes ☐ No ☐
Report Mail Address:	**Contact Name:**	**Phone/Fax:**	**Email:**	**Sampler: (Please Print)**
P.O. Box 809 Blanding UT 84511	Ryan Palmer	678 2221		
Invoice Address:	**Invoice Contact & Phone:**	**Purchase Order:**	**Quote/Bottle Order:**
Same	Same		

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

- ☐ DW
- ☐ GSA
- ☐ POTW/WWTP
- ☐ State: _____
- ☐ Other: _____
- ☐ A2LA
- ☐ EDD/EDT (Electronic Data) Format: _____
- ☐ LEVEL IV
- ☐ NELAC

RUSH: Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Sample Piez 3 Pn at 9 7/17/09 Andrew

Shipped by: UPS ABS NUDA

Cooler ID(s): Client

Receipt Temp: 2 °C

On Ice: (Yes) No

Custody Seal: (Y) N

Bottles/Coolers: B (C)

Intact: (Y) N

Signature Match: (Y) N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O; Air Water Soils/Solids Vegetation Bioassay Other)	Chloride									SEE ATTACHED	Normal Turnaround (TAT)
1	MW 18	7.14.09	0812	1-W	X										
2	MW 19		1026		X										
3	Piez-1		0925		X										
4	Piez-2		0945		X										
5	Piez-3		1010		X										
6	Piez-4		0807		X										
7	Piez-5	7.14.09	0852	1-W	X										
8															
9															
10															

LABORATORY USE ONLY: 0907069

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ryan Palmer	7.16.09 1045				
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory:	Date/Time:	Signature:
			Andrew Larsen	7/17/09 915	

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

C09070691

Denison Mines (USA) Corp

Login completed by: Edith McPike

Date and Time 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

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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

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602
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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: Stephanie D. Waldrop

Stephanie D. Waldrop
Reporting Supervisor

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Nitrate Initial
Report Date: 08/31/09

Lab ID: C09081076-001
Client Sample ID: TWN-5
Matrix: Aqueous
Collection Date: 08/27/09 06:40
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	0.22	mg/L		0.10		E353.2	08/31/09 11:33 / jal

Lab ID: C09081076-002
Client Sample ID: TWN-6
Matrix: Aqueous
Collection Date: 08/27/09 06:57
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	3.2	mg/L		0.10		E353.2	08/31/09 11:35 / jal

Lab ID: C09081076-003
Client Sample ID: TWN-7
Matrix: Aqueous
Collection Date: 08/27/09 06:25
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.10		E353.2	08/31/09 11:38 / jal

Lab ID: C09081076-004
Client Sample ID: TWN-8
Matrix: Aqueous
Collection Date: 08/27/09 07:06
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.10		E353.2	08/31/09 11:40 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Nitrate Initial
Report Date: 08/31/09

Lab ID: C09081076-005
Client Sample ID: TWN-9
Matrix: Aqueous
Collection Date: 08/27/09 07:27
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	9.3	mg/L		0.15		E353.2	08/31/09 11:50 / jal

Lab ID: C09081076-006
Client Sample ID: TWN-10
Matrix: Aqueous
Collection Date: 08/27/09 07:15
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+Nitrite as N	1.1	mg/L		0.10		E353.2	08/31/09 11:53 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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	RPDLimit	Qual
Method: E353.2									Batch: R123095
Sample ID: MBLK-1	Method Blank				Run: TECHNICON_090831A				08/31/09 09:30
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_090831A				08/31/09 09:33
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 11:43
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 11:45
Nitrogen, Nitrate+Nitrite as N	2.2	mg/L	0.10	108	90	110			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: Nitrate Initial	Sample Origin State: UT	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: P.O. Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 678-2221	Email:	Sampler: (Please Print) Ryan Palmer
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

ANALYSIS REQUESTED

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: NDA
Cooler ID(s): Client
Receipt Temp: 4 °C
On Ice: (Y) N
Custody Seal On Bottle (Y) N
On Cooler Y (N)
Intact (Y) N
Signature Match (Y) N

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Nitrate								SEE ATTACHED
1 TWN-5	8·27·09	0640	1-W	X								
2 TWN-6		0657		X								
3 TWN-7		0625		X								
4 TWN-8		0706		X								
5 TWN-9		0727		X								
6 TWN-10	8·27·09	0715	1-W	X								
7												
8												
9												
10												

LABORATORY USE ONLY
0908110760

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ryan Palmer	8·27·09 1050	RP			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Andrew	Date/Time: 8/28/09 930	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

Energy Laboratories Inc
Workorder Receipt Checklist

Denison Mines (USA) Corp

C09081076

Login completed by: Kimberly Humiston

Date and Time Received: 8/28/2009 9:30 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:	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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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

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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
C09081078-001	TWN-5	08/27/09 06:40	08/28/09	Aqueous	Chloride
C09081078-002	TWN-6	08/27/09 06:57	08/28/09	Aqueous	Same As Above
C09081078-003	TWN-7	08/27/09 06:25	08/28/09	Aqueous	Same As Above
C09081078-004	TWN-8	08/27/09 07:06	08/28/09	Aqueous	Same As Above
C09081078-005	TWN-9	08/27/09 07:27	08/28/09	Aqueous	Same As Above
C09081078-006	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: Stephanie D Waldrop

Stephanie D. Waldrop
Reporting Supervisor

ENERGY LABORATORIES
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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Chloride Inv. Initial
Report Date: 09/04/09

Lab ID: C09081078-001
Client Sample ID: TWN-5
Matrix: Aqueous
Collection Date: 08/27/09 06:40
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	42	mg/L		1		A4500-Cl B	09/04/09 13:47 / jal

Lab ID: C09081078-002
Client Sample ID: TWN-6
Matrix: Aqueous
Collection Date: 08/27/09 06:57
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	32	mg/L		1		A4500-Cl B	09/04/09 13:49 / jal

Lab ID: C09081078-003
Client Sample ID: TWN-7
Matrix: Aqueous
Collection Date: 08/27/09 06:25
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	4	mg/L		1		A4500-Cl B	09/04/09 13:51 / jal

Lab ID: C09081078-004
Client Sample ID: TWN-8
Matrix: Aqueous
Collection Date: 08/27/09 07:06
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	11	mg/L		1		A4500-Cl B	09/04/09 13:53 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines (USA) Corp
Site Name: Chloride Inv. Initial
Report Date: 09/04/09

Lab ID: C09081078-005
Client Sample ID: TWN-9
Matrix: Aqueous
Collection Date: 08/27/09 07:27
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	169	mg/L		1		A4500-Cl B	09/04/09 13:55 / jal

Lab ID: C09081078-006
Client Sample ID: TWN-10
Matrix: Aqueous
Collection Date: 08/27/09 07:15
DateReceived: 08/28/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	19	mg/L		1		A4500-Cl B	09/04/09 13:58 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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QA/QC Summary Report

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-Cl B								Batch: 090904B-CL-TTR-W	
Sample ID: MBLK9-090904B	Method Blank				Run: TITRATION_090904C			09/04/09 13:45	
Chloride	ND	mg/L	0.4						
Sample ID: C09081078-005AMS	Sample Matrix Spike				Run: TITRATION_090904C			09/04/09 14:02	
Chloride	523	mg/L	1.0	100	90	110			
Sample ID: LCS35-090904B	Laboratory Control Sample				Run: TITRATION_090904C			09/04/09 14:04	
Chloride	3500	mg/L	1.0	99	90	110			
Sample ID: C09081078-005AMSD	Sample Matrix Spike Duplicate				Run: TITRATION_090904C			09/04/09 14:15	
Chloride	523	mg/L	1.0	100	90	110	0	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: Chloride Inv. Initial	Sample Origin State: UT	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: P.O. Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 678-2221	Email:	Sampler: (Please Print) Ryan Palmer
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

ANALYSIS REQUESTED

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

SEE ATTACHED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: NDA
Cooler ID(s): Client
Receipt Temp: 4 °C
On Ice: (Y) N
Custody Seal: On Bottle (Y) N; On Cooler (Y) N
Intact (Y) N
Signature Match (Y) N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Chloride
1	TWN-5	8-27-09	0640	1-W	X
2	TWN-6		0657		X
3	TWN-7		0625		X
4	TWN-8		0706		X
5	TWN-9		0727		X
6	TWN-10	8-27-09	0715	1-W	X
7					
8					
9					
10					

LABORATORY USE ONLY
C9081078

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ryan Palmer	8-27-09 1050	Ryan Palmer			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Andrew	Date/Time: 8/28/09 930	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

C09081078

Denison Mines (USA) Corp

Login completed by: Kimberly Humiston

Date and Time Received: 8/28/2009 9:30 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:	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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Toll Free 888.235.0515 • 235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

CLIENT: 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

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602
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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.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
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
C09090891-008	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-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
C09090891-016	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
C09090891-024	WLPU	09/22/09 10:55	09/23/09	Aqueous	Same As Above

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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. Waldrop

Stephanie D. Waldrop
Reporting Supervisor

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 3rd Quarter Nitrate and Chloride
Report Date: 10/06/09

Lab ID: C09090891-001
Client Sample ID: TWN-1R
Matrix: Aqueous
Collection Date: 09/21/09 07:50
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	10/02/09 14:07 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:18 / jal

Lab ID: C09090891-002
Client Sample ID: TWN-2R
Matrix: Aqueous
Collection Date: 09/21/09 08:57
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	10/02/09 14:15 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:20 / jal

Lab ID: C09090891-003
Client Sample ID: TWN-3R
Matrix: Aqueous
Collection Date: 09/21/09 09:47
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	1	mg/L		1		A4500-Cl B	10/02/09 14:19 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:23 / jal

Lab ID: C09090891-004
Client Sample ID: TWN-4R
Matrix: Aqueous
Collection Date: 09/21/09 10:44
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	2	mg/L		1		A4500-Cl B	10/02/09 14:23 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:25 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 3rd Quarter Nitrate and Chloride
Report Date: 10/06/09

Lab ID: C09090891-005
Client Sample ID: TWN-5R
Matrix: Aqueous
Collection Date: 09/21/09 14:12
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	2	mg/L		1		A4500-Cl B	10/02/09 15:35 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:35 / jal

Lab ID: C09090891-006
Client Sample ID: TWN-6R
Matrix: Aqueous
Collection Date: 09/22/09 09:50
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	10/02/09 15:38 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:38 / jal

Lab ID: C09090891-007
Client Sample ID: TWN-7R
Matrix: Aqueous
Collection Date: 09/21/09 13:20
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	1	mg/L		1		A4500-Cl B	10/02/09 15:41 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:40 / jal

Lab ID: C09090891-008
Client Sample ID: TWN-8R
Matrix: Aqueous
Collection Date: 09/21/09 15:10
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	1	mg/L		1		A4500-Cl B	10/02/09 15:44 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:43 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 3rd Quarter Nitrate and Chloride
Report Date: 10/06/09

Lab ID: C09090891-009
Client Sample ID: TWN-9R
Matrix: Aqueous
Collection Date: 09/22/09 07:43
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	10/02/09 15:59 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:45 / jal

Lab ID: C09090891-010
Client Sample ID: TWN-10R
Matrix: Aqueous
Collection Date: 09/22/09 08:51
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	10/02/09 16:02 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 13:55 / jal

Lab ID: C09090891-011
Client Sample ID: TWN-1
Matrix: Aqueous
Collection Date: 09/22/09 14:12
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	19	mg/L		1		A4500-Cl B	10/02/09 16:15 / jal
Nitrogen, Nitrate+Nitrite as N	0.4	mg/L		0.1		E353.2	10/05/09 13:57 / jal

Lab ID: C09090891-012
Client Sample ID: TWN-2
Matrix: Aqueous
Collection Date: 09/22/09 13:56
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	17	mg/L		1		A4500-Cl B	10/02/09 16:16 / jal
Nitrogen, Nitrate+Nitrite as N	22.6	mg/L	D	0.3		E353.2	10/05/09 14:00 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 3rd Quarter Nitrate and Chloride
Report Date: 10/06/09

Lab ID: C09090891-013
Client Sample ID: TWN-3
Matrix: Aqueous
Collection Date: 09/22/09 14:01
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	99	mg/L		1		A4500-Cl B	10/02/09 16:27 / jal
Nitrogen, Nitrate+Nitrite as N	27.1	mg/L	D	0.3		E353.2	10/05/09 14:02 / jal

Lab ID: C09090891-014
Client Sample ID: TWN-4
Matrix: Aqueous
Collection Date: 09/22/09 14:06
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	13	mg/L		1		A4500-Cl B	10/02/09 16:37 / jal
Nitrogen, Nitrate+Nitrite as N	0.4	mg/L		0.1		E353.2	10/05/09 14:05 / jal

Lab ID: C09090891-015
Client Sample ID: TWN-5
Matrix: Aqueous
Collection Date: 09/22/09 13:44
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	45	mg/L		1		A4500-Cl B	10/05/09 13:35 / jal
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	10/05/09 14:15 / jal

Lab ID: C09090891-016
Client Sample ID: TWN-6
Matrix: Aqueous
Collection Date: 09/22/09 13:21
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	23	mg/L		1		A4500-Cl B	10/05/09 13:38 / jal
Nitrogen, Nitrate+Nitrite as N	1.6	mg/L		0.1		E353.2	10/05/09 14:17 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 3rd Quarter Nitrate and Chloride
Report Date: 10/06/09

Lab ID: C09090891-017
Client Sample ID: TWN-7
Matrix: Aqueous
Collection Date: 09/22/09 13:49
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	7	mg/L		1		A4500-Cl B	10/05/09 13:41 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 14:20 / jal

Lab ID: C09090891-018
Client Sample ID: TWN-8
Matrix: Aqueous
Collection Date: 09/22/09 13:17
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	12	mg/L		1		A4500-Cl B	10/05/09 13:45 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 14:22 / jal

Lab ID: C09090891-019
Client Sample ID: TWN-9
Matrix: Aqueous
Collection Date: 09/22/09 13:34
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	201	mg/L		1		A4500-Cl B	10/05/09 14:01 / jal
Nitrogen, Nitrate+Nitrite as N	8.9	mg/L		0.2		E353.2	10/05/09 14:25 / jal

Lab ID: C09090891-020
Client Sample ID: TWN-10
Matrix: Aqueous
Collection Date: 09/22/09 13:28
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	35	mg/L		1		A4500-Cl B	10/05/09 14:09 / jal
Nitrogen, Nitrate+Nitrite as N	1.6	mg/L		0.1		E353.2	10/05/09 14:32 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 3rd Quarter Nitrate and Chloride
Report Date: 10/06/09

Lab ID: C09090891-021
Client Sample ID: Piez 1
Matrix: Aqueous
Collection Date: 09/22/09 11:10
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	78	mg/L		1		A4500-Cl B	10/05/09 14:14 / jal
Nitrogen, Nitrate+Nitrite as N	7.3	mg/L		0.2		E353.2	10/05/09 14:35 / jal

Lab ID: C09090891-022
Client Sample ID: Piez 2
Matrix: Aqueous
Collection Date: 09/22/09 11:50
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	17	mg/L		1		A4500-Cl B	10/05/09 14:26 / jal
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	10/05/09 14:37 / jal

Lab ID: C09090891-023
Client Sample ID: Piez 3
Matrix: Aqueous
Collection Date: 09/22/09 12:05
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	24	mg/L		1		A4500-Cl B	10/05/09 14:41 / jal
Nitrogen, Nitrate+Nitrite as N	0.9	mg/L		0.1		E353.2	10/05/09 14:40 / jal

Lab ID: C09090891-024
Client Sample ID: WLPU
Matrix: Aqueous
Collection Date: 09/22/09 10:55
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	5	mg/L		1		A4500-Cl B	10/05/09 14:54 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 14:42 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 3rd Quarter Nitrate and Chloride
Report Date: 10/06/09

Lab ID: C09090891-025
Client Sample ID: TWN-6D
Matrix: Aqueous
Collection Date: 09/22/09 13:21
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	22	mg/L		1		A4500-Cl B	10/05/09 14:57 / jal
Nitrogen, Nitrate+Nitrite as N	1.6	mg/L		0.1		E353.2	10/05/09 14:52 / jal

Lab ID: C09090891-026
Client Sample ID: TWN-0
Matrix: Aqueous
Collection Date: 09/22/09 08:20
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	2	mg/L		1		A4500-Cl B	10/05/09 15:02 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	10/05/09 14:55 / jal

Lab ID: C09090891-027
Client Sample ID: Temp Blank
Matrix: Aqueous
Collection Date: Not Provided
DateReceived: 09/23/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Temperature	4.0	°C				E170.1	09/23/09 14:30 / kbh

Report Definitions:
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MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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-Cl B									Batch: 091002A-CL-TTR-W	
Sample ID: MBLK9-091002A		Method Blank				Run: TITRATION_091002A			10/02/09 10:58	
Chloride		ND	mg/L	0.4						
Sample ID: C09090875-002AMS		Sample Matrix Spike				Run: TITRATION_091002A			10/02/09 11:40	
Chloride		34.7	mg/L	1.0	96	90	110			
Sample ID: C09090875-002AMSD		Sample Matrix Spike Duplicate				Run: TITRATION_091002A			10/02/09 11:41	
Chloride		34.0	mg/L	1.0	94	90	110	2	10	
Sample ID: LCS35-091002A		Laboratory Control Sample				Run: TITRATION_091002A			10/02/09 15:08	
Chloride		3540	mg/L	1.0	100	90	110			
Sample ID: C09090981-014BMS		Sample Matrix Spike				Run: TITRATION_091002A			10/02/09 17:08	
Chloride		96.2	mg/L	1.0	108	90	110			
Sample ID: C09090981-014BMSD		Sample Matrix Spike Duplicate				Run: TITRATION_091002A			10/02/09 17:08	
Chloride		91.9	mg/L	1.0	104	90	110	4.5	10	
Method: A4500-Cl B									Batch: 091005A-CL-TTR-W	
Sample ID: MBLK9-091005A		Method Blank				Run: TITRATION_091005C			10/05/09 12:38	
Chloride		ND	mg/L	0.4						
Sample ID: C09090891-022BMS		Sample Matrix Spike				Run: TITRATION_091005C			10/05/09 14:37	
Chloride		99.8	mg/L	1.0	94	90	110			
Sample ID: C09090891-022BMSD		Sample Matrix Spike Duplicate				Run: TITRATION_091005C			10/05/09 14:37	
Chloride		99.8	mg/L	1.0	94	90	110	0	10	
Sample ID: LCS35-091005A		Laboratory Control Sample				Run: TITRATION_091005C			10/05/09 16:10	
Chloride		3780	mg/L	1.0	107	90	110			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

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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		Method Blank				Run: TECHNICON_091005A				10/05/09 11:08
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.03						
Sample ID: LCS-2		Laboratory Control Sample				Run: TECHNICON_091005A				10/05/09 11:10
Nitrogen, Nitrate+Nitrite as N		2.57	mg/L	0.10	103	90	110			
Sample ID: C09090891-004AMS		Sample Matrix Spike				Run: TECHNICON_091005A				10/05/09 13:28
Nitrogen, Nitrate+Nitrite as N		2.13	mg/L	0.10	103	90	110			
Sample ID: C09090891-004AMSD		Sample Matrix Spike Duplicate				Run: TECHNICON_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		Sample Matrix Spike				Run: TECHNICON_091005A				10/05/09 14:07
Nitrogen, Nitrate+Nitrite as N		2.47	mg/L	0.10	102	90	110			
Sample ID: C09090891-014AMSD		Sample Matrix Spike Duplicate				Run: TECHNICON_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		Sample Matrix Spike				Run: TECHNICON_091005A				10/05/09 14:45
Nitrogen, Nitrate+Nitrite as N		2.01	mg/L	0.10	100	90	110			
Sample ID: C09090891-024AMSD		Sample Matrix Spike Duplicate				Run: TECHNICON_091005A				10/05/09 14:47
Nitrogen, Nitrate+Nitrite as N		1.99	mg/L	0.10	100	90	110	1	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: 3rd Quarter Nitrate & chloride	Sample Origin State: UT	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: PO Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 678-2221	Email:	Sampler: (Please Print) Tanner H.
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: Hand
Cooler ID(s): client
Receipt Temp 4 °C
On Ice: Y N
Custody Seal On Bottle Y N
On Cooler Y N
Intact Y N
Signature Match Y N

#	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Nitrate	Chloride	SEE ATTACHED
1	TWN-1R	9.21.09	0750	2-W	X	X	
2	TWN-2R	9.21.09	0857		X	X	
3	TWN-3R	9.21.09	0947		X	X	
4	TWN-4R	9.21.09	1044		X	X	
5	TWN-5R	9.21.09	1412		X	X	
6	TWN-6R	9.22.09	0950		X	X	
7	TWN-7R	9.21.09	1320		X	X	
8	TWN-8R	9.21.09	1510		X	X	
9	TWN-9R	9.22.09	0743		X	X	
10	TWN-10R	9.22.09	0851	2-W	X	X	

LABORATORY USE ONLY: C0909U891

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Tanner Holliday	9.23.09 1430	Tanner Holliday			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Andrew	Date/Time: 09/23/09 1430	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: 3rd Quarter Nitrate & chloride	Sample Origin State: UT	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: P.O. Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 678 2221	Email:	Sampler: (Please Print) Tanner H.
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O DW; Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water)	Nitrate	Chloride							SEE ATTACHED
1 TWN-1	9-22-09	1412	2-W	X	X							
2 TWN-2	9-22-09	1356		X	X							
3 TWN-3	9-22-09	1401		X	X							
4 TWN-4	9-22-09	1406		X	X							
5 TWN-5	9-22-09	1344		X	X							
6 TWN-6	9-22-09	1321		X	X							
7 TWN-7	9-22-09	1349		X	X							
8 TWN-8	9-22-09	1317		X	X							
9 TWN-9	9-22-09	1334		X	X							
10 TWN-10	9-22-09	1328	2-W	X	X							

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: Hand
Cooler ID(s): Client
Receipt Temp: 4 °C
On Ice: Y N
Custody Seal: On Bottle Y N; On Cooler Y N
Intact: Y N
Signature Match: Y N

LABORATORY USE ONLY: C09090891

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Tanner Holliday	9-23-09 1430	Tanner Holliday			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Andrew	Date/Time: 9/23/09 1430	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

Page ____ of ____

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: 3rd Quarter Nitrate & chloride	Sample Origin State: UT	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: P.O. Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 678 2221	Email:	Sampler: (Please Print) Tanner H.
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

ANALYSIS REQUESTED

Standard Turnaround (TAT) — RUSH: Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: Hand
Cooler ID(s): Client
Receipt Temp: 4 °C
On Ice: (Y) N
Custody Seal: On Bottle Y (N); On Cooler (Y) N; Intact (Y) N; Signature Match (Y) N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O DW; Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water)	Nitrate	Chloride	SEE ATTACHED
1	Piez 1	9.22.09	1110	2-W	X	X	
2	Piez 2	9.22.09	1150		X	X	
3	Piez 3	9.22.09	1205		X	X	
4	WLPU	9.22.09	1055		X	X	
5	TWN-6D	9.22.09	1321		X	X	
6	TWN-0	9.22.09	0820	2-W	X	X	
7	~~2 Temp blanks per container Hsa~~						
8	Temp Blank.						
9							
10							

LABORATORY USE ONLY: C09090891

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Tanner Holliday	9.23.09 1430	Tanner Holliday			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory:	Date/Time: 9/23/09 1430	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

Denison Mines USA Corp

C09090891

Login completed by: Halley Ackerman

Date and Time Received: 9/23/2009 2:30 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 ☐	
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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CLIENT: Denison Mines USA Corp
Project: 3rd Quarter Nitrate and Chloride
Sample Delivery Group: C09090891

Date: *06-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.

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

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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

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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. Waldrop

Stephanie D. Waldrop
Reporting Supervisor

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate and Chloride
Report Date: 11/11/09

Lab ID: C09110253-001
Client Sample ID: TWN 3R
Matrix: Aqueous
Collection Date: 11/02/09 09:54
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	3	mg/L		1		A4500-Cl B	11/09/09 10:14 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 10:54 / jal

Lab ID: C09110253-002
Client Sample ID: TWN 3
Matrix: Aqueous
Collection Date: 11/02/09 14:00
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	106	mg/L		1		A4500-Cl B	11/09/09 10:18 / lr
Nitrogen, Nitrate+Nitrite as N	29.0	mg/L	D	0.3		E353.2	11/09/09 11:11 / jal

Lab ID: C09110253-003
Client Sample ID: TWN 2R
Matrix: Aqueous
Collection Date: 11/02/09 11:05
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	11/09/09 10:21 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 10:59 / jal

Lab ID: C09110253-004
Client Sample ID: TWN 2
Matrix: Aqueous
Collection Date: 11/02/09 11:34
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	55	mg/L		1		A4500-Cl B	11/09/09 10:27 / lr
Nitrogen, Nitrate+Nitrite as N	20.8	mg/L		0.2		E353.2	11/09/09 11:02 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate and Chloride
Report Date: 11/11/09

Lab ID: C09110253-005
Client Sample ID: TWN 19R
Matrix: Aqueous
Collection Date: 11/02/09 13:20
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	2	mg/L		1		A4500-Cl B	11/09/09 10:30 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 11:04 / jal

Lab ID: C09110253-006
Client Sample ID: TWN 19
Matrix: Aqueous
Collection Date: 11/02/09 13:42
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	125	mg/L		1		A4500-Cl B	11/09/09 10:32 / lr
Nitrogen, Nitrate+Nitrite as N	7.4	mg/L		0.2		E353.2	11/09/09 11:16 / jal

Lab ID: C09110253-007
Client Sample ID: TWN 18R
Matrix: Aqueous
Collection Date: 11/02/09 15:00
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	1	mg/L		1		A4500-Cl B	11/09/09 10:46 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 11:19 / jal

Lab ID: C09110253-008
Client Sample ID: TWN 18
Matrix: Aqueous
Collection Date: 11/02/09 15:33
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	57	mg/L		1		A4500-Cl B	11/09/09 10:49 / lr
Nitrogen, Nitrate+Nitrite as N	1.3	mg/L		0.1		E353.2	11/09/09 11:21 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate and Chloride
Report Date: 11/11/09

Lab ID: C09110253-009
Client Sample ID: TWN 11R
Matrix: Aqueous
Collection Date: 11/03/09 08:20
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	11/09/09 10:56 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 11:24 / jal

Lab ID: C09110253-010
Client Sample ID: TWN 11
Matrix: Aqueous
Collection Date: 11/03/09 08:53
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	74	mg/L		1		A4500-Cl B	11/09/09 11:11 / lr
Nitrogen, Nitrate+Nitrite as N	1.3	mg/L		0.1		E353.2	11/09/09 11:26 / jal

Lab ID: C09110253-011
Client Sample ID: TWN 12R
Matrix: Aqueous
Collection Date: 11/03/09 09:47
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	11/09/09 11:14 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 11:34 / jal

Lab ID: C09110253-012
Client Sample ID: TWN 12
Matrix: Aqueous
Collection Date: 11/03/09 10:30
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	109	mg/L		1		A4500-Cl B	11/09/09 11:16 / lr
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	11/09/09 11:36 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate and Chloride
Report Date: 11/11/09

Lab ID: C09110253-013
Client Sample ID: TWN 8R
Matrix: Aqueous
Collection Date: 11/03/09 13:10
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	3	mg/L		1		A4500-Cl B	11/09/09 11:18 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 11:39 / jal

Lab ID: C09110253-014
Client Sample ID: TWN 8
Matrix: Aqueous
Collection Date: 11/03/09 13:45
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	12	mg/L		1		A4500-Cl B	11/09/09 11:21 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 11:41 / jal

Lab ID: C09110253-015
Client Sample ID: TWN 6R
Matrix: Aqueous
Collection Date: 11/03/09 14:35
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	11/09/09 11:25 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 11:44 / jal

Lab ID: C09110253-016
Client Sample ID: TWN 6
Matrix: Aqueous
Collection Date: 11/03/09 15:02
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	21	mg/L		1		A4500-Cl B	11/09/09 11:27 / lr
Nitrogen, Nitrate+Nitrite as N	1.4	mg/L		0.1		E353.2	11/09/09 11:54 / jal

Report Definitions:
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QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate and Chloride
Report Date: 11/11/09

Lab ID: C09110253-017
Client Sample ID: TWN 16R
Matrix: Aqueous
Collection Date: 11/04/09 07:47
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	1	mg/L		1		A4500-Cl B	11/09/09 11:34 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 11:56 / jal

Lab ID: C09110253-018
Client Sample ID: TWN 16
Matrix: Aqueous
Collection Date: 11/04/09 08:15
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	39	mg/L		1		A4500-Cl B	11/09/09 11:37 / lr
Nitrogen, Nitrate+Nitrite as N	1.0	mg/L		0.1		E353.2	11/09/09 11:59 / jal

Lab ID: C09110253-019
Client Sample ID: TWN 17R
Matrix: Aqueous
Collection Date: 11/04/09 08:58
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	1	mg/L		1		A4500-Cl B	11/09/09 11:39 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 12:01 / jal

Lab ID: C09110253-020
Client Sample ID: TWN 17
Matrix: Aqueous
Collection Date: 11/04/09 09:24
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	152	mg/L		1		A4500-Cl B	11/09/09 11:41 / lr
Nitrogen, Nitrate+Nitrite as N	6.7	mg/L		0.2		E353.2	11/09/09 12:04 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate and Chloride
Report Date: 11/11/09

Lab ID: C09110253-021
Client Sample ID: TWN 0
Matrix: Aqueous
Collection Date: 11/04/09 09:24
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	187	mg/L		1		A4500-Cl B	11/09/09 11:43 / lr
Nitrogen, Nitrate+Nitrite as N	6.7	mg/L		0.2		E353.2	11/09/09 12:14 / jal

Lab ID: C09110253-022
Client Sample ID: TWN 13R
Matrix: Aqueous
Collection Date: 11/04/09 12:43
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	1	mg/L		1		A4500-Cl B	11/09/09 11:51 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 12:16 / jal

Lab ID: C09110253-023
Client Sample ID: TWN 13
Matrix: Aqueous
Collection Date: 11/04/09 13:11
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	83	mg/L		1		A4500-Cl B	11/09/09 11:54 / lr
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	11/09/09 12:19 / jal

Lab ID: C09110253-024
Client Sample ID: TWN 14R
Matrix: Aqueous
Collection Date: 11/04/09 13:57
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	11/09/09 11:56 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/09/09 12:21 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate and Chloride
Report Date: 11/11/09

Lab ID: C09110253-025
Client Sample ID: TWN 14
Matrix: Aqueous
Collection Date: 11/04/09 14:27
DateReceived: 11/06/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	32	mg/L		1		A4500-Cl B	11/09/09 11:59 / lr
Nitrogen, Nitrate+Nitrite as N	3.4	mg/L		0.2		E353.2	11/09/09 12:24 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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: A4500-Cl B								Batch: 091109-CL-TTR-W	
Sample ID: MBLK9-091109	Method Blank				Run: TITRATION_091109A			11/09/09 08:38	
Chloride	ND	mg/L	0.4						
Sample ID: C09110083-001AMS	Sample Matrix Spike				Run: TITRATION_091109A			11/09/09 09:42	
Chloride	5030	mg/L	1.0	101	90	110			
Sample ID: C09110083-001AMSD	Sample Matrix Spike Duplicate				Run: TITRATION_091109A			11/09/09 09:45	
Chloride	4960	mg/L	1.0	99	90	110	1.4	10	
Sample ID: C09110253-006BMS	Sample Matrix Spike				Run: TITRATION_091109A			11/09/09 10:35	
Chloride	300	mg/L	1.0	99	90	110			
Sample ID: C09110253-006BMSD	Sample Matrix Spike Duplicate				Run: TITRATION_091109A			11/09/09 10:36	
Chloride	302	mg/L	1.0	100	90	110	0.6	10	
Sample ID: LCS35-091109	Laboratory Control Sample				Run: TITRATION_091109A			11/09/09 10:39	
Chloride	3600	mg/L	1.0	102	90	110			
Sample ID: C09110253-016BMS	Sample Matrix Spike				Run: TITRATION_091109A			11/09/09 11:31	
Chloride	105	mg/L	1.0	95	90	110			
Sample ID: C09110253-016BMSD	Sample Matrix Spike Duplicate				Run: TITRATION_091109A			11/09/09 11:32	
Chloride	108	mg/L	1.0	98	90	110	2.5	10	
Sample ID: C09110266-001AMS	Sample Matrix Spike				Run: TITRATION_091109A			11/09/09 12:09	
Chloride	52.1	mg/L	1.0	96	90	110			
Sample ID: C09110266-001AMSD	Sample Matrix Spike Duplicate				Run: TITRATION_091109A			11/09/09 12:10	
Chloride	51.2	mg/L	1.0	94	90	110	1.7	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

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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: TECHNICON_091109A				11/09/09 10:49
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_091109A				11/09/09 10:51
Nitrogen, Nitrate+Nitrite as N	2.50	mg/L	0.10	97	90	110			
Sample ID: C09110253-005AMS	Sample Matrix Spike				Run: TECHNICON_091109A				11/09/09 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: TECHNICON_091109A				11/09/09 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: TECHNICON_091109A				11/09/09 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: TECHNICON_091109A				11/09/09 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: TECHNICON_091109A				11/09/09 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: TECHNICON_091109A				11/09/09 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.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: 4th Quarter Nitrate & Chloride	Sample Origin State: Ut	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: PO BOX 809 Blanding, Ut 84511	Contact Name: Ryan Palmer Phone/Fax: 435 678 2221	Email: –	Sampler: (Please Print) Tanner Holliday
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

SEE ATTACHED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: Fedex
Cooler ID(s): Client
Receipt Temp: 2 °C
On Ice: (Y) N
Custody Seal: On Bottle Y N; On Cooler (Y) N
Intact (Y) N
Signature Match (Y) N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Nitrate	Chloride											
1	TWN 3R	11-2-09	0954	2-W	X	X											
2	TWN 3	11-2-09	1400	2-W	X	X											
3	TWN 2R	11-2-09	1105	2-W	X	X											
4	TWN 2	11-2-09	1134	2-W	X	X											
5	TWN 19 R	11-2-09	1320	2-W	X	X											
6	TWN 19	11-2-09	1342	2-W	X	X											
7	TWN 18 R	11-2-09	1500	2-W	X	X											
8	TWN 18	11-2-09	1533	2-W	X	X											
9	TWN 11 R	11-3-09	0820	2-W	X	X											
10	TWN 11	11-3-09	0853	2-W	X	X											

LABORATORY USE ONLY: C09110253

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Tanner Holliday	11/5/09 1050	Tanner Holliday			

Received by Laboratory: Andrew Date/Time: 11-6-09 945 Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
Denison Mines	4th Quarter ~~Groundwater~~ Nitrate & Chloride	State: Ut	Yes ☐ No ☐
Report Mail Address: PO BOX 809 Blanding, ut 84511	**Contact Name:** Ryan Palmer **Phone/Fax:** 435 678 2221	**Email:** -	**Sampler: (Please Print)** Tanner Holliday
Invoice Address: Same	**Invoice Contact & Phone:** Same	**Purchase Order:**	**Quote/Bottle Order:**

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O DW; Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water)	Nitrate	Chloride								SEE ATTACHED
1 TWN 12R	11-3-09	0947	2-W	X	X								
2 TWN 12	11-3-09	1030	2-W	X	X								
3 TWN 8R	11-3-09	1310	2-W	X	X								
4 TWN 8	11-3-09	1345	2-W	X	X								
5 TWN 6R	11-3-09	1435	2-W	X	X								
6 TWN 6	11-3-09	1502	2-W	X	X								
7 TWN 16R	11-4-09	0747	2-W	X	X								
8 TWN 16	11-4-09	0815	2-W	X	X								
9 TWN 17R	11-4-09	0858	2-W	X	X								
10 TWN 17	11-4-09	0924	2-W	X	X								

Standard Turnaround (TAT)

RUSH — Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: FedEx
Cooler ID(s): client
Receipt Temp: 2 °C
On Ice: (Y) N
Custody Seal: On Bottle Y N; On Cooler (Y) N
Intact (Y) N
Signature Match (Y) N

LABORATORY USE ONLY: CC9110253

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Tanner Holliday	11/5/09 1050	Tanner Holliday			
Sample Disposal: Return to Client: _____ Lab Disposal: _____			Received by Laboratory: Andrew	Date/Time: 11-6-09 945	Signature:

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: 4Th Quarter Nitrate & Chloride	Sample Origin State: Ut	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: PO BOX 809 Blanding, UT 84511	Contact Name: Ryan Palmer Phone/Fax: 435 678 2221	Email: –	Sampler: (Please Print) Tanner Holliday
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

Standard Turnaround (TAT) — RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: Fed Ex
Cooler ID(s): client
Receipt Temp: 2 °C
On Ice: (Y) N
Custody Seal: On Bottle Y N; On Cooler (Y) N; Intact (Y) N; Signature Match (Y) N

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Nitrate	Chloride	SEE ATTACHED
1 TWN 0	11-4-09	0924	2-W	X	X	
2 TWN 13 R	11-4-09	1243	2-W	X	X	
3 TWN 13	11-4-09	1311	2-W	X	X	
4 TWN 14 R	11-4-09	1357	2-W	X	X	
5 TWN 14	11-4-09	1427	2-W	X	X	
6						
7						
8						
9						
10						

LABORATORY USE ONLY: C09110253

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Tanner Holliday	11/5/09 1050	Tanner Holliday			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Andrew	Date/Time: 11-6-09 945	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

Denison Mines USA Corp

C09110253

Login completed by: Halley Ackerman

Date and Time Received: 11/6/2009 9:45 AM

Reviewed by:

Received by: al

Reviewed Date:

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

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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. Waldrop

Stephanie D. Waldrop
Reporting Supervisor

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate & Chloride
Report Date: 11/04/09

Lab ID: C09101104-001
Client Sample ID: UWLP
Matrix: Aqueous
Collection Date: 10/27/09 09:10
DateReceived: 10/29/09

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+Nitrite as N	ND	mg/L		0.1		E353.2	11/02/09 14:07 / jal

Lab ID: C09101104-002
Client Sample ID: Piez 1
Matrix: Aqueous
Collection Date: 10/27/09 09:35
DateReceived: 10/29/09

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+Nitrite as N	7.4	mg/L		0.2		E353.2	11/02/09 14:14 / jal

Lab ID: C09101104-003
Client Sample ID: Piez 2
Matrix: Aqueous
Collection Date: 10/27/09 10:20
DateReceived: 10/29/09

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 / ljl
Nitrogen, Nitrate+Nitrite as N	0.6	mg/L		0.1		E353.2	11/02/09 14:17 / jal

Lab ID: C09101104-004
Client Sample ID: Piez 3
Matrix: Aqueous
Collection Date: 10/27/09 10:30
DateReceived: 10/29/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	19	mg/L		1		E300.0	10/31/09 02:10 / ljl
Nitrogen, Nitrate+Nitrite as N	1.2	mg/L		0.1		E353.2	11/02/09 14:19 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate & Chloride
Report Date: 11/04/09

Lab ID: C09101104-005
Client Sample ID: TWN-1R
Matrix: Aqueous
Collection Date: 10/28/09 08:20
DateReceived: 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+Nitrite as N	ND	mg/L		0.1		E353.2	11/02/09 14:22 / jal

Lab ID: C09101104-006
Client Sample ID: TWN-1
Matrix: Aqueous
Collection Date: 10/28/09 13:20
DateReceived: 10/29/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	18	mg/L		1		E300.0	10/31/09 02:42 / ljl
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	11/02/09 14:24 / jal

Lab ID: C09101104-007
Client Sample ID: TWN-4R
Matrix: Aqueous
Collection Date: 10/28/09 10:10
DateReceived: 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 02:59 / ljl
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/03/09 10:35 / jal

Lab ID: C09101104-008
Client Sample ID: TWN-4
Matrix: Aqueous
Collection Date: 10/28/09 13:10
DateReceived: 10/29/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	11	mg/L		1		E300.0	10/31/09 03:15 / ljl
Nitrogen, Nitrate+Nitrite as N	0.4	mg/L		0.1		E353.2	11/03/09 10:38 / jal

Report Definitions:
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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 Control Sample				Run: IC2-C_091029A				10/29/09 20:36
Chloride	9.74	mg/L	1.0	97	90	110			
Sample ID: MBLK	Method Blank				Run: IC2-C_091029A				10/29/09 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: TECHNICON_091102A				11/02/09 10:57
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_091102A				11/02/09 10:59
Nitrogen, Nitrate+Nitrite as N	2.50	mg/L	0.10	100	90	110			
Sample ID: C09101102-005HMS	Sample Matrix Spike				Run: TECHNICON_091102A				11/02/09 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: TECHNICON_091102A				11/02/09 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: TECHNICON_091102A				11/02/09 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: TECHNICON_091102A				11/02/09 14:29
Nitrogen, Nitrate+Nitrite as N	2.54	mg/L	0.10	104	90	110	2.3	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

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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: R125947
Sample ID: MBLK-1	Method Blank				Run: TECHNICON_091103A				11/03/09 10:10
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_091103A				11/03/09 10:13
Nitrogen, Nitrate+Nitrite as N	2.57	mg/L	0.10	103	90	110			
Sample ID: C09101127-001AMS	Sample Matrix Spike				Run: TECHNICON_091103A				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 Spike Duplicate				Run: TECHNICON_091103A				11/03/09 10:30
Nitrogen, Nitrate+Nitrite as N	2.26	mg/L	0.10	106	90	110	0.4	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: 4th Quarter Nitrate & chloride	Sample Origin State: UT	EPA/State Compliance: Yes ☒ No ☐
Report Mail Address: P.O. Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 678-2221	Email:	Sampler: (Please Print) Ryan Palmer
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

ANALYSIS REQUESTED

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Nitrate	Chloride							SEE ATTACHED
1 UWLP	10-27-09	0910	2-W	X	X							
2 Piez 1	10-27-09	0935		X	X							
3 Piez 2	10-27-09	1020		X	X							
4 Piez 3	10-27-09	1030		X	X							
5 TWN-1R	10-28-09	0820		X	X							
6 TWN-1[redacted]	10-28-09	1320		X	X							
7 TWN-4R	10-28-09	1010		X	X							
8 TWN-4	10-28-09	1310	2-W	X	X							
9												
10												

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: there will be more Samples comming Next week under this project name

Shipped by: Hand
Cooler ID(s): Various Client
Receipt Temp: 3 °C
On Ice: (Y) N
Custody Seal: On Bottle Y (N); On Cooler (Y) N
Intact (Y) N
Signature Match (Y) N

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ron Wallace	10/29/09 0210	Ron Wallace			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Andrew	10/29/09 1410	

Sample Disposal: Return to Client: _____ Lab Disposal: _____

Energy Laboratories Inc
Workorder Receipt Checklist

C09101104

Denison Mines USA Corp

Login completed by: Diane Downing

Date and Time Received: 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 ☐	
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

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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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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

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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

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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. Waldrop

Stephanie D. Waldrop
Reporting Supervisor

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate & Chloride
Report Date: 11/18/09

Lab ID: C09110461-001
Client Sample ID: TWN-D1
Matrix: Aqueous
Collection Date: 11/10/09 12:35
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	11/13/09 14:16 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/17/09 12:51 / jal

Lab ID: C09110461-002
Client Sample ID: TWN-15R
Matrix: Aqueous
Collection Date: 11/10/09 08:25
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	23	mg/L		1		A4500-Cl B	11/13/09 14:18 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/17/09 12:53 / jal

Lab ID: C09110461-003
Client Sample ID: TWN-15
Matrix: Aqueous
Collection Date: 11/10/09 08:53
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	78	mg/L		1		A4500-Cl B	11/13/09 14:21 / lr
Nitrogen, Nitrate+Nitrite as N	1.1	mg/L		0.1		E353.2	11/17/09 12:56 / jal

Lab ID: C09110461-004
Client Sample ID: TWN-10R
Matrix: Aqueous
Collection Date: 11/10/09 10:10
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	11/13/09 14:24 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/17/09 12:58 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602
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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate & Chloride
Report Date: 11/18/09

Lab ID: C09110461-005
Client Sample ID: TWN-10
Matrix: Aqueous
Collection Date: 11/10/09 10:22
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	26	mg/L		1		A4500-Cl B	11/13/09 14:27 / lr
Nitrogen, Nitrate+Nitrite as N	1.4	mg/L		0.1		E353.2	11/17/09 13:01 / jal

Lab ID: C09110461-006
Client Sample ID: TWN-9R
Matrix: Aqueous
Collection Date: 11/10/09 11:05
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	1	mg/L		1		A4500-Cl B	11/13/09 14:30 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/17/09 13:11 / jal

Lab ID: C09110461-007
Client Sample ID: TWN-9
Matrix: Aqueous
Collection Date: 11/10/09 12:09
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	205	mg/L		1		A4500-Cl B	11/13/09 14:33 / lr
Nitrogen, Nitrate+Nitrite as N	12.0	mg/L		0.2		E353.2	11/17/09 13:13 / jal

Lab ID: C09110461-008
Client Sample ID: TWN-5R
Matrix: Aqueous
Collection Date: 11/10/09 12:45
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	11/13/09 14:36 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/17/09 13:16 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate & Chloride
Report Date: 11/18/09

Lab ID: C09110461-009
Client Sample ID: TWN-5
Matrix: Aqueous
Collection Date: 11/10/09 13:19
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	48	mg/L		1		A4500-Cl B	11/13/09 14:40 / lr
Nitrogen, Nitrate+Nitrite as N	0.2	mg/L		0.1		E353.2	11/17/09 13:18 / jal

Lab ID: C09110461-010
Client Sample ID: TWN-7R
Matrix: Aqueous
Collection Date: 11/10/09 14:00
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	ND	mg/L		1		A4500-Cl B	11/13/09 14:47 / lr
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/17/09 13:21 / jal

Lab ID: C09110461-011
Client Sample ID: TWN-7
Matrix: Aqueous
Collection Date: 11/10/09 14:13
DateReceived: 11/12/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	7	mg/L		1		A4500-Cl B	11/13/09 14:49 / lr
Nitrogen, Nitrate+Nitrite as N	0.1	mg/L		0.1		E353.2	11/17/09 13:28 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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-Cl B								Batch: 091113-CL-TTR-W	
Sample ID: MBLK9-091113	Method Blank				Run: TITRATION_091113B			11/13/09 14:04	
Chloride	ND	mg/L	0.4						
Sample ID: C09110461-009AMS	Sample Matrix Spike				Run: TITRATION_091113B			11/13/09 14:43	
Chloride	222	mg/L	1.0	99	90	110			
Sample ID: C09110461-009AMSD	Sample Matrix Spike Duplicate				Run: TITRATION_091113B			11/13/09 14:44	
Chloride	224	mg/L	1.0	100	90	110	0.8	10	
Sample ID: LCS35-091113	Laboratory Control Sample				Run: TITRATION_091113B			11/13/09 15:19	
Chloride	3600	mg/L	1.0	102	90	110			
Method: E353.2								Batch: R126597	
Sample ID: MBLK-1	Method Blank				Run: TECHNICON_091117A			11/17/09 10:11	
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_091117A			11/17/09 10:13	
Nitrogen, Nitrate+Nitrite as N	2.56	mg/L	0.10	102	90	110			
Sample ID: C09110461-005BMS	Sample Matrix Spike				Run: TECHNICON_091117A			11/17/09 13:03	
Nitrogen, Nitrate+Nitrite as N	3.93	mg/L	0.10	84	90	110			S
Sample ID: C09110461-005BMSD	Sample Matrix Spike Duplicate				Run: TECHNICON_091117A			11/17/09 13:06	
Nitrogen, Nitrate+Nitrite as N	3.90	mg/L	0.10	83	90	110	0.8	10	S
Sample ID: C09110474-004FMS	Sample Matrix Spike				Run: TECHNICON_091117A			11/17/09 13:41	
Nitrogen, Nitrate+Nitrite as N	2.09	mg/L	0.10	104	90	110			
Sample ID: C09110474-004FMSD	Sample Matrix Spike Duplicate				Run: TECHNICON_091117A			11/17/09 13:43	
Nitrogen, Nitrate+Nitrite as N	2.16	mg/L	0.10	108	90	110	3.3	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
Denison Mines	4th Quarter Nitrate & Chloride	State: UT	Yes ☐ No ☐
Report Mail Address: PO BOX 809 Blanding Ut 84511	**Contact Name:** Ryan Palmer **Phone/Fax:** 435 678 2221	**Email:** -	**Sampler: (Please Print)** Ryan Palmer
Invoice Address: Same	**Invoice Contact & Phone:** same	**Purchase Order:**	**Quote/Bottle Order:**

Special Report/Formats:

☐ 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
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

ANALYSIS REQUESTED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: FedEx
Cooler ID(s): Client
Receipt Temp: 2 °C
On Ice: Y N
Custody Seal: On Bottle Y N; On Cooler Y N
Intact Y N
Signature Match Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Nitrate	Chloride	SEE ATTACHED	RUSH	Comments
1	TWN - D1	11-10-09	1235	2-W	X	X		X	
2									
3									
4									
5									
6									
7									
8									
9									
10									

LABORATORY USE ONLY: C0911046 1

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ryan Palmer	11-11-09 1100				
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Andrew	Date/Time: 11/12/09 9:36	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: 4th Quarter Nitrate & chloride	Sample Origin State: UT	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: P.O. Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 435 678 4063	Email:	Sampler: (Please Print) Ryan Palmer
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

ANALYSIS REQUESTED

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

SEE ATTACHED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: FEDEX
Cooler ID(s): Plank
Receipt Temp: 2 °C
On Ice: (Y) N
Custody Seal: On Bottle Y (N); On Cooler Y N; Intact Y N; Signature Match Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Nitrate	chloride									RUSH	Comments
1	TWN-15R	11-10-09	0825	2-W	X	X									X	
2	TWN-15		0853		X	X									X	
3	TWN-10R		1010		X	X									X	
4	TWN-10		1022		X	X									X	
5	TWN-9R		1105		X	X									X	
6	TWN-9		1209		X	X									X	
7	TWN-5R		1245		X	X									X	
8	TWN-5		1319		X	X									X	
9	TWN-7R		1400		X	X									X	
10	TWN-7	11-10-09	1413	2-W	X	X									X	

LABORATORY USE ONLY: C0911046 1

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ryan Palmer	11-11-09 1100	Ryan Palmer			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Andrew	Date/Time: 11/12/09 930	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

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 www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Energy Laboratories Inc
Workorder Receipt Checklist

Denison Mines USA Corp

C09110461

Login completed by: Halley Ackerman

Date and Time Received: 11/12/2009 9:30 AM

Reviewed by:

Received by: al

Reviewed Date:

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

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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.

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

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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. Waldrop

Stephanie D. Waldrop
Reporting Supervisor

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate & Chloride
Report Date: 11/04/09

Lab ID: C09101104-001
Client Sample ID: UWLP
Matrix: Aqueous
Collection Date: 10/27/09 09:10
DateReceived: 10/29/09

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+Nitrite as N	ND	mg/L		0.1		E353.2	11/02/09 14:07 / jal

Lab ID: C09101104-002
Client Sample ID: Piez 1
Matrix: Aqueous
Collection Date: 10/27/09 09:35
DateReceived: 10/29/09

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+Nitrite as N	7.4	mg/L		0.2		E353.2	11/02/09 14:14 / jal

Lab ID: C09101104-003
Client Sample ID: Piez 2
Matrix: Aqueous
Collection Date: 10/27/09 10:20
DateReceived: 10/29/09

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 / ljl
Nitrogen, Nitrate+Nitrite as N	0.6	mg/L		0.1		E353.2	11/02/09 14:17 / jal

Lab ID: C09101104-004
Client Sample ID: Piez 3
Matrix: Aqueous
Collection Date: 10/27/09 10:30
DateReceived: 10/29/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	19	mg/L		1		E300.0	10/31/09 02:10 / ljl
Nitrogen, Nitrate+Nitrite as N	1.2	mg/L		0.1		E353.2	11/02/09 14:19 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Site Name: 4th Quarter Nitrate & Chloride
Report Date: 11/04/09

Lab ID: C09101104-005
Client Sample ID: TWN-1R
Matrix: Aqueous
Collection Date: 10/28/09 08:20
DateReceived: 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+Nitrite as N	ND	mg/L		0.1		E353.2	11/02/09 14:22 / jal

Lab ID: C09101104-006
Client Sample ID: TWN-1
Matrix: Aqueous
Collection Date: 10/28/09 13:20
DateReceived: 10/29/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	18	mg/L		1		E300.0	10/31/09 02:42 / ljl
Nitrogen, Nitrate+Nitrite as N	0.5	mg/L		0.1		E353.2	11/02/09 14:24 / jal

Lab ID: C09101104-007
Client Sample ID: TWN-4R
Matrix: Aqueous
Collection Date: 10/28/09 10:10
DateReceived: 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 02:59 / ljl
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	11/03/09 10:35 / jal

Lab ID: C09101104-008
Client Sample ID: TWN-4
Matrix: Aqueous
Collection Date: 10/28/09 13:10
DateReceived: 10/29/09

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Chloride	11	mg/L		1		E300.0	10/31/09 03:15 / ljl
Nitrogen, Nitrate+Nitrite as N	0.4	mg/L		0.1		E353.2	11/03/09 10:38 / jal

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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 Control Sample				Run: IC2-C_091029A				10/29/09 20:36
Chloride	9.74	mg/L	1.0	97	90	110			
Sample ID: MBLK	Method Blank				Run: IC2-C_091029A				10/29/09 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: TECHNICON_091102A				11/02/09 10:57
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_091102A				11/02/09 10:59
Nitrogen, Nitrate+Nitrite as N	2.50	mg/L	0.10	100	90	110			
Sample ID: C09101102-005HMS	Sample Matrix Spike				Run: TECHNICON_091102A				11/02/09 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: TECHNICON_091102A				11/02/09 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: TECHNICON_091102A				11/02/09 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: TECHNICON_091102A				11/02/09 14:29
Nitrogen, Nitrate+Nitrite as N	2.54	mg/L	0.10	104	90	110	2.3	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

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Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

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: R125947
Sample ID: MBLK-1	Method Blank				Run: TECHNICON_091103A				11/03/09 10:10
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.03						
Sample ID: LCS-2	Laboratory Control Sample				Run: TECHNICON_091103A				11/03/09 10:13
Nitrogen, Nitrate+Nitrite as N	2.57	mg/L	0.10	103	90	110			
Sample ID: C09101127-001AMS	Sample Matrix Spike				Run: TECHNICON_091103A				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 Spike Duplicate				Run: TECHNICON_091103A				11/03/09 10:30
Nitrogen, Nitrate+Nitrite as N	2.26	mg/L	0.10	106	90	110	0.4	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Denison Mines	Project Name, PWS, Permit, Etc.: 4th Quarter Nitrate & chloride	Sample Origin State: UT	EPA/State Compliance: Yes ☒ No ☐
Report Mail Address: P.O. Box 809 Blanding UT 84511	Contact Name: Ryan Palmer Phone/Fax: 678-2221	Email:	Sampler: (Please Print) Ryan Palmer
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

ANALYSIS REQUESTED

SEE ATTACHED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: there will be more Samples Comming Next week Under this project Name

Shipped by: Hand
Cooler ID(s): Various Client
Receipt Temp: 3 °C
On Ice: (Y) N
Custody Seal: On Bottle Y (N); On Cooler (Y) N
Intact (Y) N
Signature Match (Y) N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Nitrate	Chloride
1	UWLP	10-27-09	0910	2-W	X	X
2	Piez 1	10-27-09	0935		X	X
3	Piez 2	10-27-09	1020		X	X
4	Piez 3	10-27-09	1030		X	X
5	TWN-1R	10-28-09	0820		X	X
6	TWN-1	10-28-09	1320		X	X
7	TWN-4R	10-28-09	1010		X	X
8	TWN-4	10-28-09	1310	2-W	X	X
9						
10						

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Ron Wallace	10/29/09 0210	Ron Wallace			
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Andrew	10/29/09 1410	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

Energy Laboratories Inc
Workorder Receipt Checklist

Denison Mines USA Corp

C09101104

Login completed by: Diane Downing

Date and Time Received: 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 ☐	
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

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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

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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
C09100620-001	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. Waldrop

Stephanie D. Waldrop
Reporting Supervisor

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LABORATORY ANALYTICAL REPORT

Client: Denison Mines USA Corp
Project: Frog Pond
Lab ID: C09100620-001
Client Sample ID: Frog Pond

Report Date: 10/21/09
Collection Date: 10/14/09 08:52
DateReceived: 10/15/09
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Nitrate+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.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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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: R125355
Sample ID: MBLK-1		Method Blank				Run: TECHNICON_091020A				10/20/09 12:51
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.03						
Sample ID: LCS-2		Laboratory Control Sample				Run: TECHNICON_091020A				10/20/09 12:54
Nitrogen, Nitrate+Nitrite as N		2.44	mg/L	0.10	**98**	90	110			
Sample ID: C09100600-001DMS		Sample Matrix Spike				Run: TECHNICON_091020A				10/20/09 15:44
Nitrogen, Nitrate+Nitrite as N		1.93	mg/L	0.10	**96**	90	110			
Sample ID: C09100600-001DMSD		Sample Matrix Spike Duplicate				Run: TECHNICON_091020A				10/20/09 15:46
Nitrogen, Nitrate+Nitrite as N		1.92	mg/L	0.10	**96**	90	110	**0.5**	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
Denison Mines (USA) Corp.	Frog Pond	State: Utah	Yes ☐ No ☐
Report Mail Address:	**Contact Name:** / **Phone/Fax:**	**Email:**	**Sampler: (Please Print)**
P.O. Box 809, Blanding, Utah	David Turk 435.678.2221 / 435.678.2224	dturk@denisonmines.com	David Turk
Invoice Address:	**Invoice Contact & Phone:**	**Purchase Order:**	**Quote/Bottle Order:**
-Same-	-Same-		

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O DW; Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water)	Nitrate									SEE ATTACHED	Standard Turnaround (TAT)	RUSH	Comments:
1 Frog Pond	10/14/09	0852	1-W	/												
2																
3																
4																
5																
6																
7																
8																
9																
10																

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

LABORATORY USE ONLY

Shipped by: Hand
Cooler ID(s): Client
Receipt Temp: 3 °C
On Ice: Y N
Custody Seal: On Bottle Y N; On Cooler Y N
Intact: Y N
Signature Match: Y N
C09100620

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
David Turk	10/14/09 1200				
Tanner Holliday	10/15/09 1330	Tanner Holliday			
			Received by Laboratory: [illegible]	10/15/09 14:02	

Sample Disposal: Return to Client: _____ Lab Disposal: _____

Energy Laboratories Inc
Workorder Receipt Checklist

C09100620

Denison Mines USA Corp

Login completed by: Tabitha Edwards

Date and Time Received: 10/15/2009 2:02 PM

Reviewed by:

Received by: em

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 ☐	
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

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Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

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.

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

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 Date	Nitrate (mg/l)	Chloride (mg/l)
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 Date	Nitrate (mg/l)	Chloride (mg/l)
2/6/2009	23.6	96
7/21/2009	25.3	96
9/21/2009	27.1	99
11/2/2009	29	106

TWN-4	Nitrate (mg/l)	Chloride (mg/l)
Date		
2/6/2009	1	13
7/21/2009	0.05	12
9/21/2009	0.4	13
10/28/2009	0.4	11

TWN-5 Date	Nitrate (mg/l)	Chloride (mg/l)
8/25/2009	22	42
9/21/2009	0.5	45
11/10/2009	0.2	48

TWN-6 Date	Nitrate (mg/l)	Chloride (mg/l)
8/25/2009	3.2	32
9/22/2009	1.6	13
11/3/2009	1.4	21

TWN-7 Date	Nitrate (mg/l)	Chloride (mg/l)
8/25/2009	ND	11
9/21/2009	ND	7
11/10/2009	0.1	7

TWN-8 Date	Nitrate (mg/l)	Chloride (mg/l)
8/25/2009	ND	11
9/21/2009	ND	12
11/10/2009	ND	12

TWN-9 Date	Nitrate (mg/l)	Chloride (mg/l)
8/25/2009	9.3	169
9/22/2009	8.9	201
11/10/2009	12	205

TWN-10 Date	Nitrate (mg/l)	Chloride (mg/l)
8/25/2009	1.1	19
9/22/2009	1.6	35
11/10/2009	1.4	26

TWN-11 Date	Nitrate (mg/l)	Chloride (mg/l)
11/3/2009	1.3	74

TWN-12 Date	Nitrate (mg/l)	Chloride (mg/l)
11/3/2009	0.5	109

TWN-13 Date	Nitrate (mg/l)	Chloride (mg/l)
11/4/2009	0.5	83

TWN-14 Date	Nitrate (mg/l)	Chloride (mg/l)
11/4/2009	3.4	32

TWN-15 Date	Nitrate (mg/l)	Chloride (mg/l)
11/10/2009	1.1	78

TWN-16 Date	Nitrate (mg/l)	Chloride (mg/l)
11/4/2009	1	39

TWN-17 Date	Nitrate (mg/l)	Chloride (mg/l)
11/4/2009	6.7	152

TWN-18 Date	Nitrate (mg/l)	Chloride (mg/l)
11/2/2009	1.3	57

TWN-19 Date	Nitrate (mg/l)	Chloride (mg/l)
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

MW-18	Nitrate (mg/l)	Chloride (mg/l)
Date		
7/14/2009	ND	51

MW-19	Nitrate (mg/l)	Chloride (mg/l)
Date		
7/14/2009	2.2	24

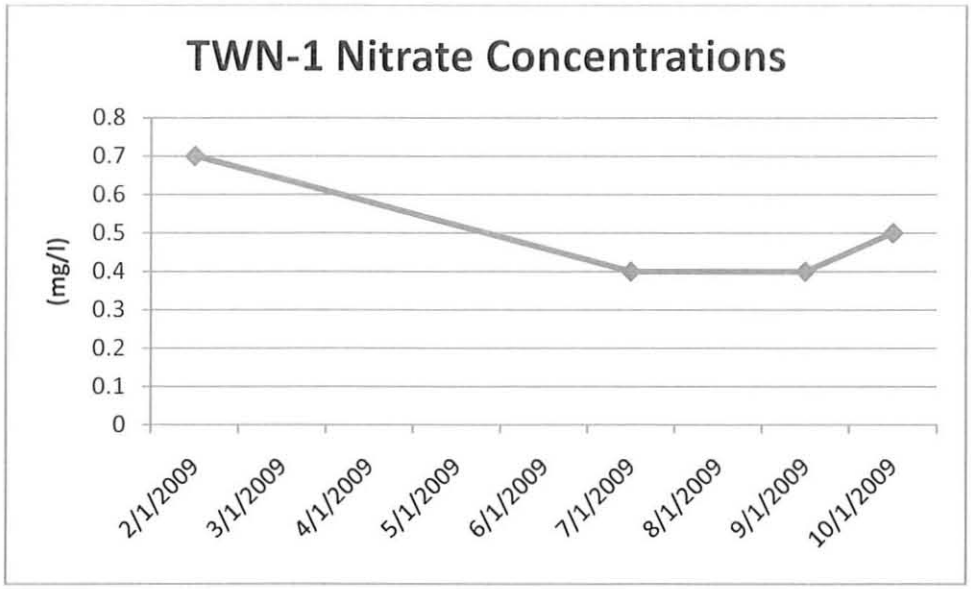
Wildlife Pond

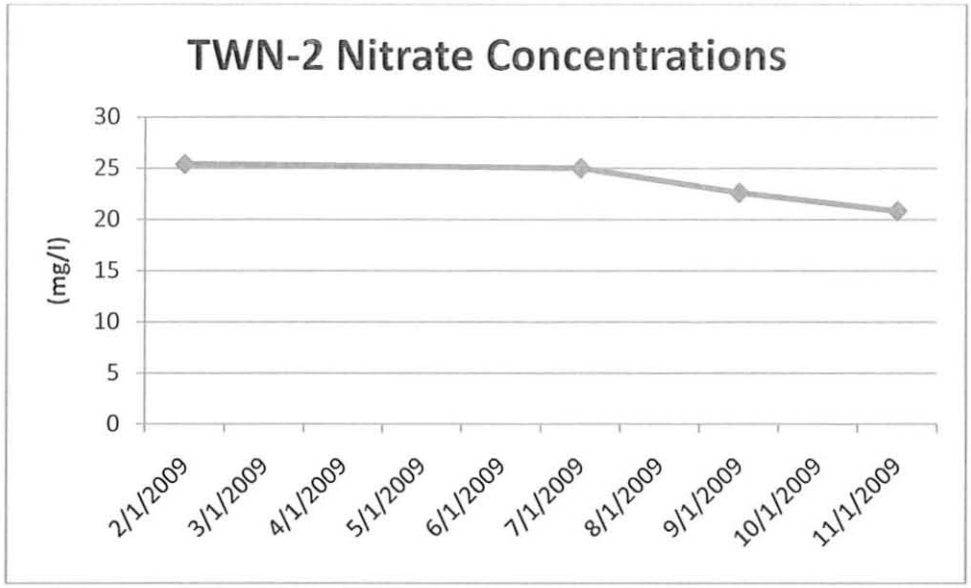
Date	Nitrate (mg/l)	Chloride (mg/l)
9/22/2009	ND	5
10/27/2009	ND	3

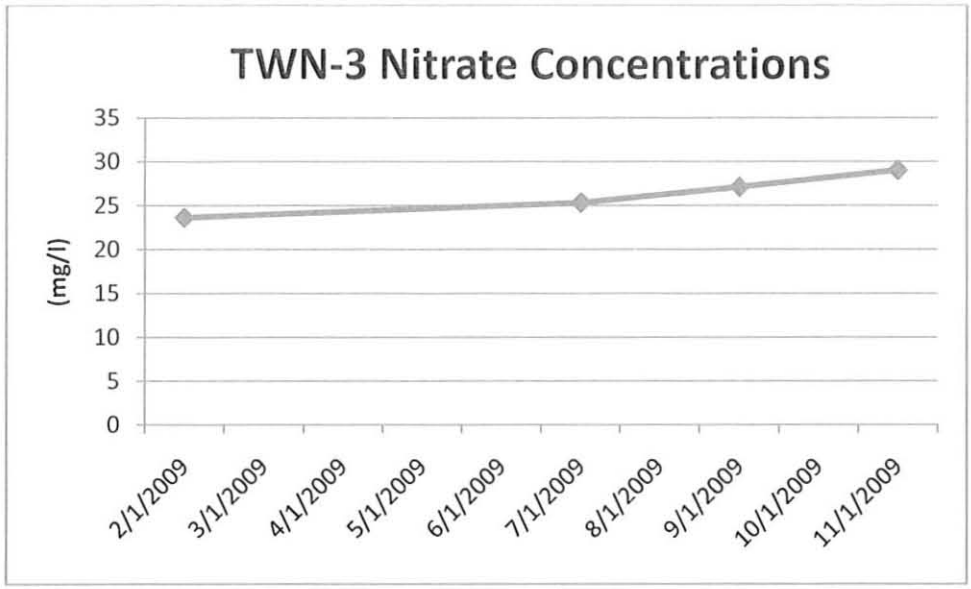
Frog Pond Date	Nitrate (mg/l)	Chloride (mg/l)
10/14/2009	ND	NA

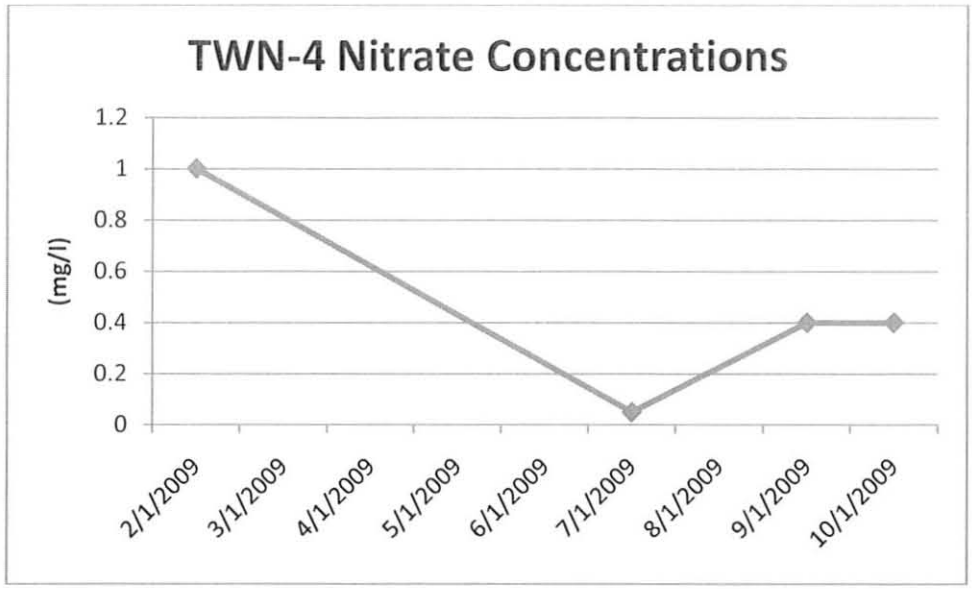
Tab I

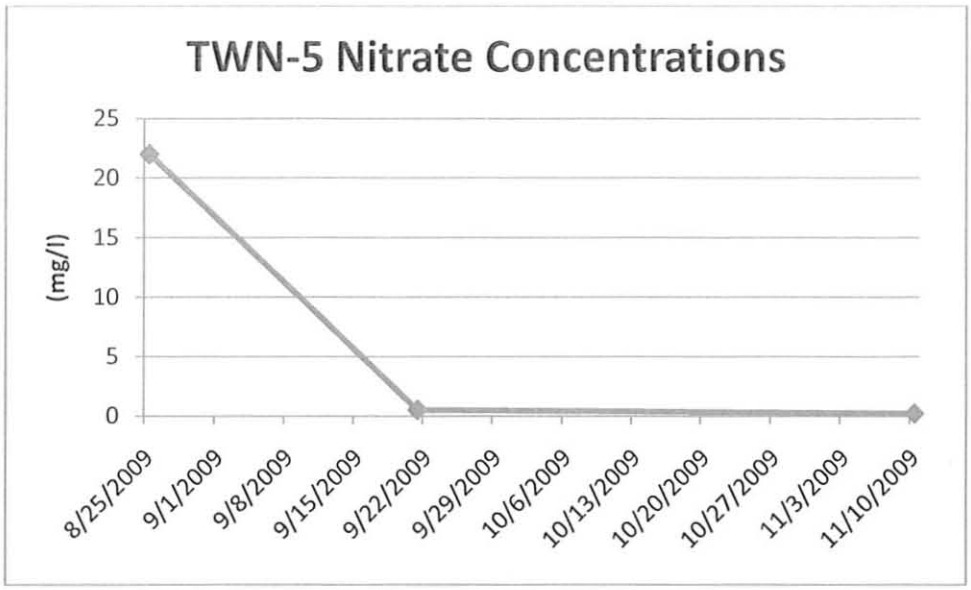
Nitrate Concentration Graphs

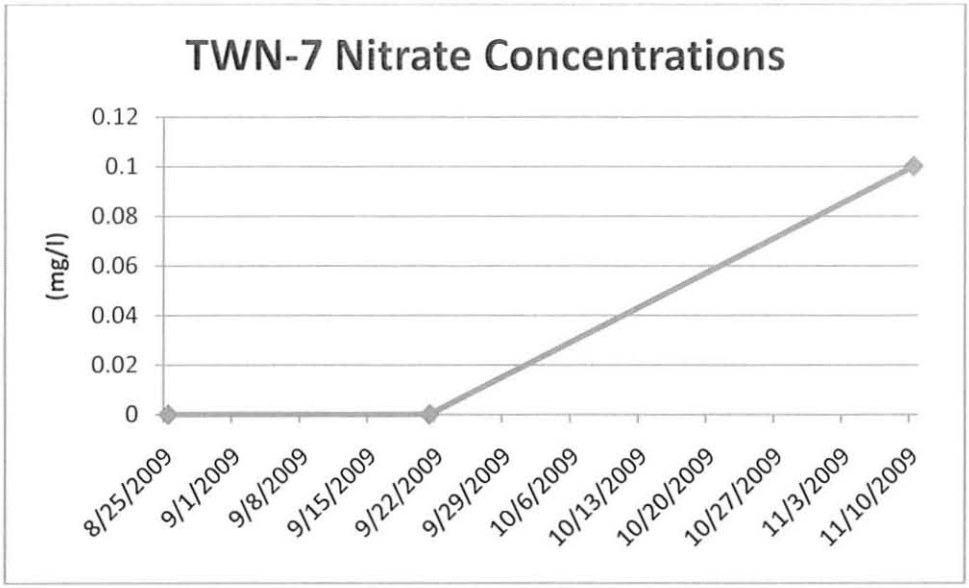

TWN-1 Nitrate Concentrations
(mg/l)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009

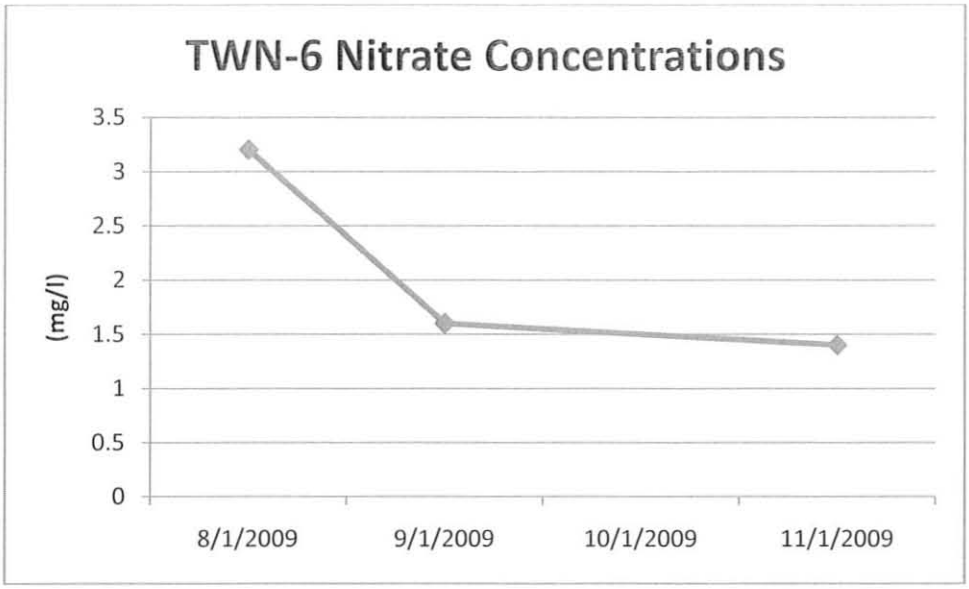

TWN-2 Nitrate Concentrations
(mg/l)
30
25
20
15
10
5
0
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009
11/1/2009

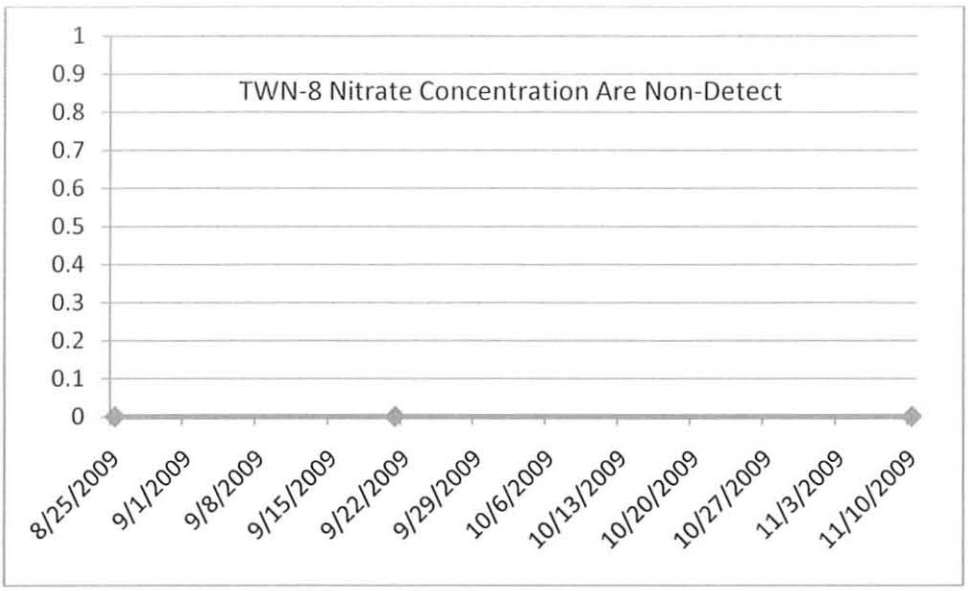

TWN-3 Nitrate Concentrations
(mg/l)
35
30
25
20
15
10
5
0
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009
11/1/2009

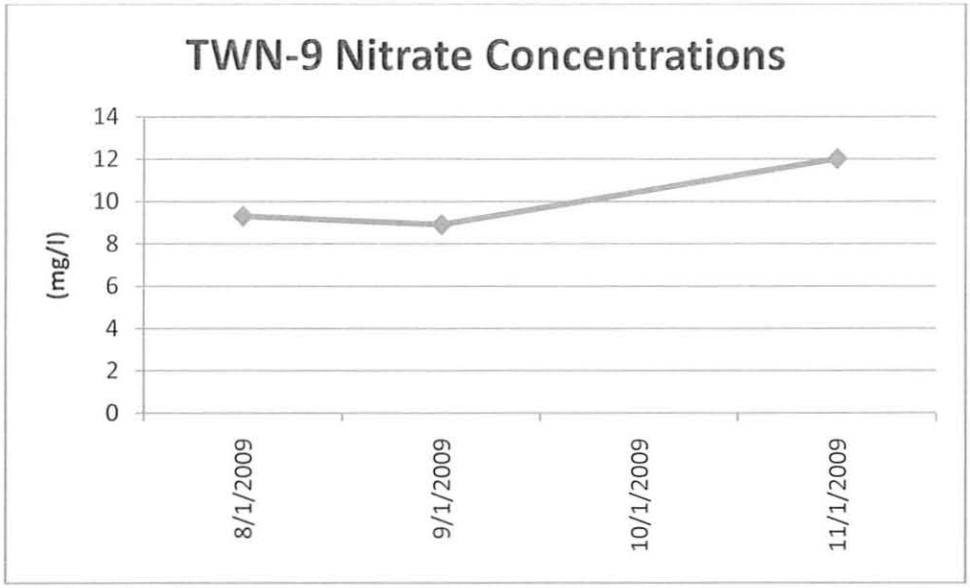

TWN-4 Nitrate Concentrations
(mg/l)
1.2
1
0.8
0.6
0.4
0.2
0
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009

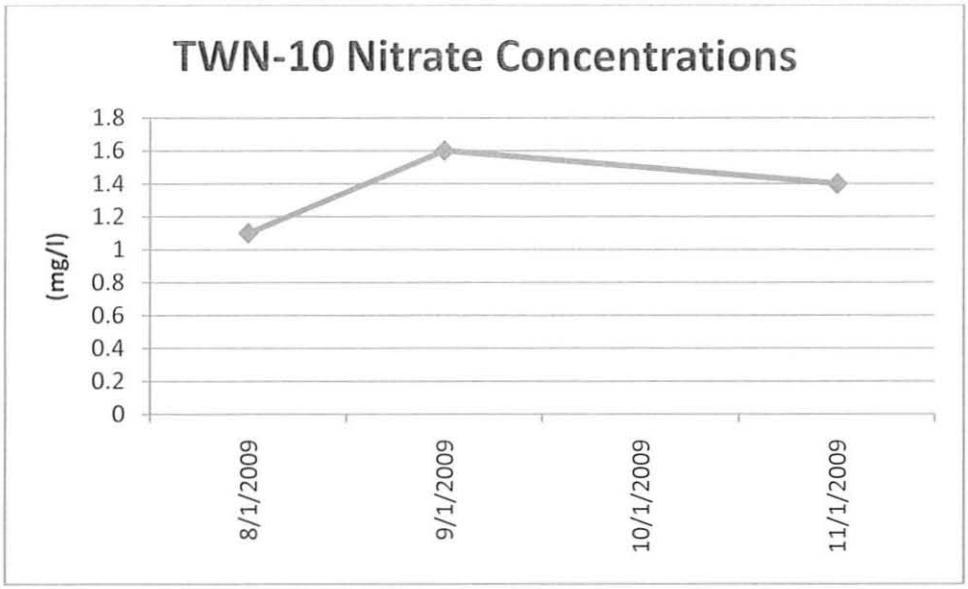

TWN-5 Nitrate Concentrations
(mg/l)
25
20
15
10
5
0
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009

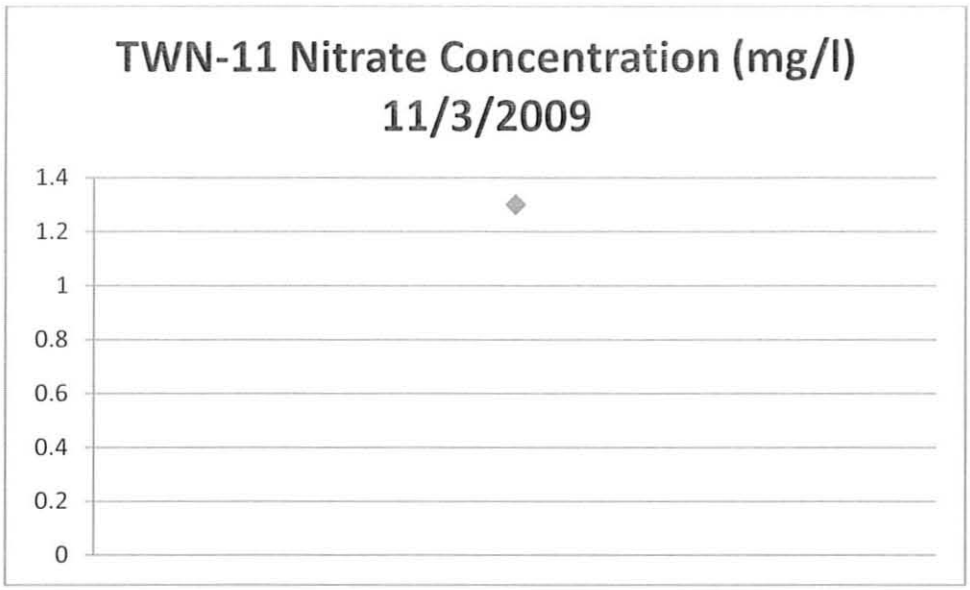

TWN-7 Nitrate Concentrations
(mg/l)
0.12
0.1
0.08
0.06
0.04
0.02
0
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009

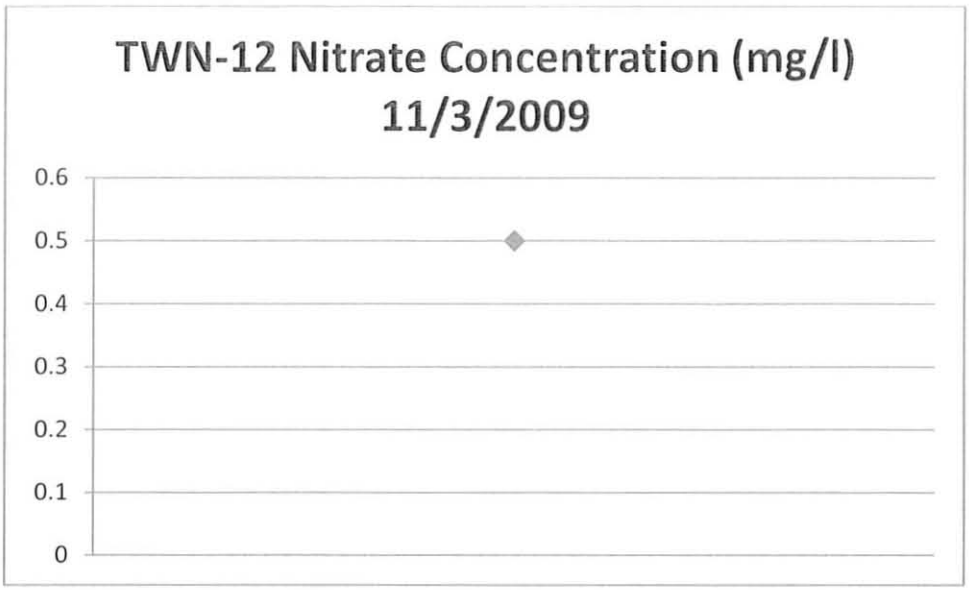

TWN-6 Nitrate Concentrations
(mg/l)
3.5
3
2.5
2
1.5
1
0.5
0
8/1/2009
9/1/2009
10/1/2009
11/1/2009

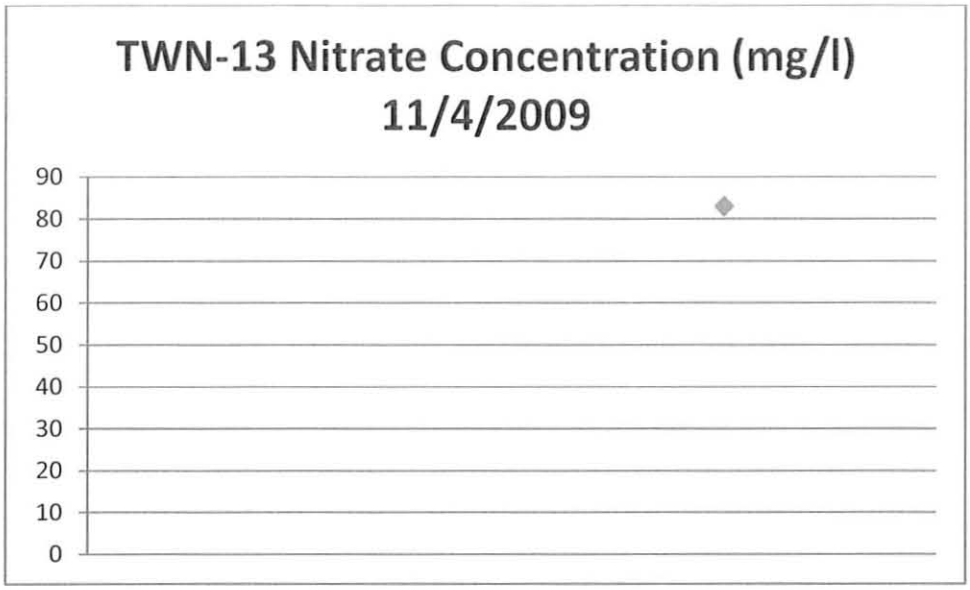

TWN-8 Nitrate Concentration Are Non-Detect
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009

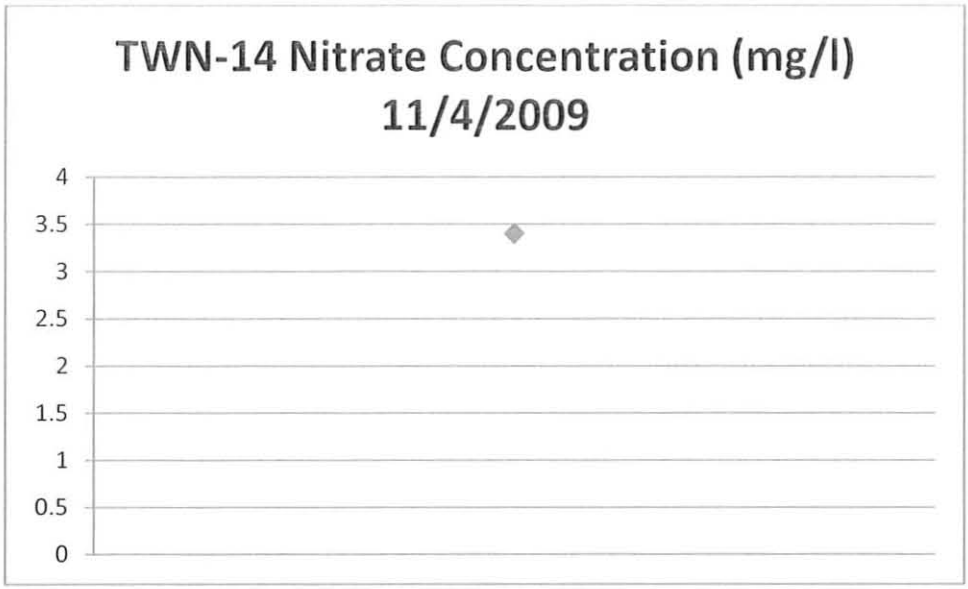

TWN-9 Nitrate Concentrations
(mg/l)
14
12
10
8
6
4
2
0
8/1/2009
9/1/2009
10/1/2009
11/1/2009

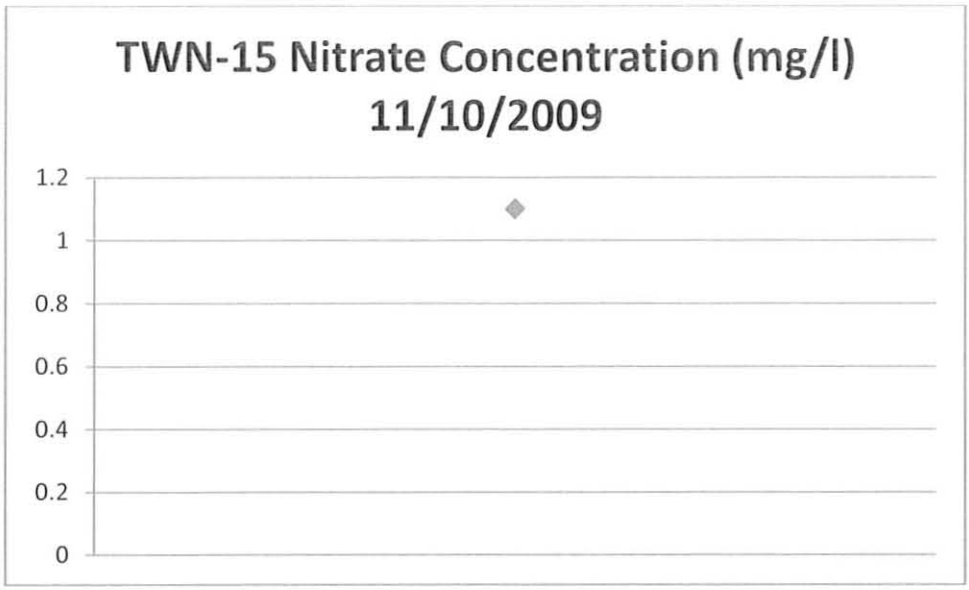

TWN-10 Nitrate Concentrations
(mg/l)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
8/1/2009
9/1/2009
10/1/2009
11/1/2009

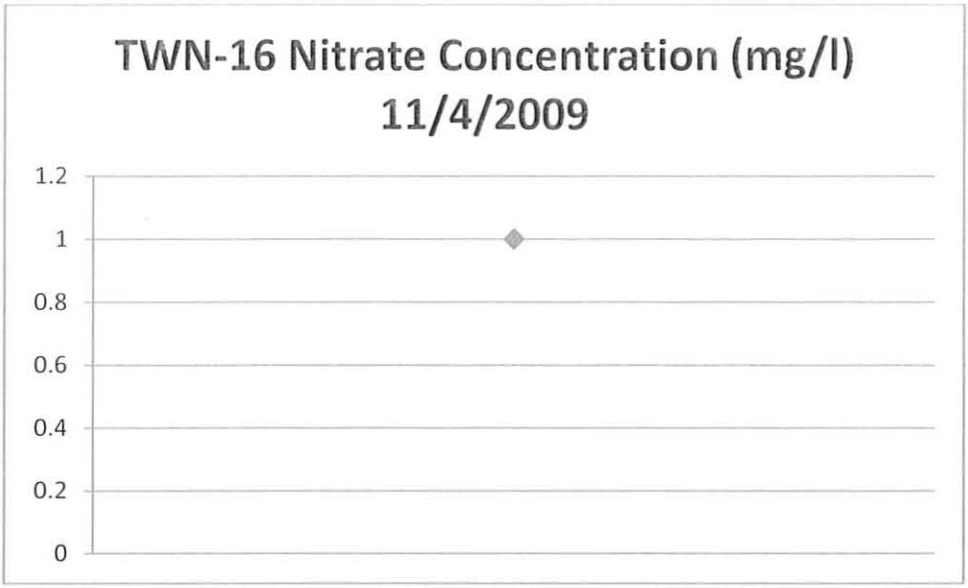

TWN-11 Nitrate Concentration (mg/l)
11/3/2009
1.4
1.2
1
0.8
0.6
0.4
0.2
0

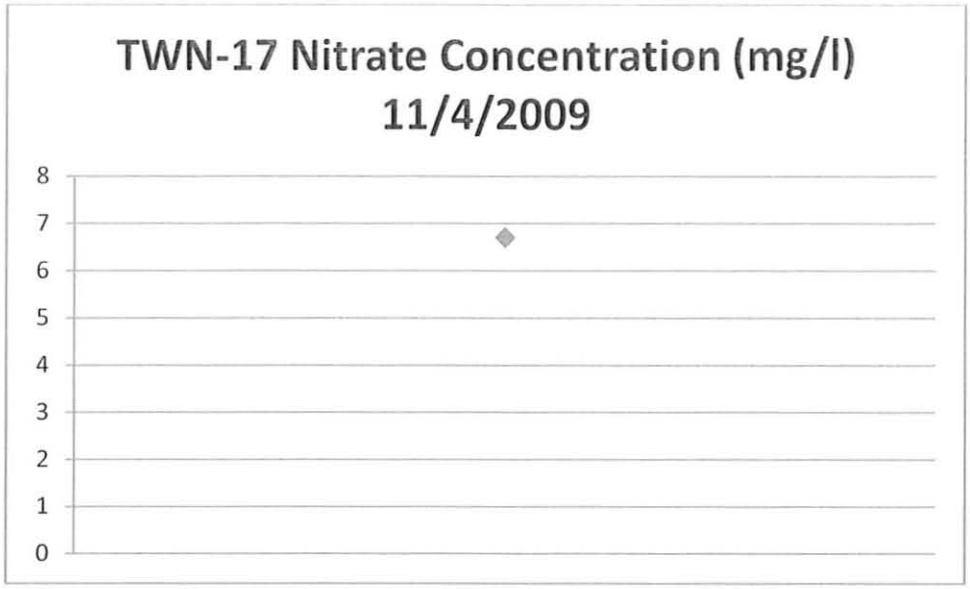

TWN-12 Nitrate Concentration (mg/l)
11/3/2009
0.6
0.5
0.4
0.3
0.2
0.1
0

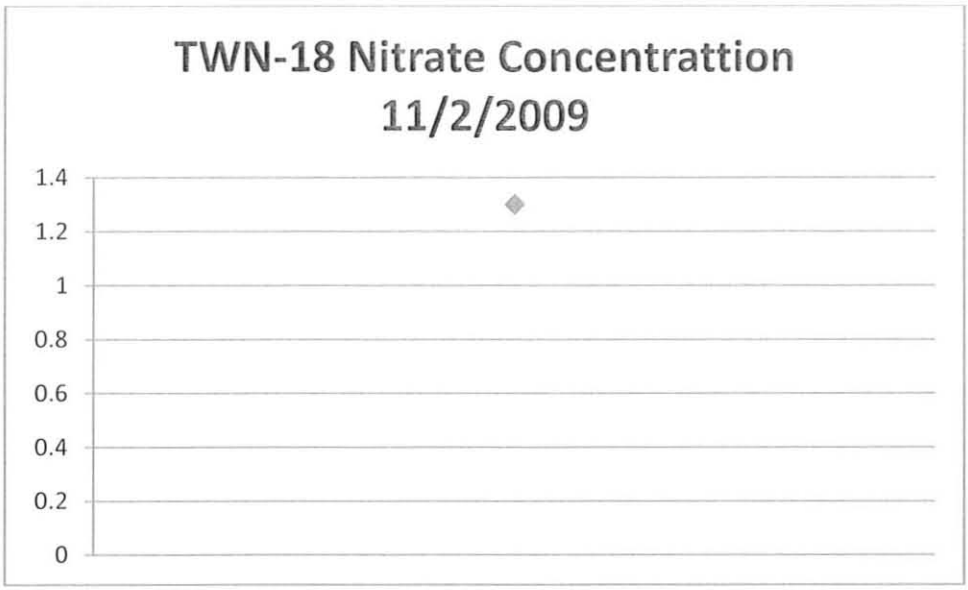

TWN-13 Nitrate Concentration (mg/l)
11/4/2009
90
80
70
60
50
40
30
20
10
0

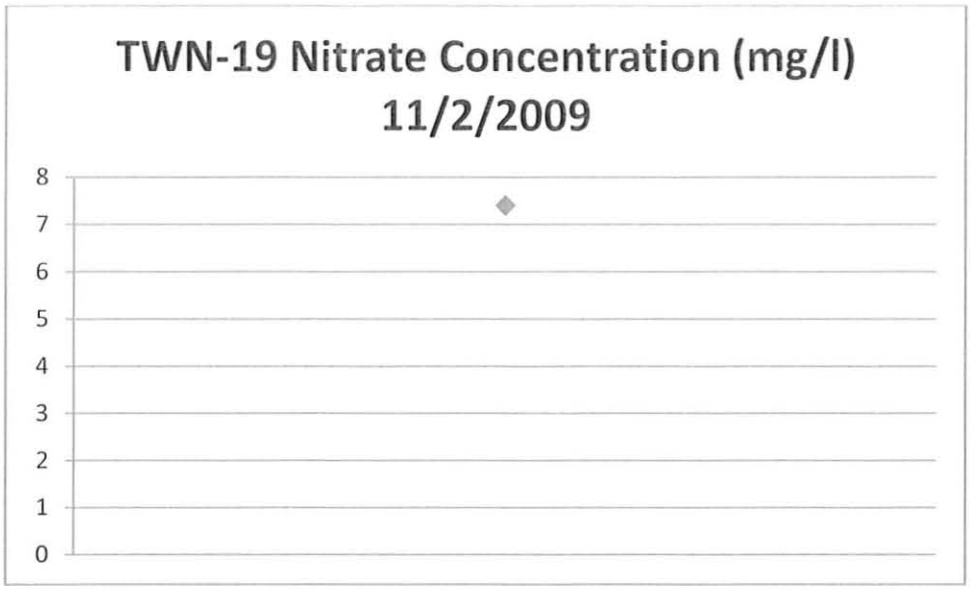

TWN-14 Nitrate Concentration (mg/l)
11/4/2009
4
3.5
3
2.5
2
1.5
1
0.5
0

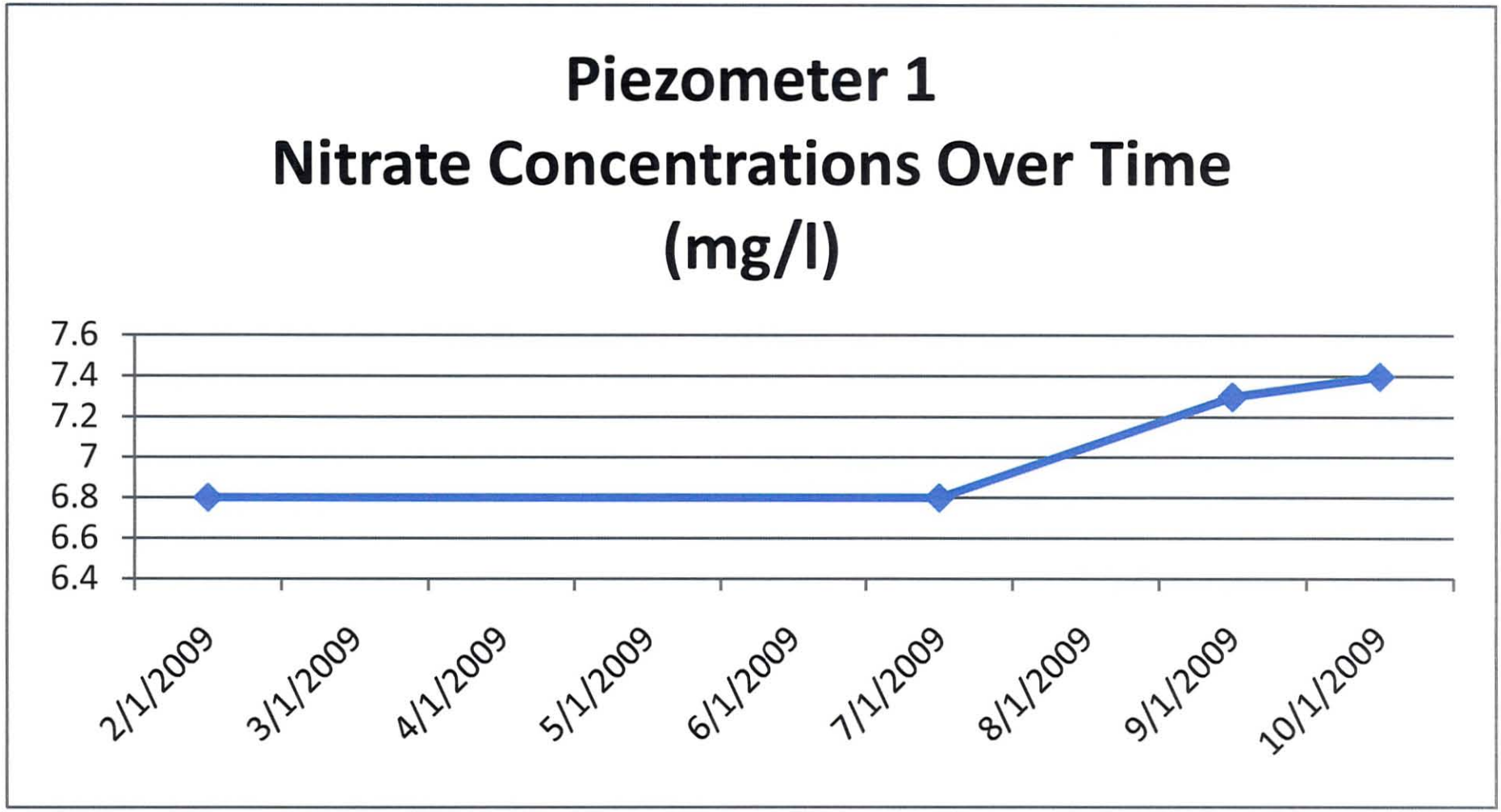

TWN-15 Nitrate Concentration (mg/l)
11/10/2009
1.2
1
0.8
0.6
0.4
0.2
0

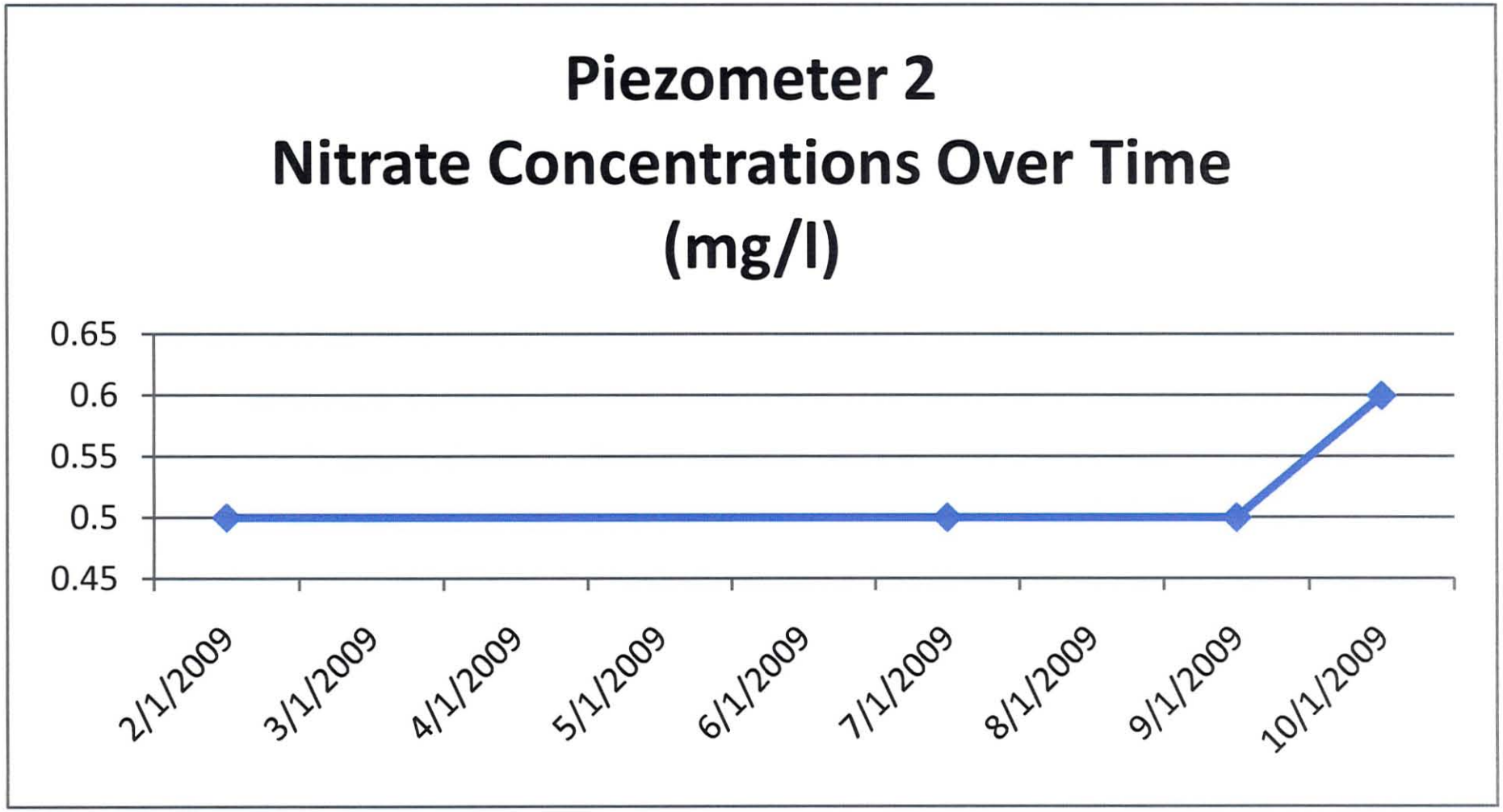

TWN-16 Nitrate Concentration (mg/l)
11/4/2009
1.2
1
0.8
0.6
0.4
0.2
0

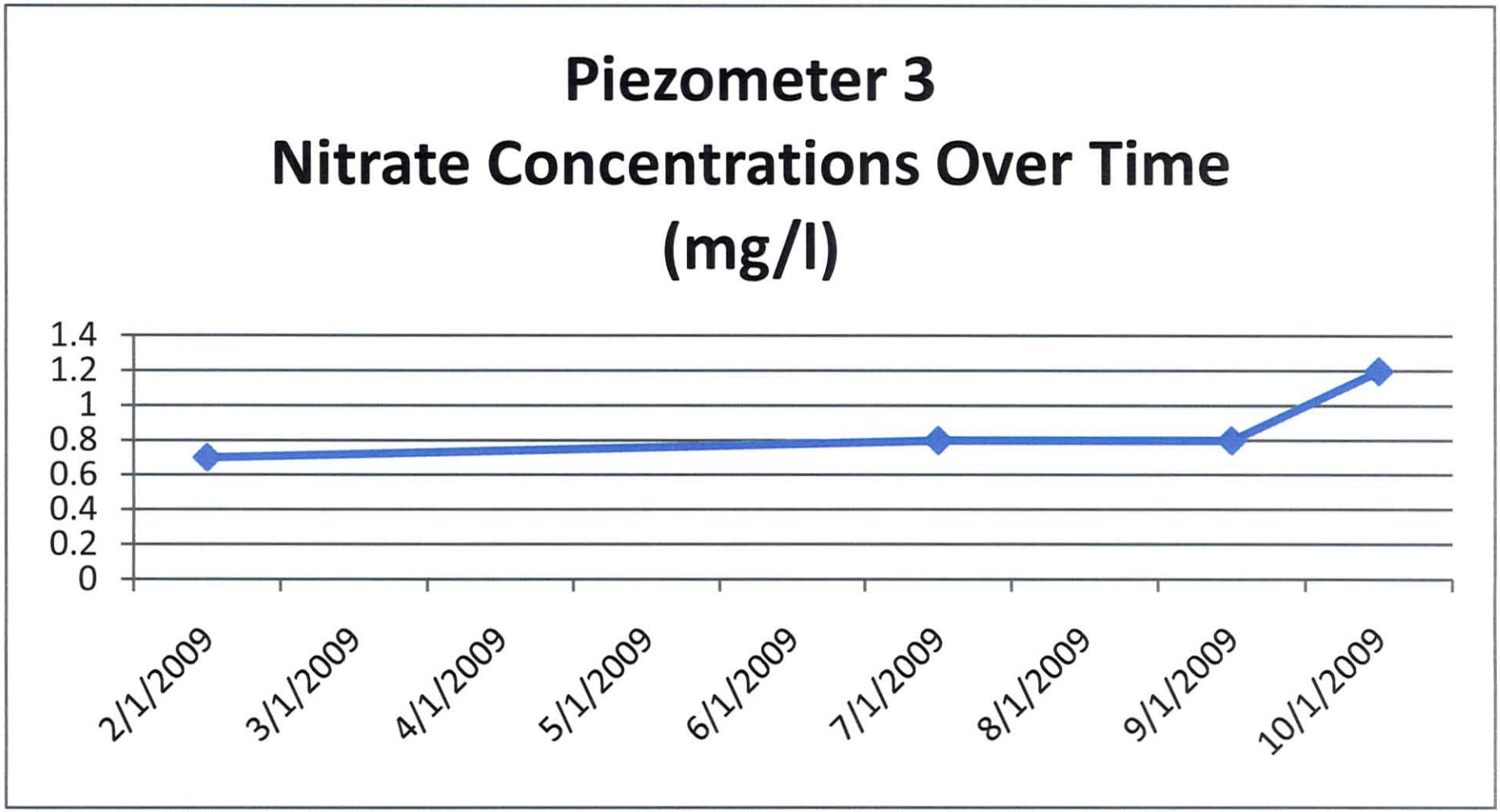

TWN-17 Nitrate Concentration (mg/l)
11/4/2009
8
7
6
5
4
3
2
1
0

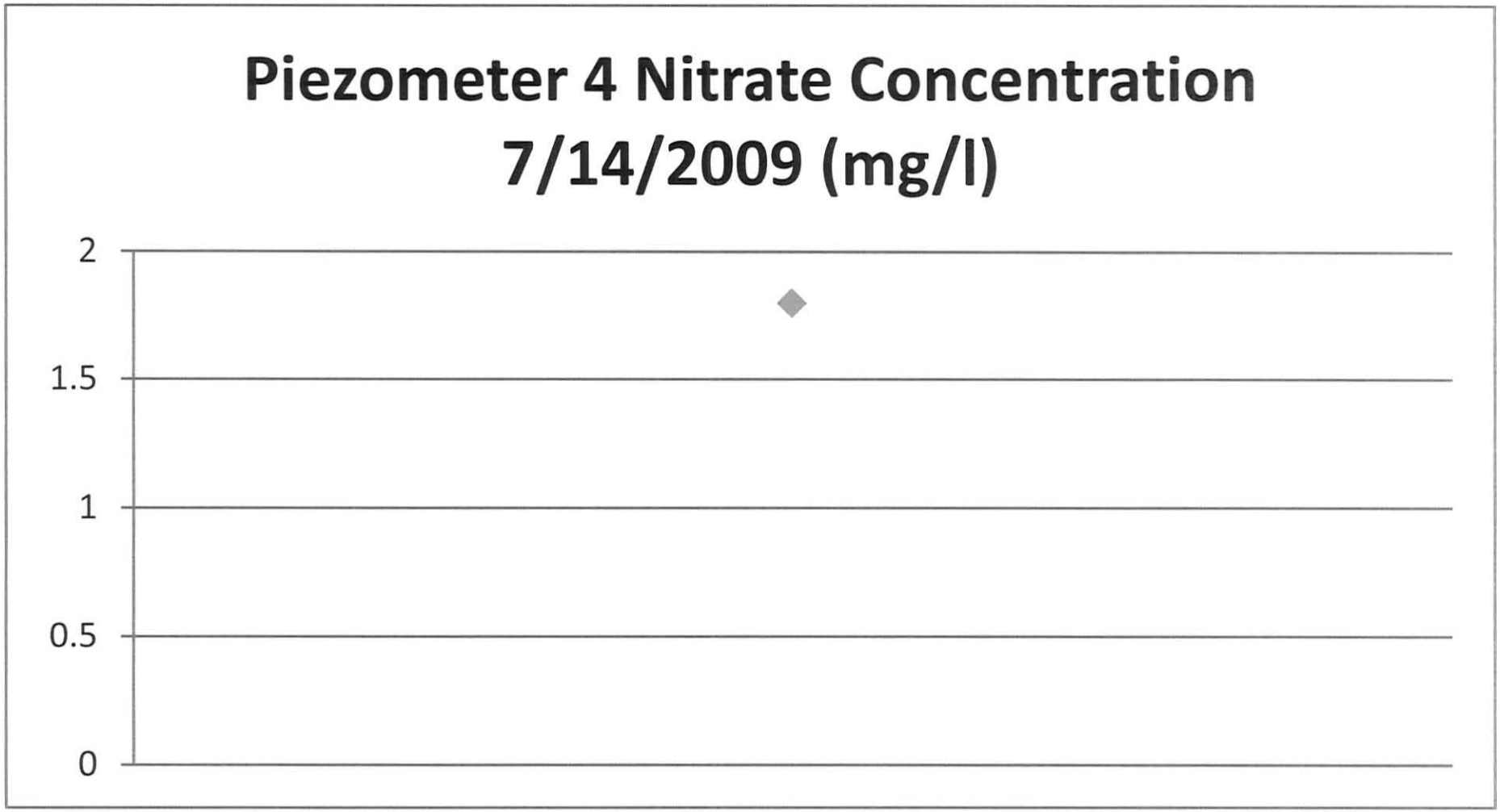

TWN-18 Nitrate Concentrattion
11/2/2009
1.4
1.2
1
0.8
0.6
0.4
0.2
0

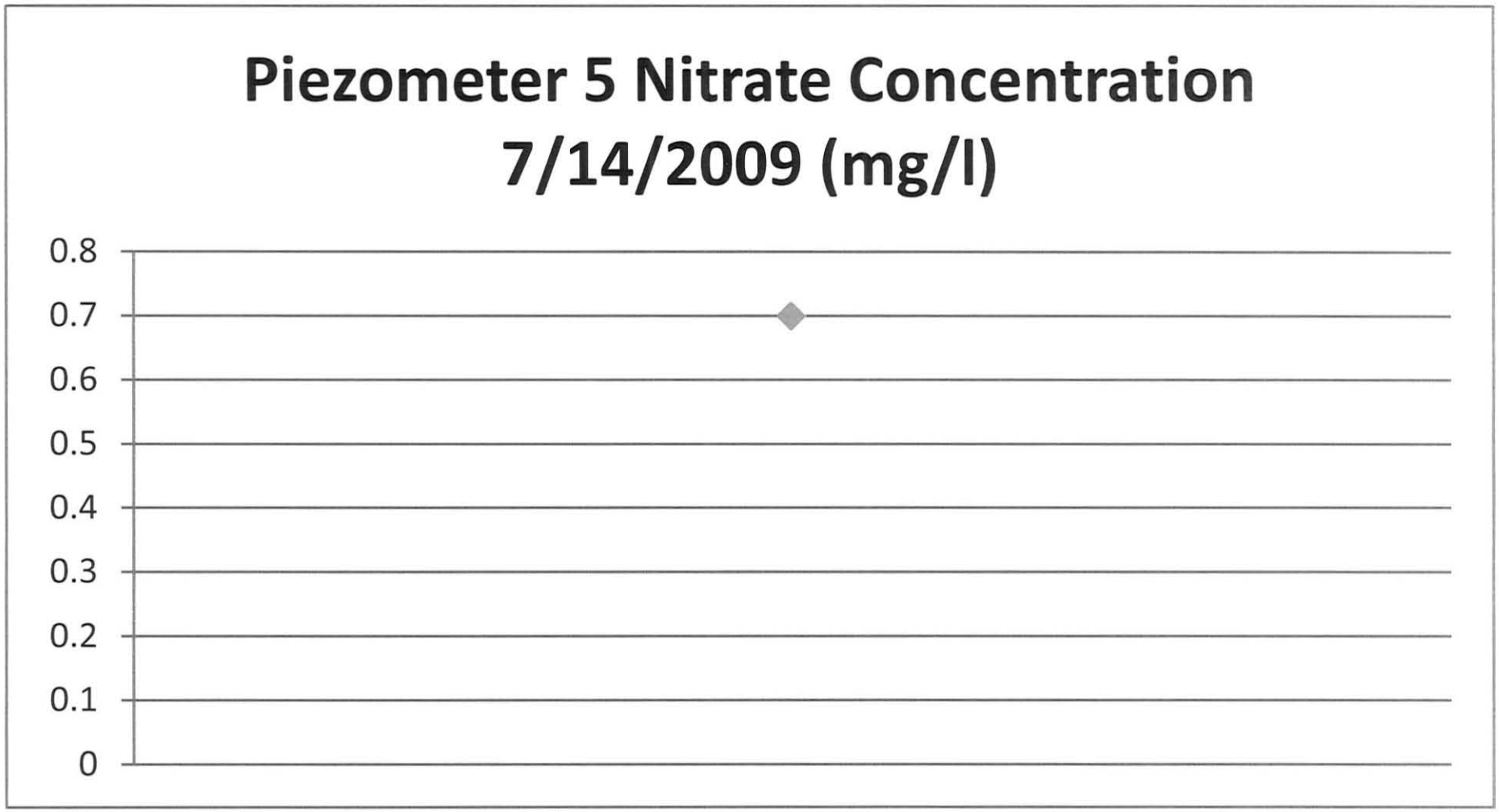

TWN-19 Nitrate Concentration (mg/l)
11/2/2009
8
7
6
5
4
3
2
1
0

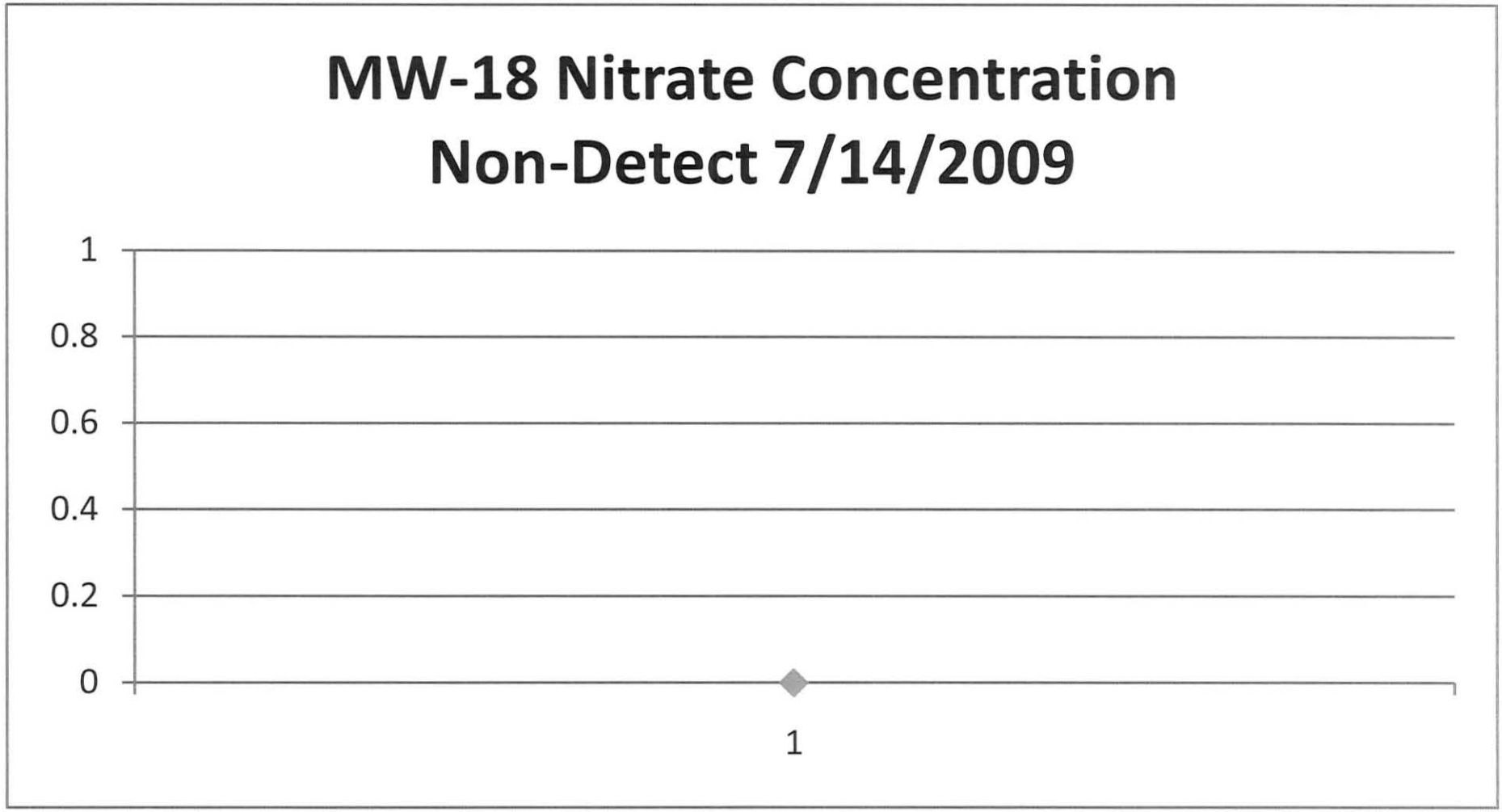

Piezometer 1
Nitrate Concentrations Over Time
(mg/l)
7.6
7.4
7.2
7
6.8
6.6
6.4
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009

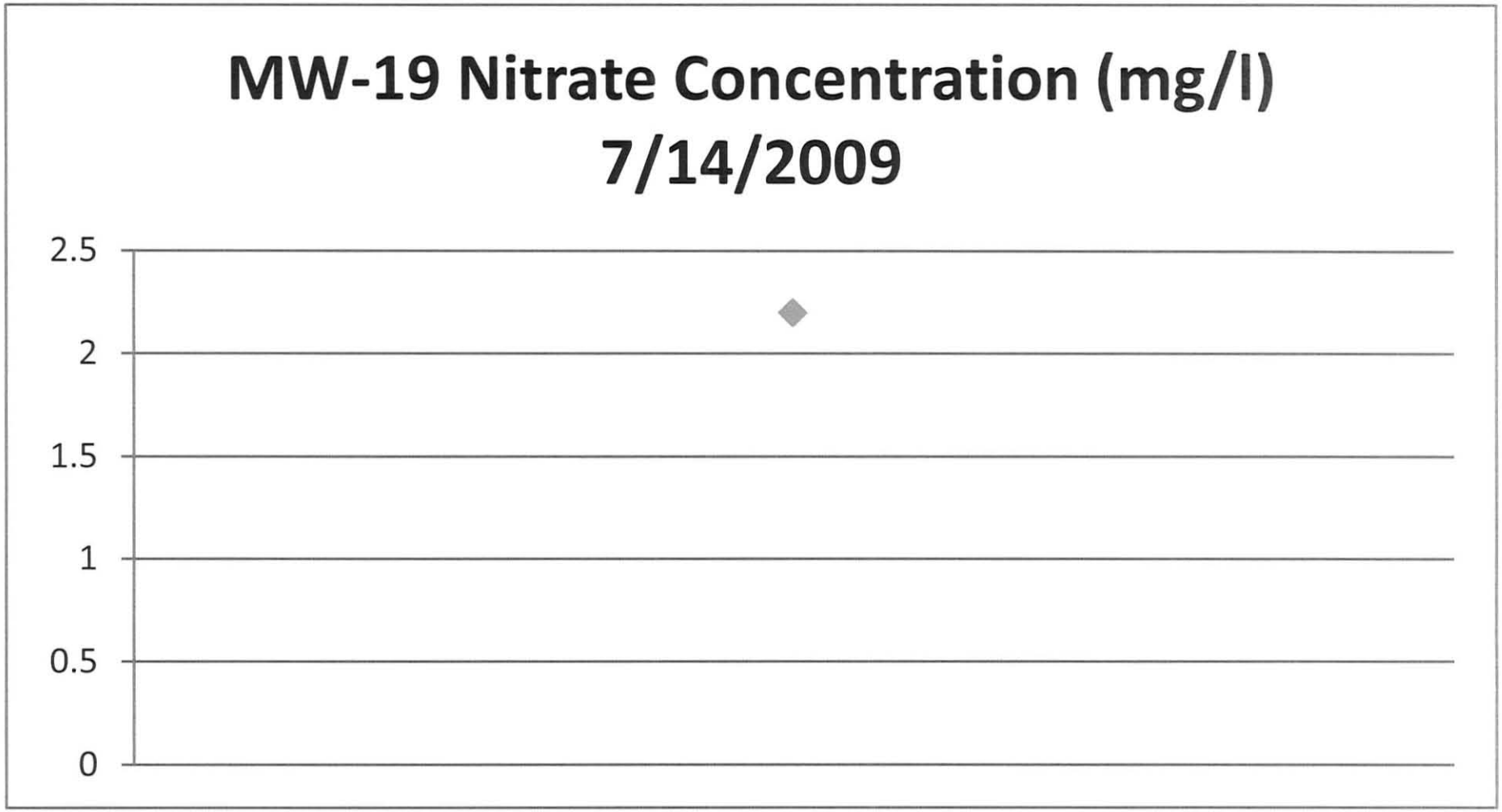

Piezometer 2
Nitrate Concentrations Over Time
(mg/l)
0.65
0.6
0.55
0.5
0.45
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009

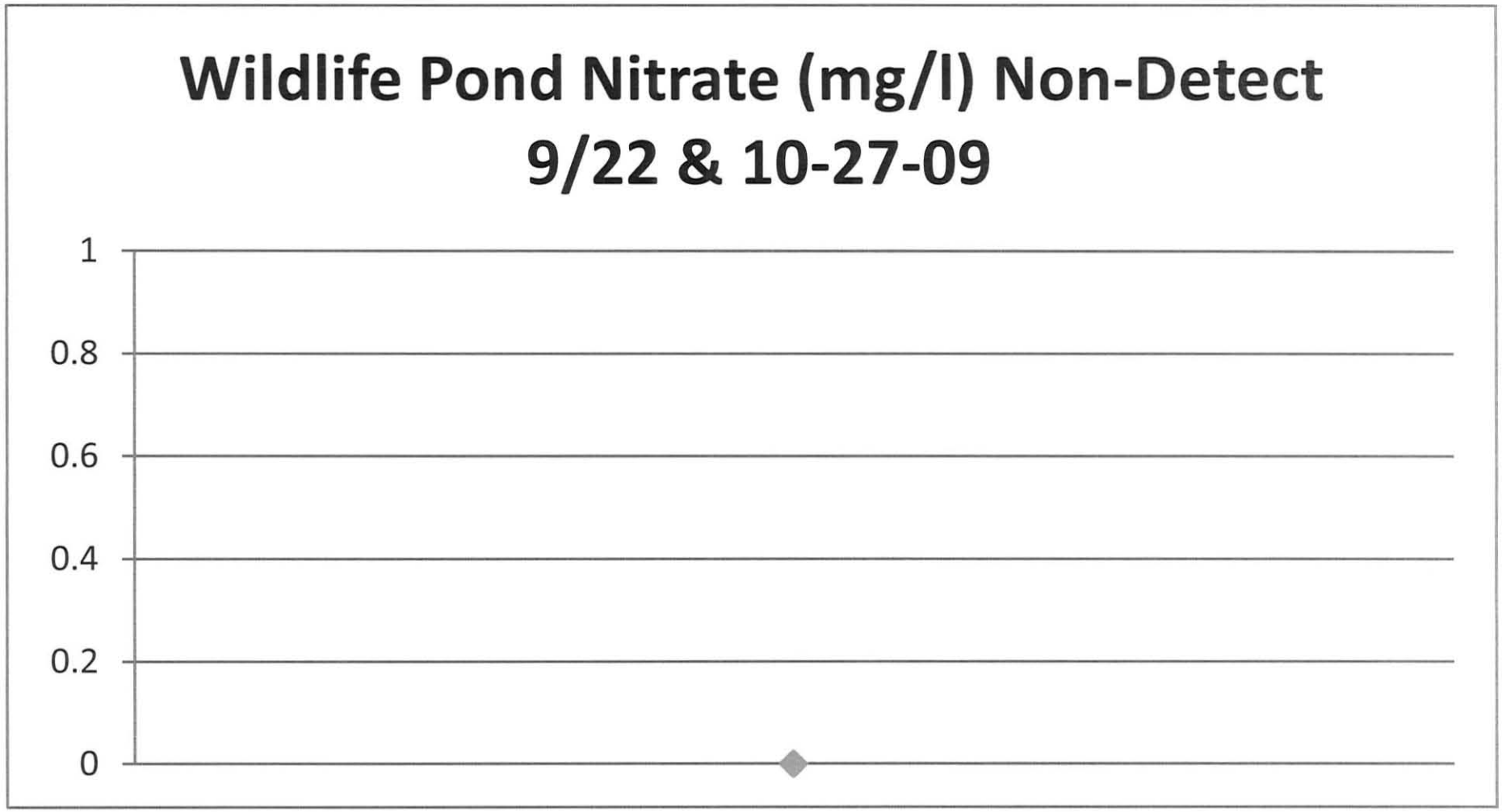

Piezometer 3
Nitrate Concentrations Over Time
(mg/l)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009

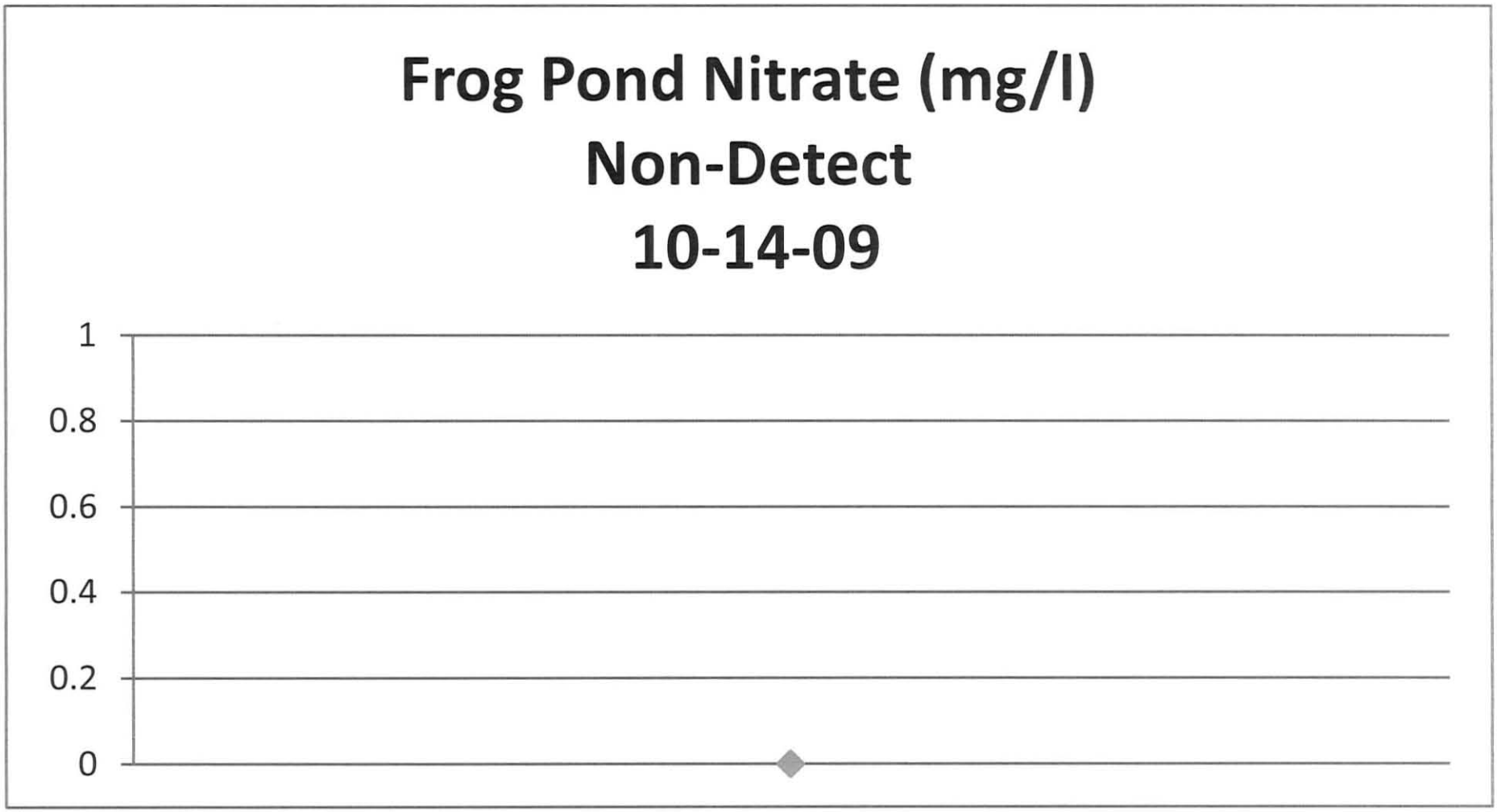

Piezometer 4 Nitrate Concentration
7/14/2009 (mg/l)
2
1.5
1
0.5
0


Piezometer 5 Nitrate Concentration
7/14/2009 (mg/l)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0

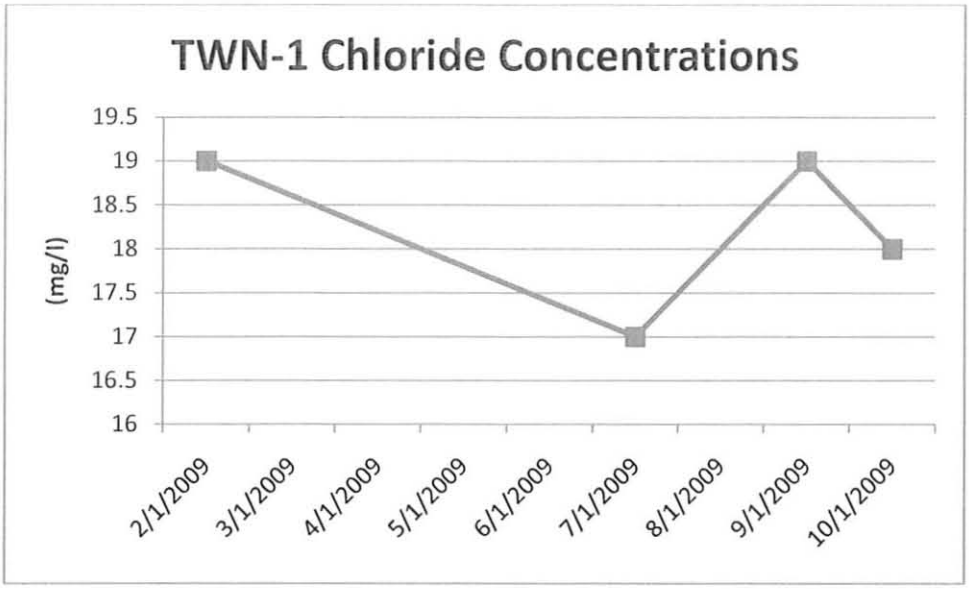

MW-18 Nitrate Concentration
Non-Detect 7/14/2009
1
0.8
0.6
0.4
0.2
0
1

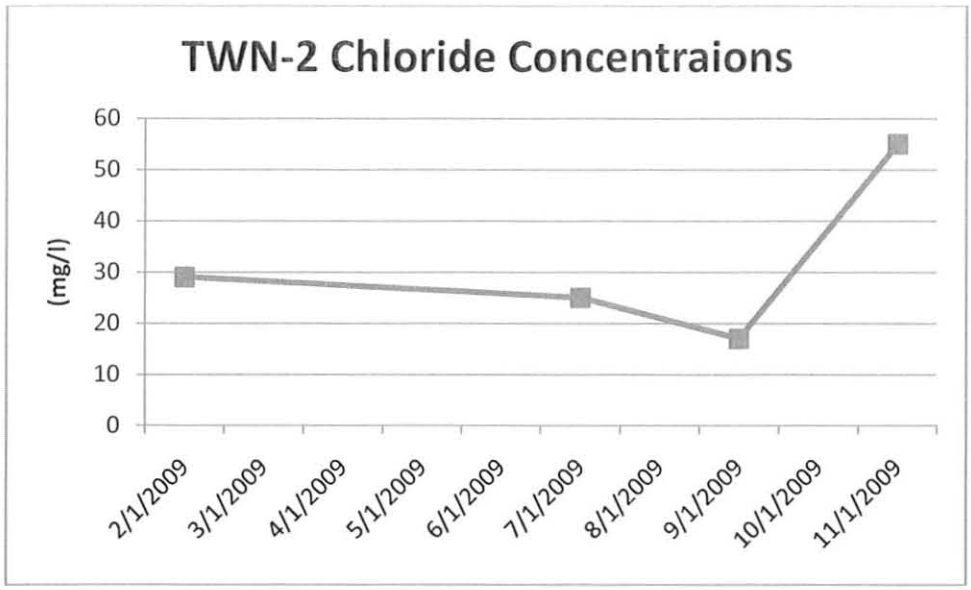

MW-19 Nitrate Concentration (mg/l)
7/14/2009
2.5
2
1.5
1
0.5
0

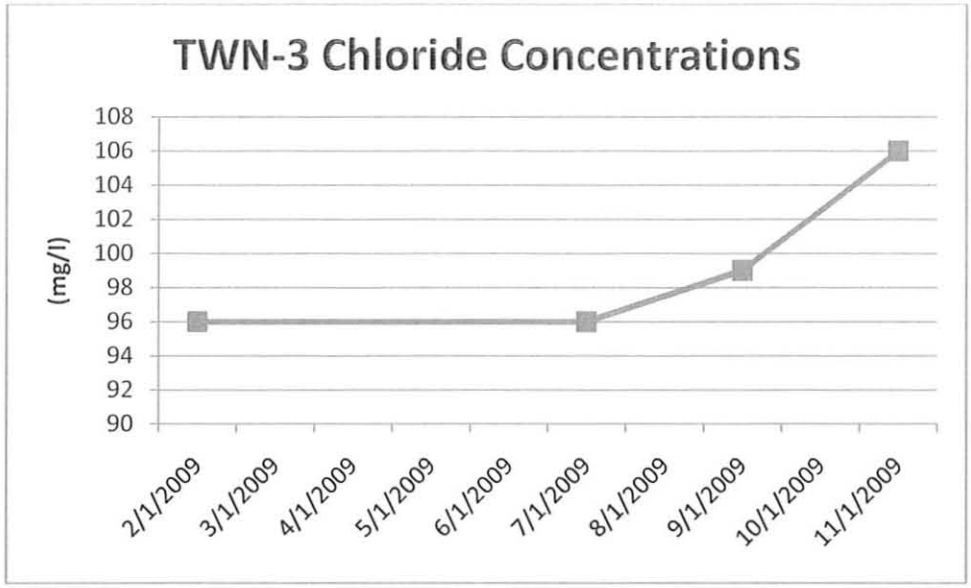

Wildlife Pond Nitrate (mg/l) Non-Detect
9/22 & 10-27-09
1
0.8
0.6
0.4
0.2
0

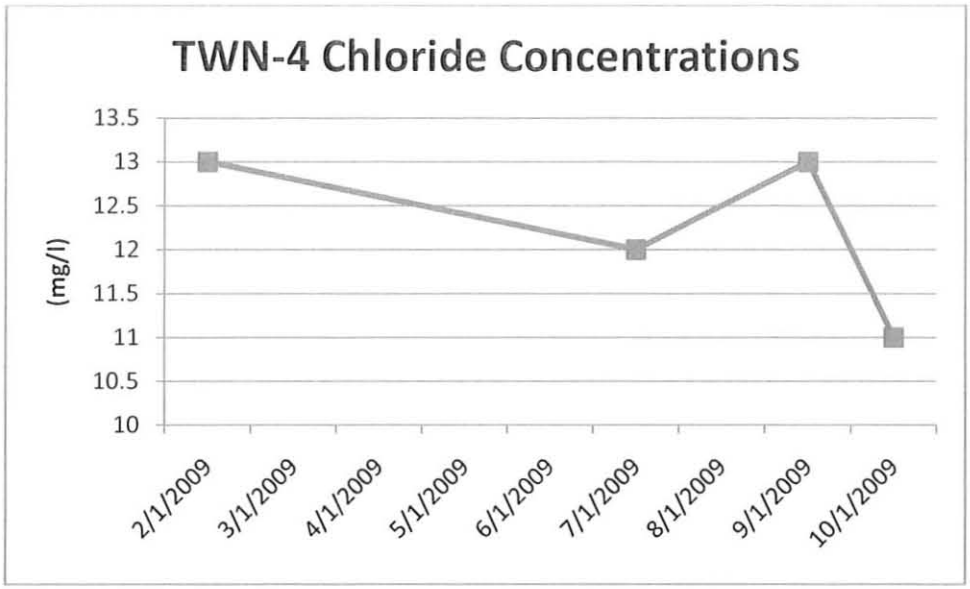

Frog Pond Nitrate (mg/l)
Non-Detect
10-14-09
1
0.8
0.6
0.4
0.2
0

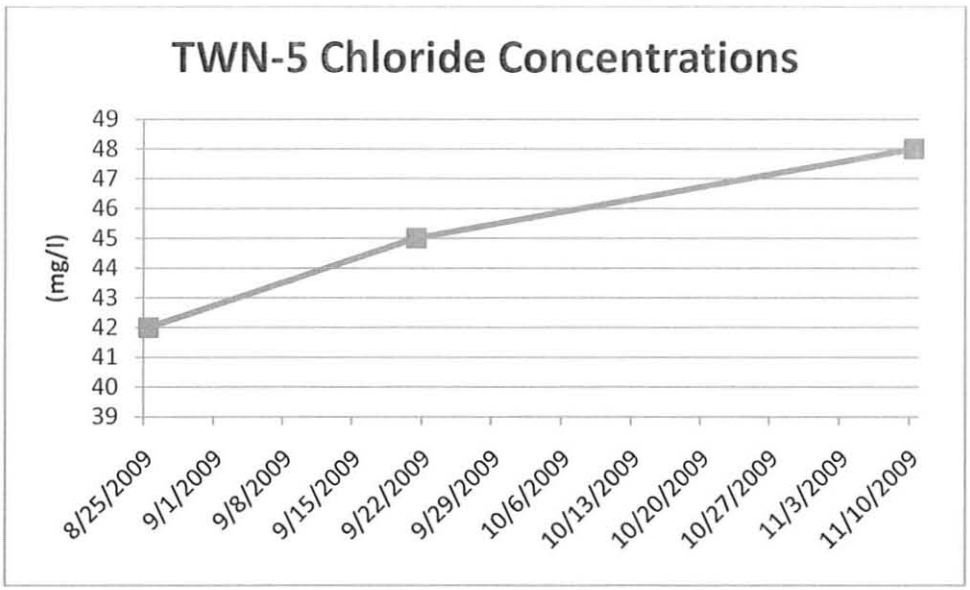
Chloride Concentration Graphs

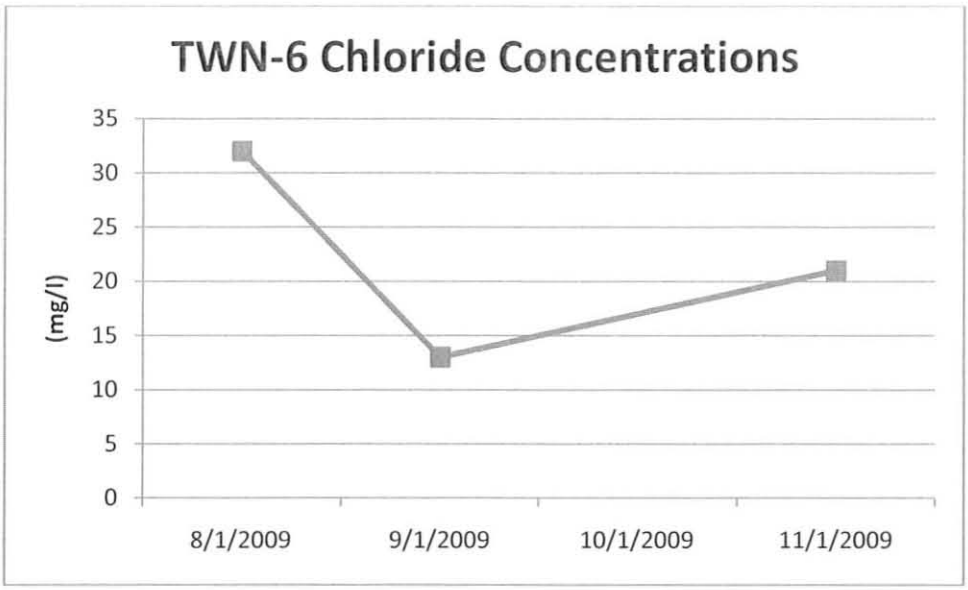

TWN-1 Chloride Concentrations
(mg/l)
19.5
19
18.5
18
17.5
17
16.5
16
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009

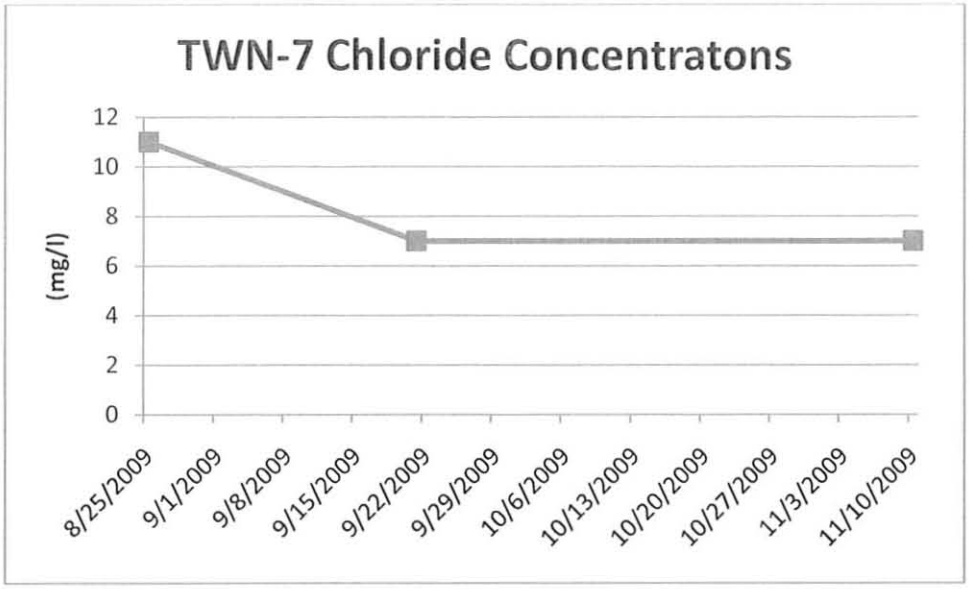

TWN-2 Chloride Concentraions
(mg/l)
60
50
40
30
20
10
0
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009
11/1/2009

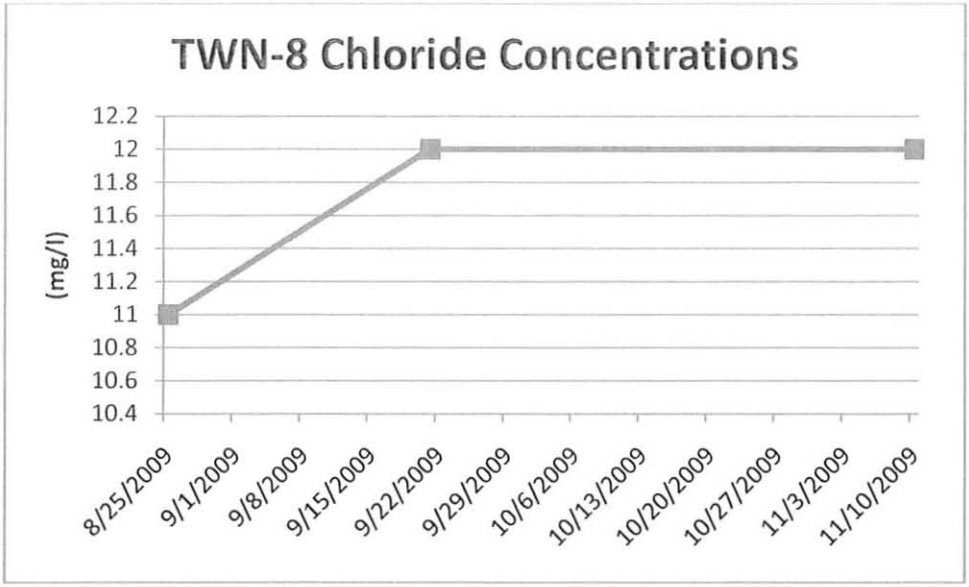

TWN-3 Chloride Concentrations
(mg/l)
108
106
104
102
100
98
96
94
92
90
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009
11/1/2009

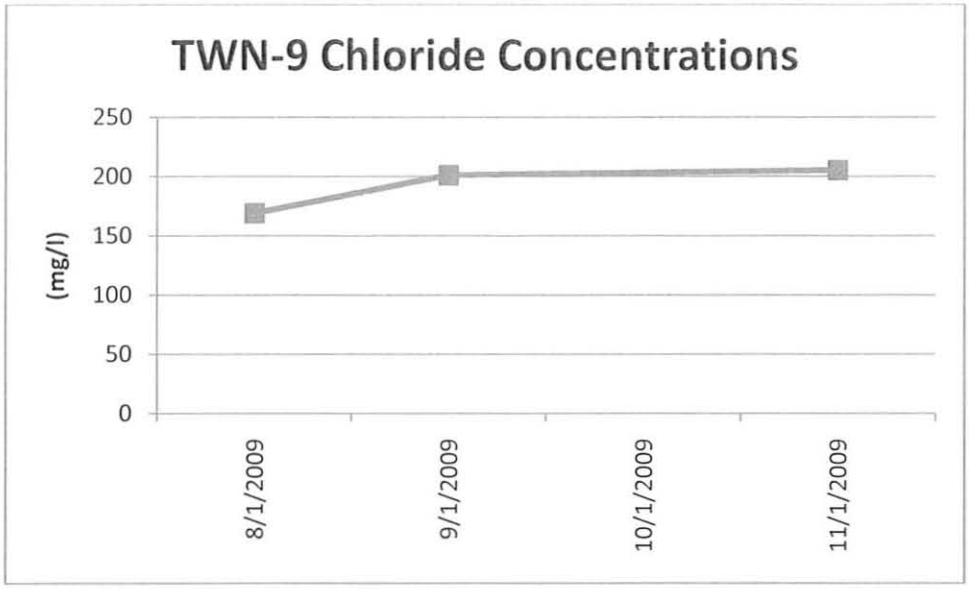

TWN-4 Chloride Concentrations
(mg/l)
13.5
13
12.5
12
11.5
11
10.5
10
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009

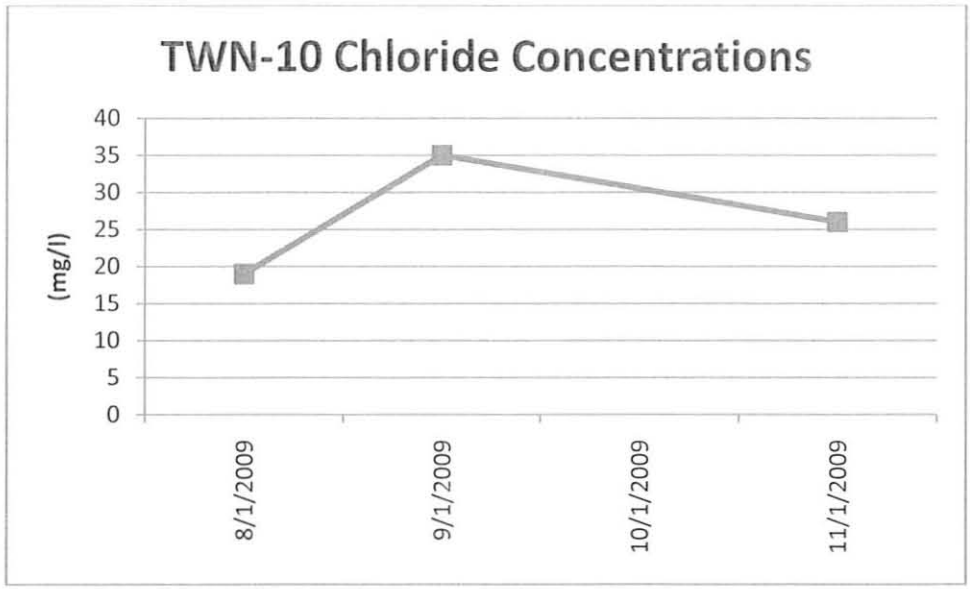

TWN-5 Chloride Concentrations
(mg/l)
49
48
47
46
45
44
43
42
41
40
39
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009

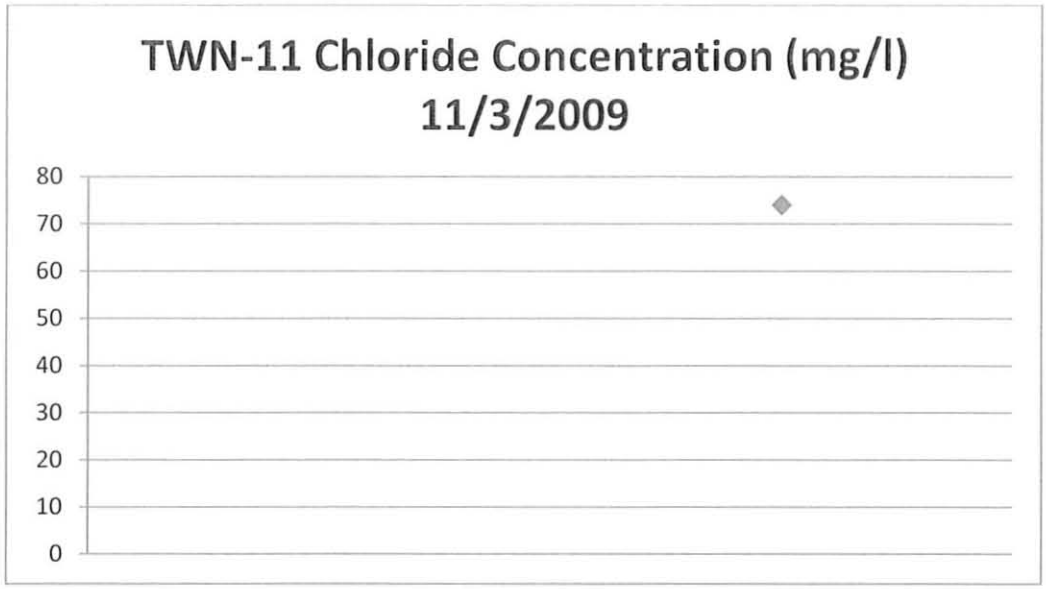

TWN-6 Chloride Concentrations
(mg/l)
35
30
25
20
15
10
5
0
8/1/2009
9/1/2009
10/1/2009
11/1/2009

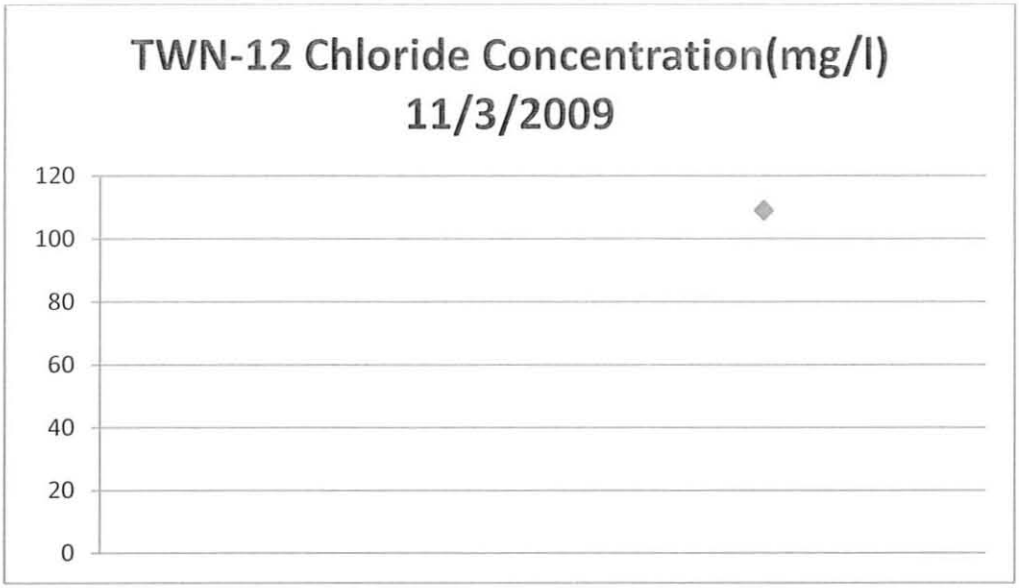

TWN-7 Chloride Concentratons
(mg/l)
12
10
8
6
4
2
0
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009

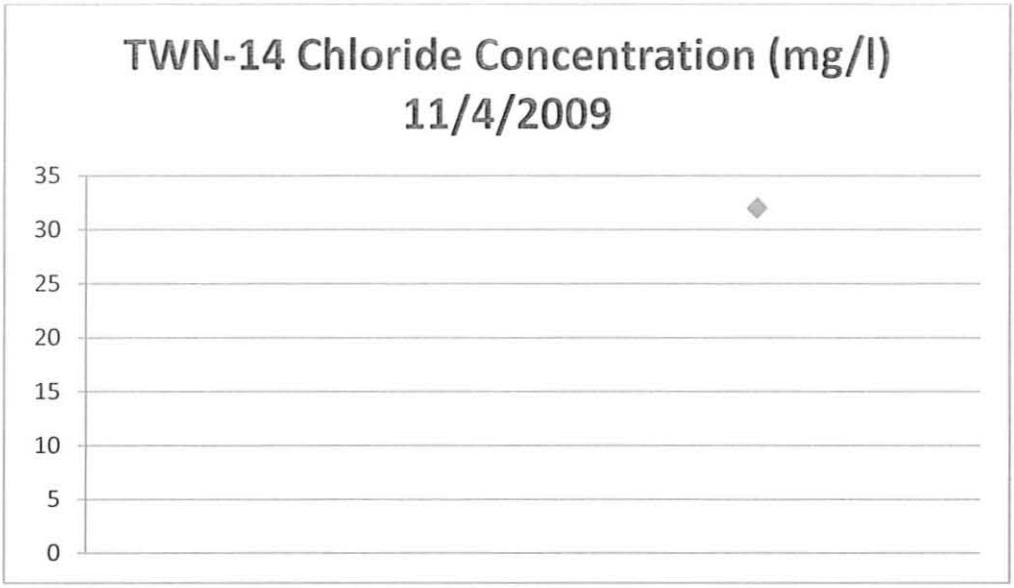

TWN-8 Chloride Concentrations
(mg/l)
12.2
12
11.8
11.6
11.4
11.2
11
10.8
10.6
10.4
8/25/2009
9/1/2009
9/8/2009
9/15/2009
9/22/2009
9/29/2009
10/6/2009
10/13/2009
10/20/2009
10/27/2009
11/3/2009
11/10/2009

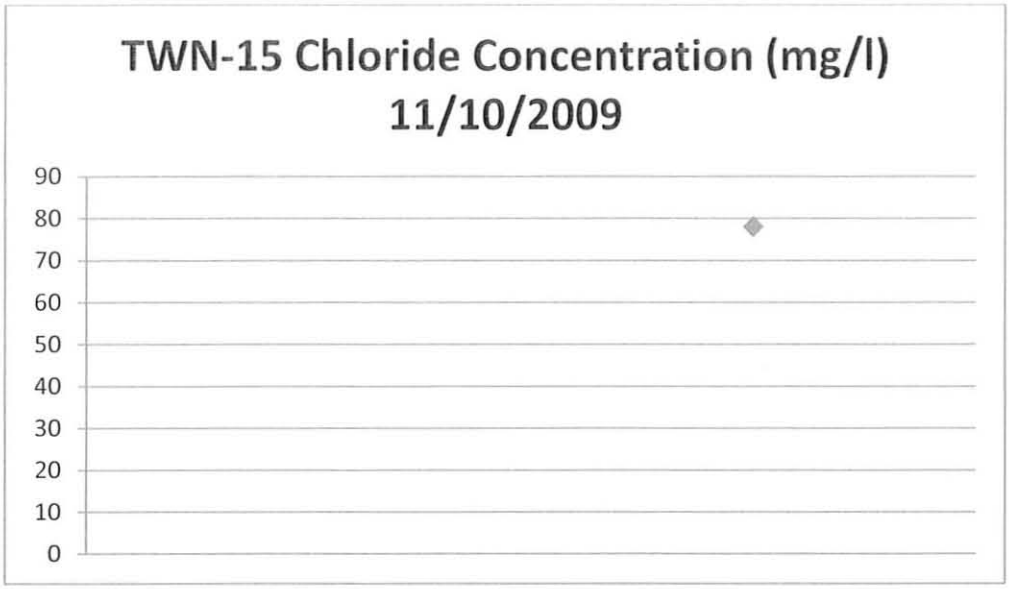

TWN-9 Chloride Concentrations
(mg/l)
250
200
150
100
50
0
8/1/2009
9/1/2009
10/1/2009
11/1/2009

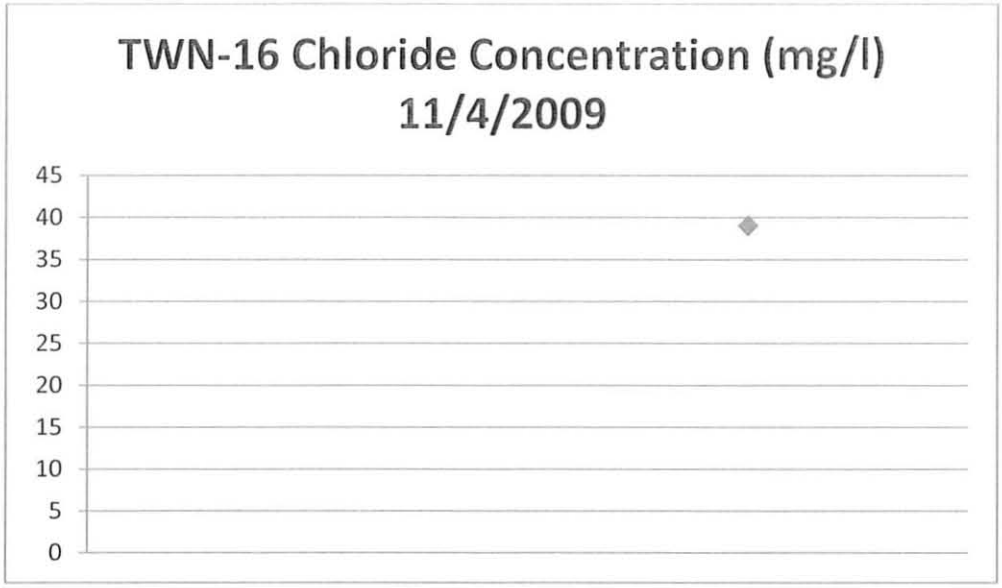

TWN-10 Chloride Concentrations
(mg/l)
40
35
30
25
20
15
10
5
0
8/1/2009
9/1/2009
10/1/2009
11/1/2009

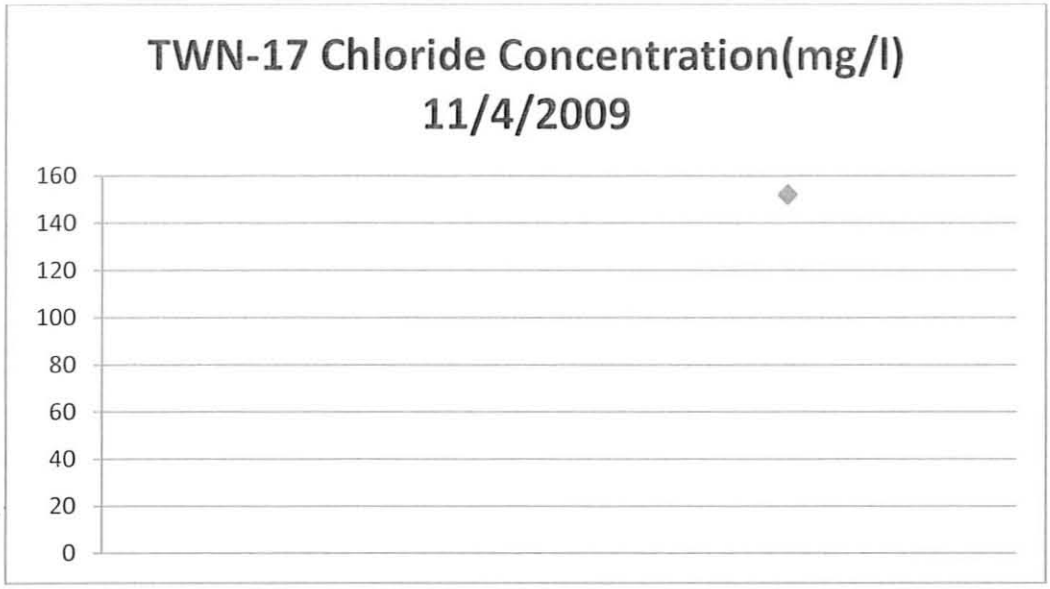

TWN-11 Chloride Concentration (mg/l)
11/3/2009
80
70
60
50
40
30
20
10
0

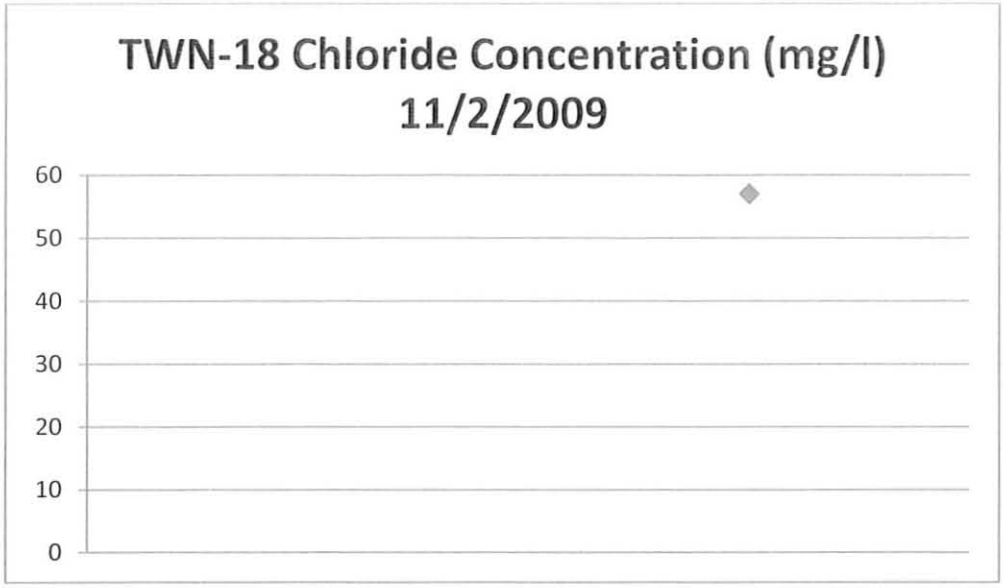

TWN-12 Chloride Concentration(mg/l)
11/3/2009
120
100
80
60
40
20
0

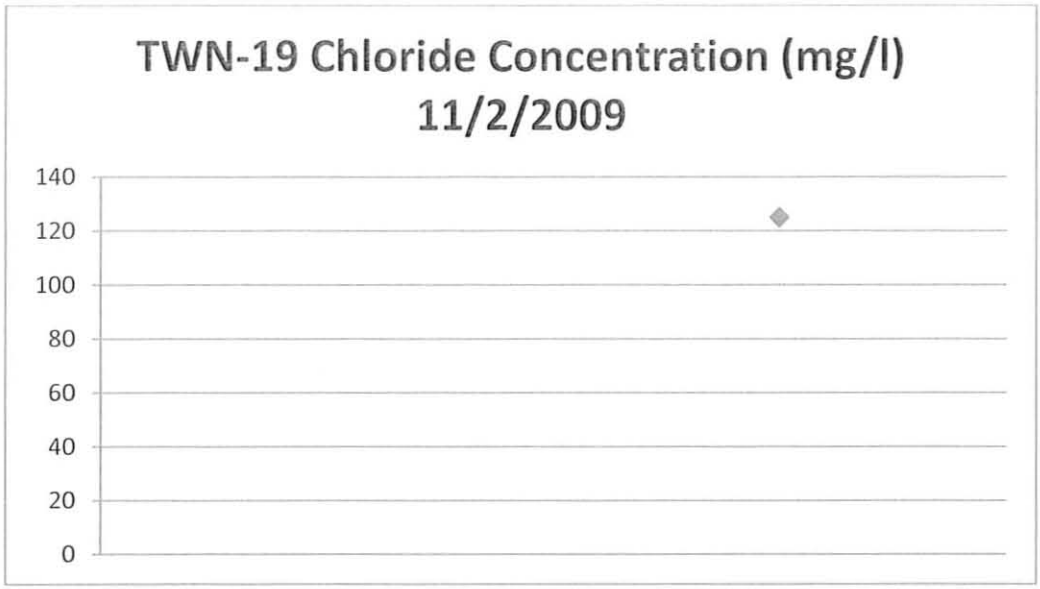

TWN-14 Chloride Concentration (mg/l)
11/4/2009
35
30
25
20
15
10
5
0

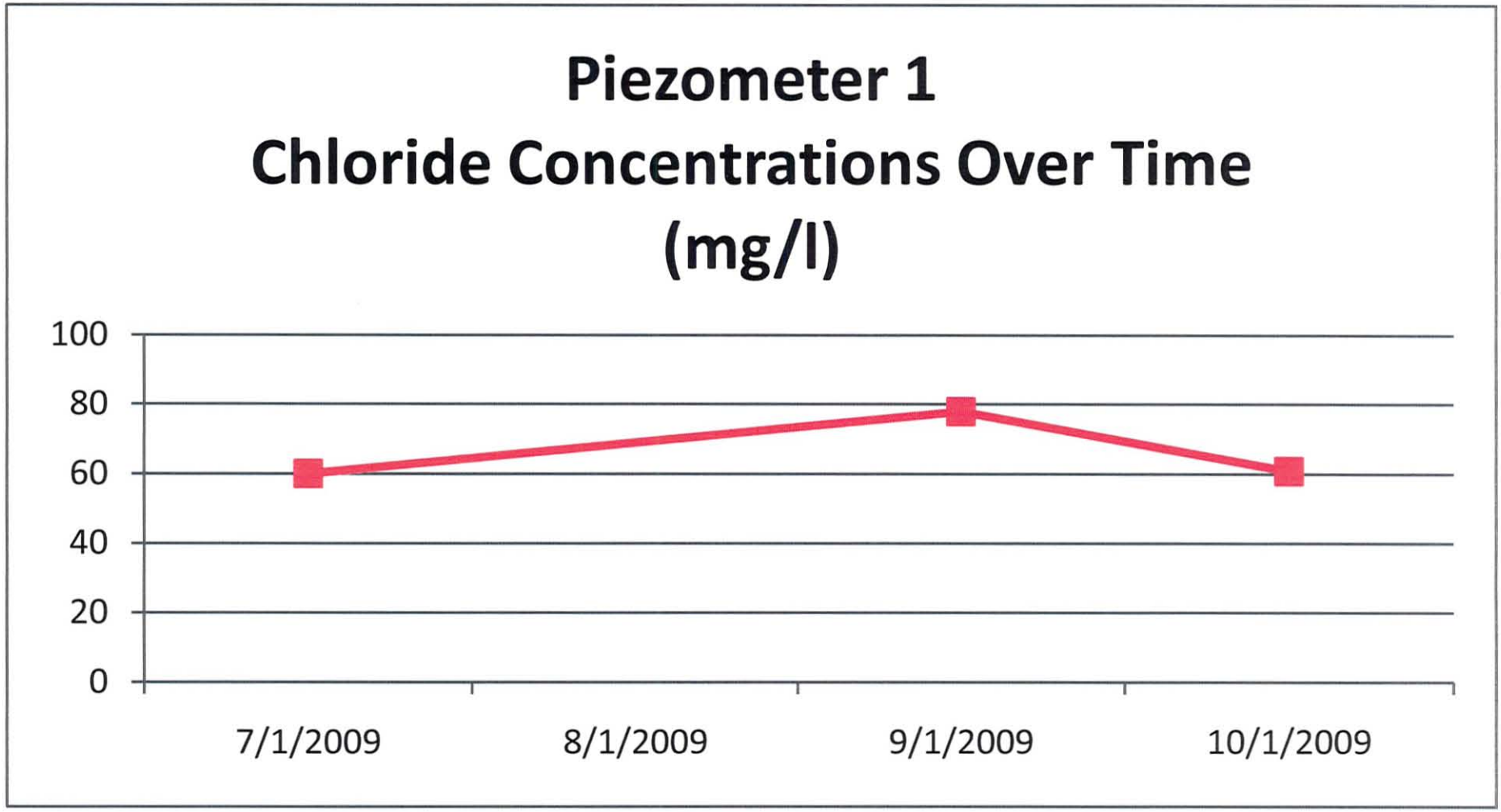

TWN-15 Chloride Concentration (mg/l)
11/10/2009
90
80
70
60
50
40
30
20
10
0

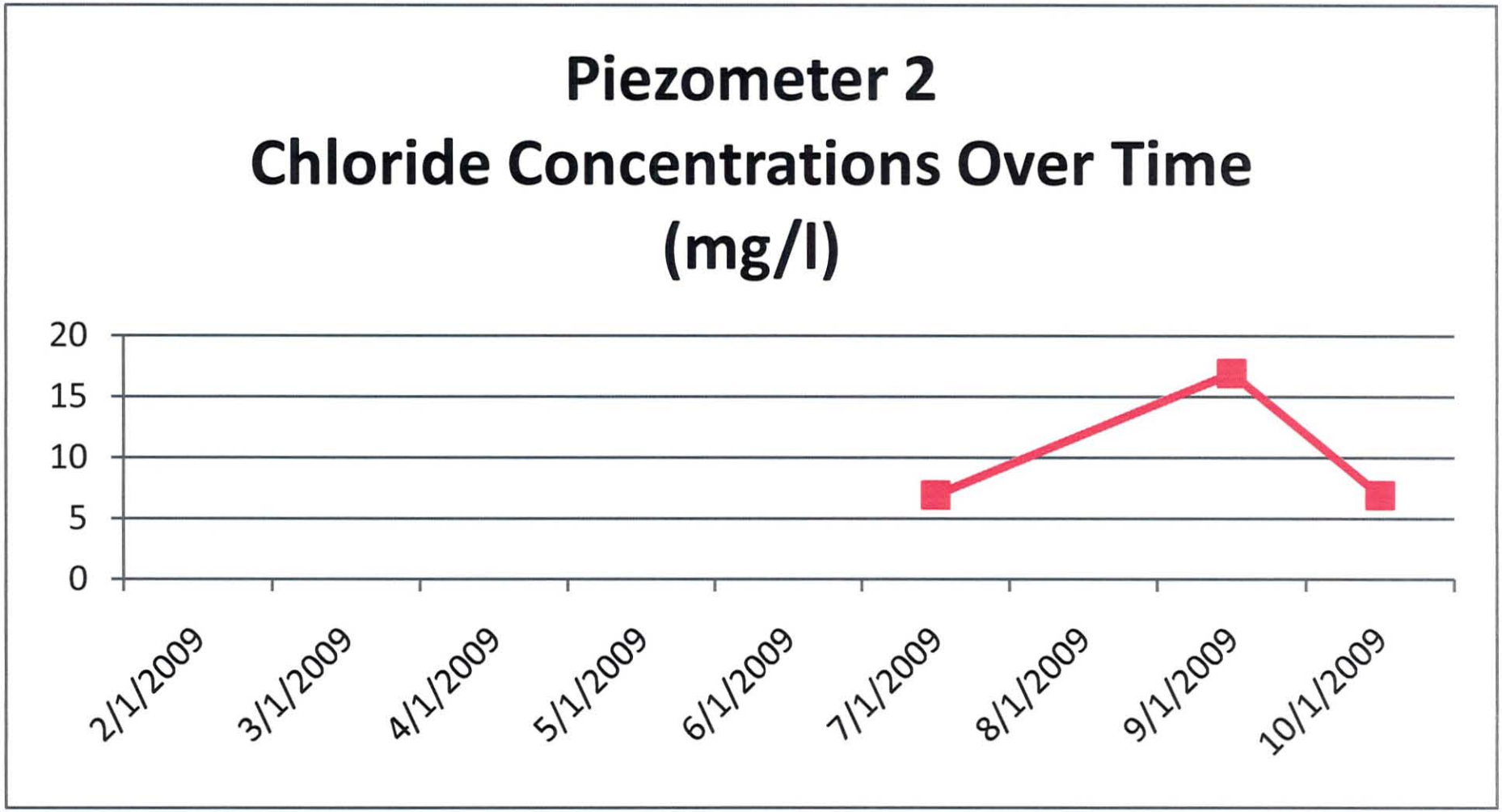

TWN-16 Chloride Concentration (mg/l)
11/4/2009
45
40
35
30
25
20
15
10
5
0

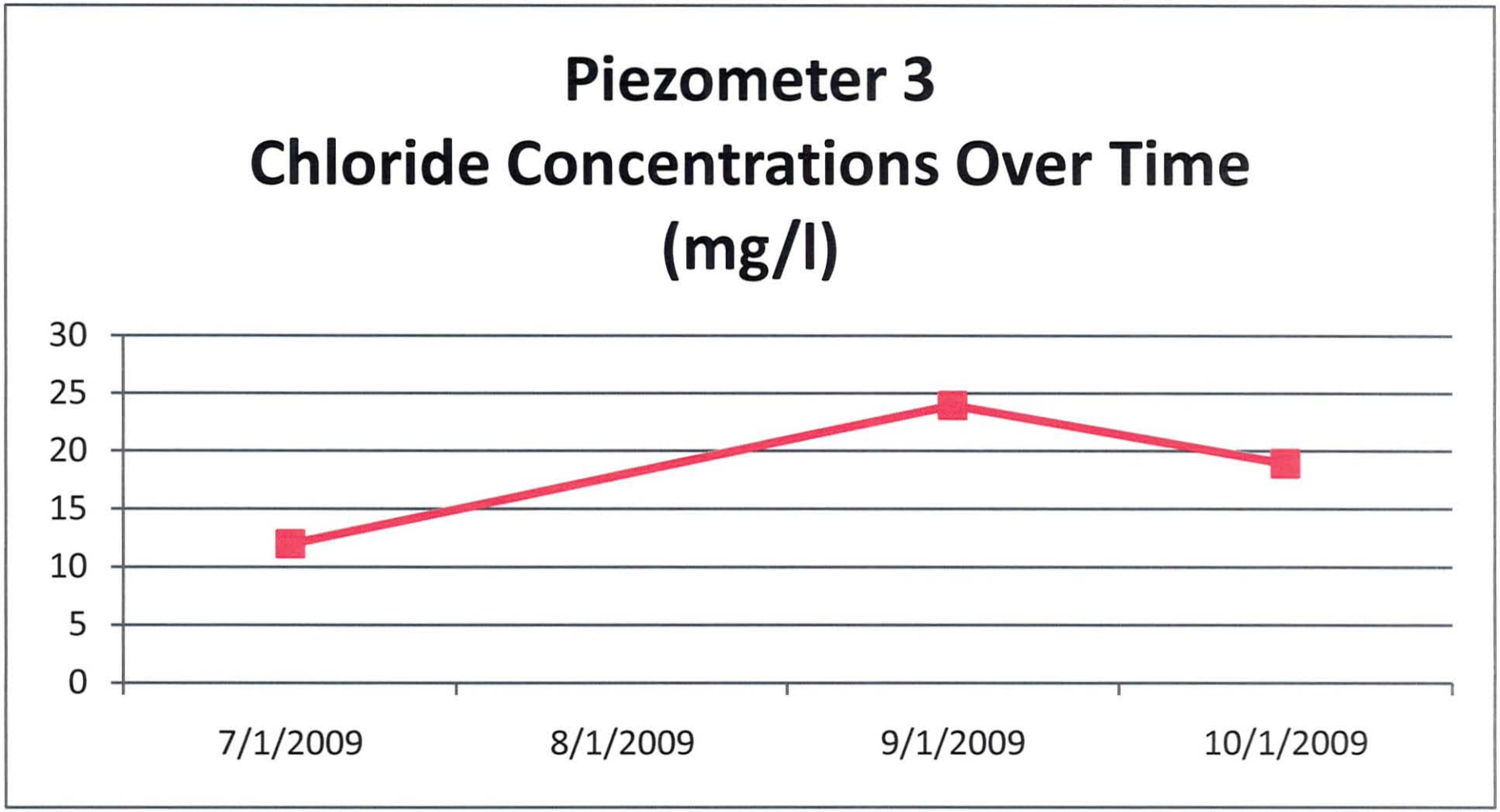

TWN-17 Chloride Concentration(mg/l)
11/4/2009
160
140
120
100
80
60
40
20
0

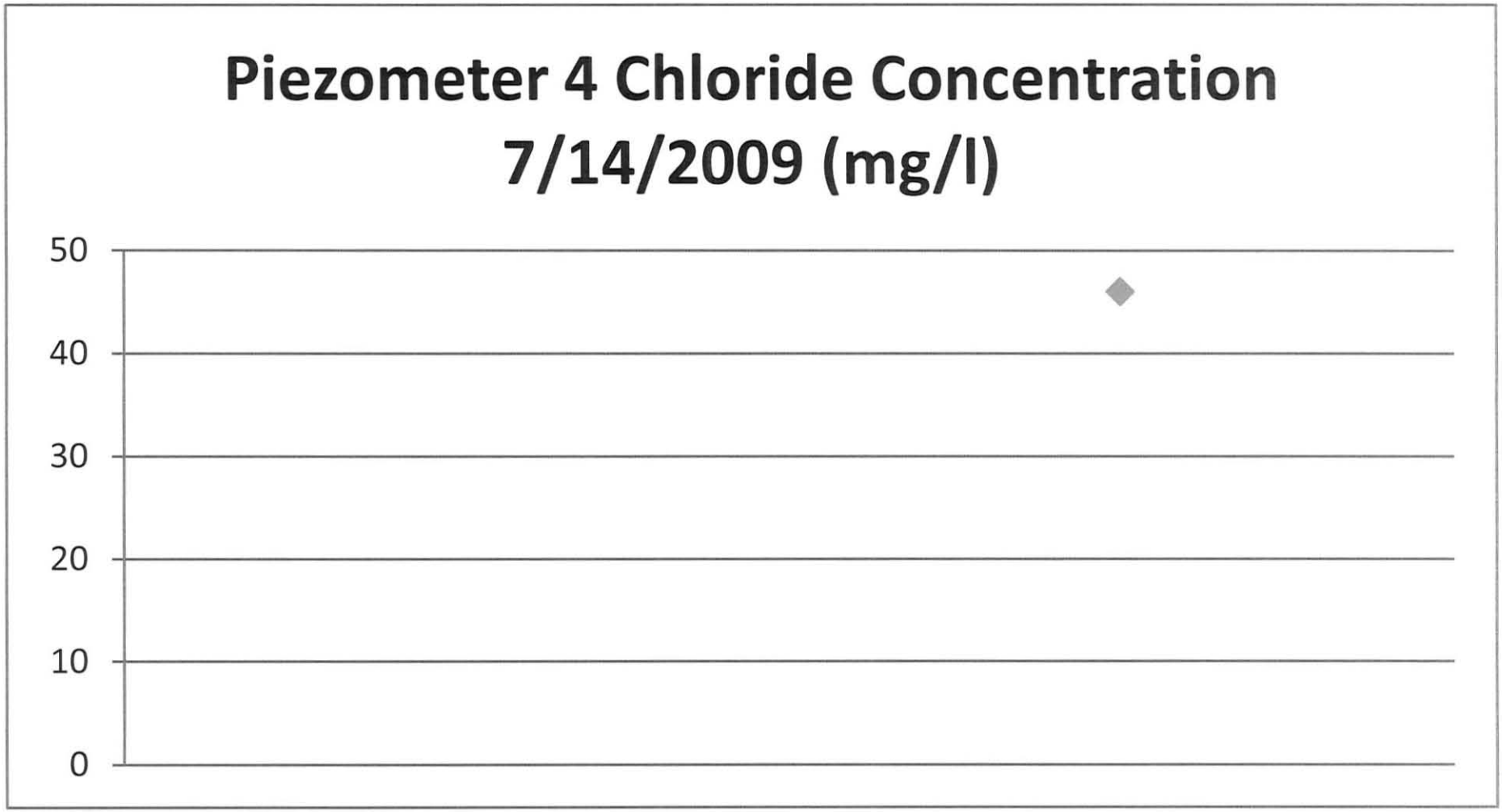

TWN-18 Chloride Concentration (mg/l)
11/2/2009
60
50
40
30
20
10
0

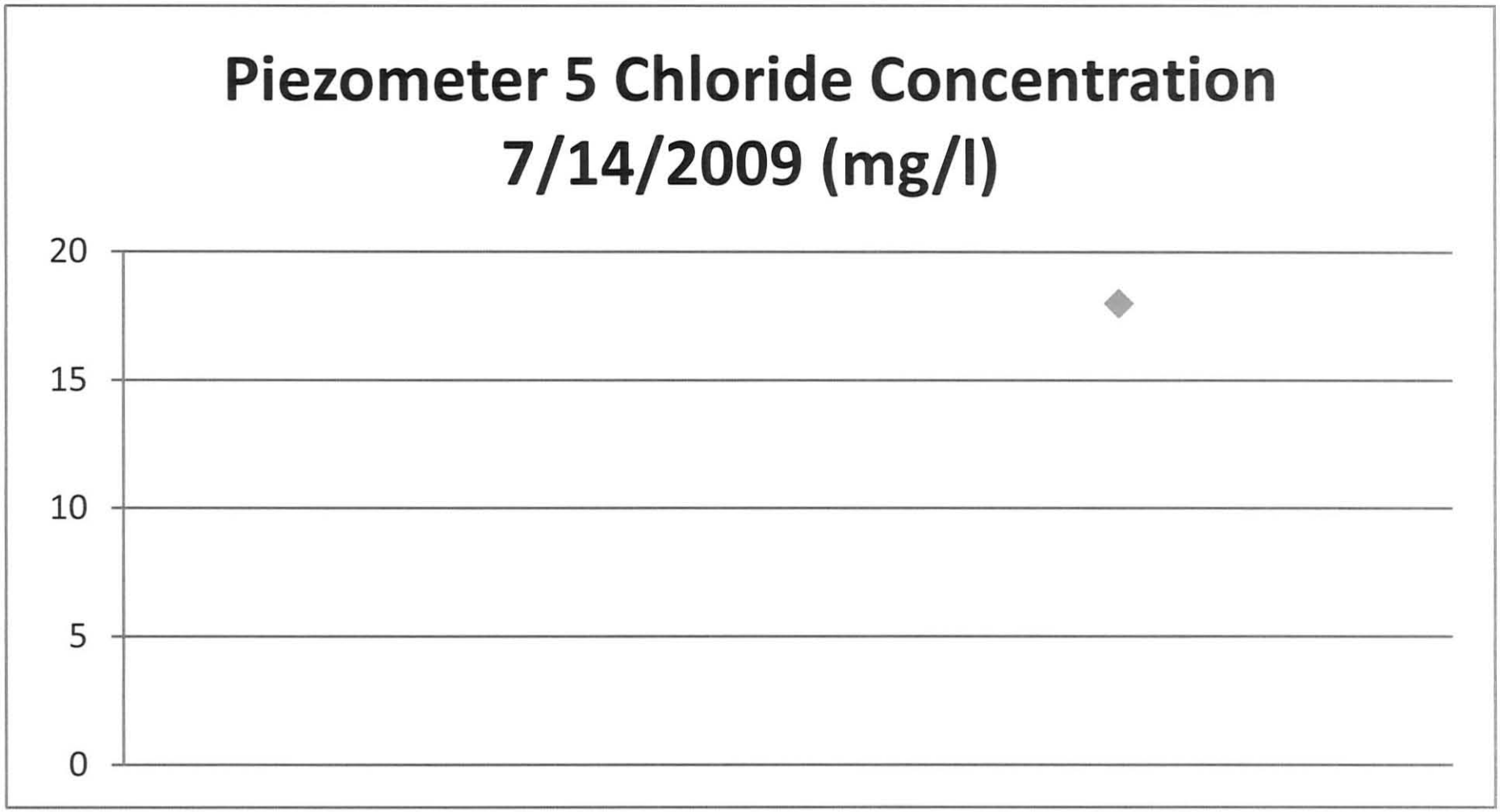

TWN-19 Chloride Concentration (mg/l)
11/2/2009
140
120
100
80
60
40
20
0

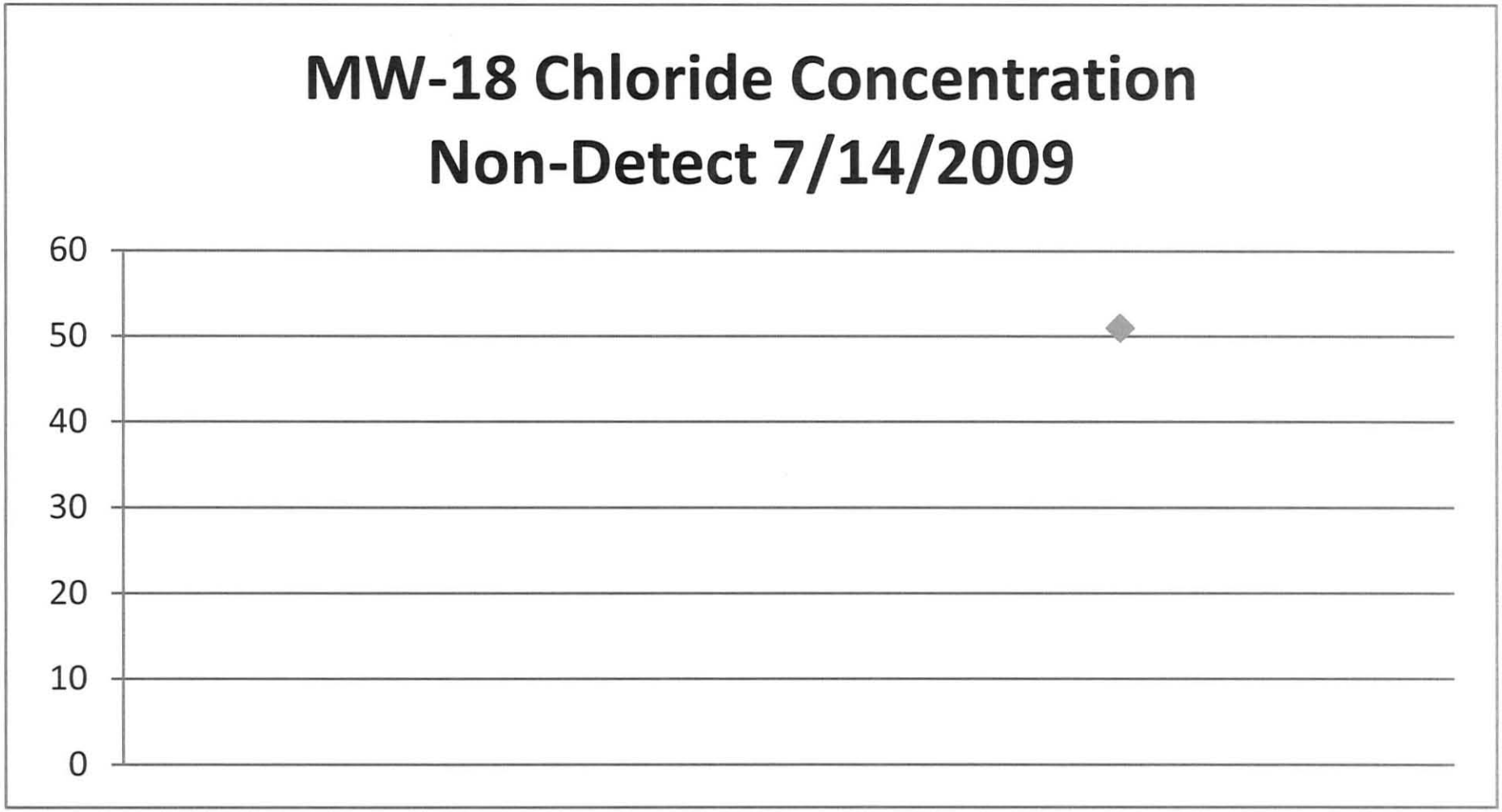

Piezometer 1
Chloride Concentrations Over Time
(mg/l)
100
80
60
40
20
0
7/1/2009
8/1/2009
9/1/2009
10/1/2009

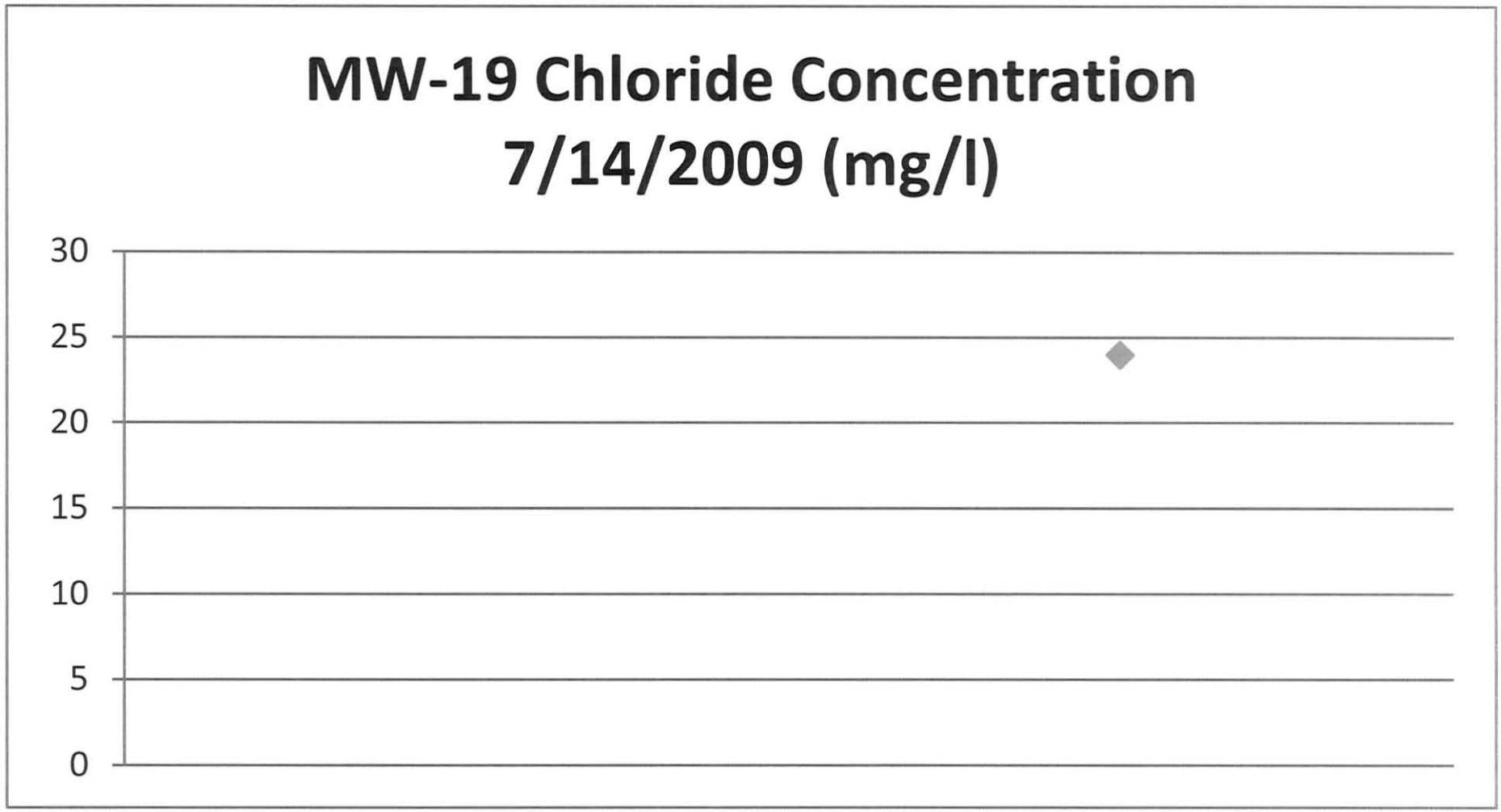

Piezometer 2
Chloride Concentrations Over Time
(mg/l)
20
15
10
5
0
2/1/2009
3/1/2009
4/1/2009
5/1/2009
6/1/2009
7/1/2009
8/1/2009
9/1/2009
10/1/2009

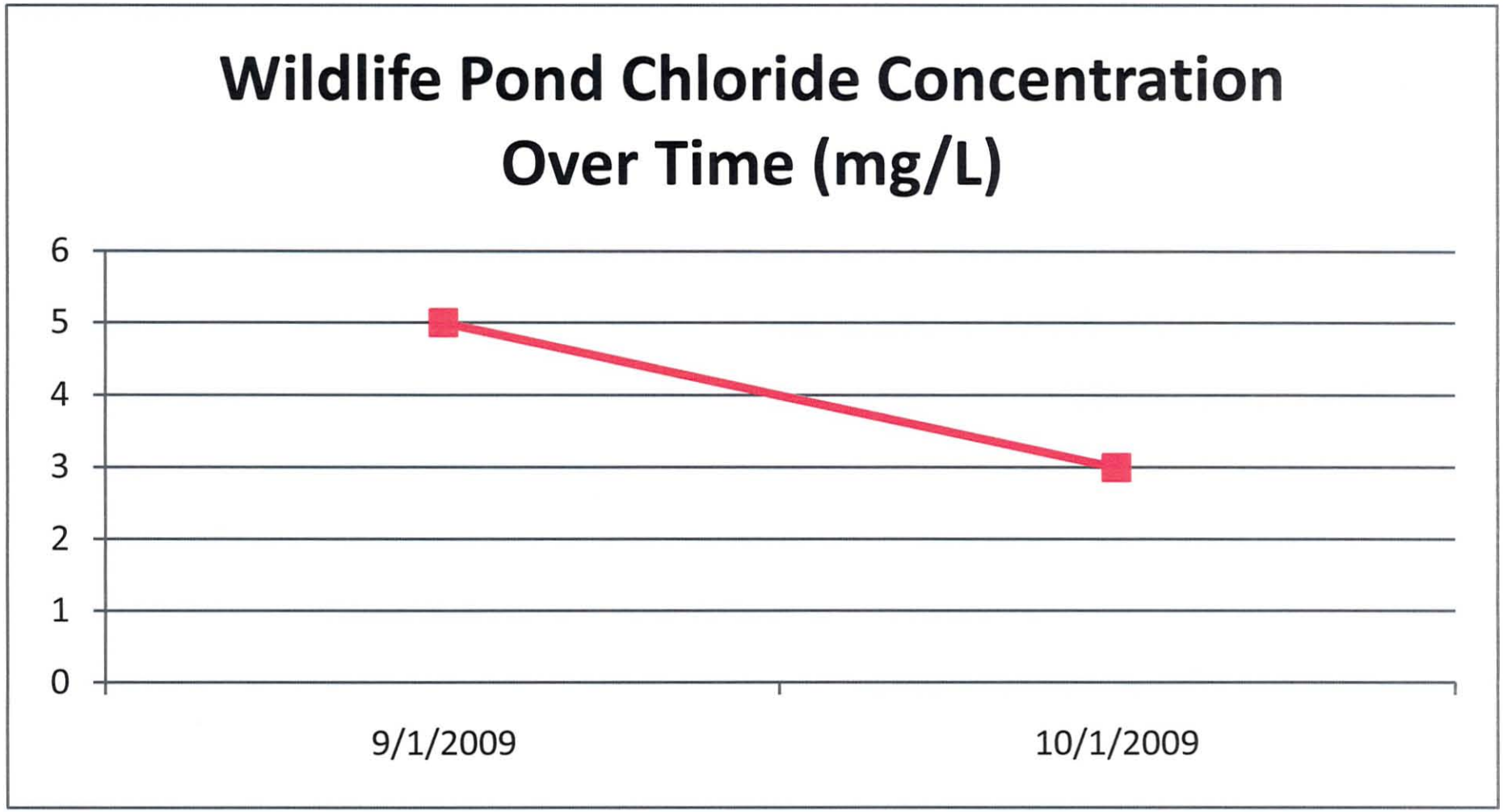

Piezometer 3
Chloride Concentrations Over Time
(mg/l)
30
25
20
15
10
5
0
7/1/2009
8/1/2009
9/1/2009
10/1/2009


Piezometer 4 Chloride Concentration
7/14/2009 (mg/l)
50
40
30
20
10
0


Piezometer 5 Chloride Concentration
7/14/2009 (mg/l)
20
15
10
5
0


MW-18 Chloride Concentration
Non-Detect 7/14/2009
60
50
40
30
20
10
0


MW-19 Chloride Concentration
7/14/2009 (mg/l)
30
25
20
15
10
5
0


Wildlife Pond Chloride Concentration Over Time (mg/L)
6
5
4
3
2
1
0
9/1/2009
10/1/2009

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)

SITE HYDROGEOLOGY AND ESTIMATION OF GROUNDWATER PORE VELOCITIES IN THE PERCHED ZONE WHITE MESA URANIUM MILL SITE NEAR BLANDING, UTAH

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Environmental Science & Technology

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FIGURES

APPENDIX

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.

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 3º. 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 2.7×10^{-6} centimeters per second (cm/s) to 9.1×10^{-4} cm/s, with a geometric average of 3.9×10^{-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

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 2×10^{-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 4×10^{-7} to 1×10^{-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 2.5×10^{-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 1.4×10^{-3} cm/s and 7.5×10^{-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 4×10^{-5} to 5×10^{-4} cm/s in the area east to northeast of the tailings cells, assuming the perched zone is unconfined, and from 5×10^{-5} to 1×10^{-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.

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 2.3×10^{-5} and 4.3×10^{-5} cm/s. Assuming the average conductivity ranges from 2.3×10^{-5} to 4.3×10^{-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 most of these wells have not changed significantly since 2005, nor have the estimated pore

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 x 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 4×10^{-7} cm/s) occur in this area. Hydraulic tests of TWN-series wells yield a geometric average of approximately 5.3×10^{-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 x 10^{-5} and 4.3 x 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 x 10^{-5} to 4.3 x 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.

5. REFERENCES

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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.

TABLES

TABLE 1
Peel Hydraulic Test Results[1]

Well	Hydraulic Conductivity (cm/s)
MW-11	1.4×10^{-3}
MW-12	2.2×10^{-5}
MW-14	7.5×10^{-4}
MW-15	1.9×10^{-5}

Notes:
cm/s = centimeters per second
[1] From UMETCO, 1993

TABLE 2
Results of July 2002 and June 2005 Hydraulic Tests[2]

	Permeability in Centimeters Per Second	
Well	**KGS**	**Bouwer-Rice**
MW-3	4.0×10^{-7}	1.5×10^{-5}
MW-5	3.5×10^{-6}	2.4×10^{-5}
MW-17	2.6×10^{-5}	2.7×10^{-5}
MW-20	--	9.3×10^{-6}
MW-22	1.0×10^{-6}	7.9×10^{-6}
MW-25	1.1×10^{-4}	7.4×10^{-5}

Geometric Average of above test results with Peel[3] test results for MW-11, MW-12, MW-14, and MW-15.

2.3×10^{-5}	4.3×10^{-5}

[2]From HGC, 2002; HGC, 2005
[3]From UMETCO, 1993

TABLE 3
Estimated Hydraulic Conductivities and Perched Zone Pore Velocities

Well	Hydraulic Conductivity[a]		Hydraulic Gradient	Pore Velocity[b]
	(cm/s)	(ft/yr)	(ft/ft)	(ft/yr)
MW-23	2.2×10^{-7}	0.22	0.008	0.010
MW-25	1.1×10^{-4}	112	0.023	14.3
MW-27	7.2×10^{-5}	74	0.022	9.0
MW-28	1.8×10^{-6}	1.8	0.029	0.29
MW-29	1.1×10^{-4}	112	0.013	8.1
MW-30	8.1×10^{-5}	83	0.027	12.4
MW-31	7.1×10^{-5}	73	0.024	9.7
MW-32	2.9×10^{-5}	29	0.021	3.38
TW4-20	5.6×10^{-5}	57	0.037	11.7
TW4-21	1.9×10^{-4} [c]	194	0.046	49.5
TW4-22	1.2×10^{-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	8.2×10^{-5}
	Confined	8.4	0.023	24	0.35	1.3×10^{-4}
TW4-2	Unconfined	4.6	0.0065	39	0.12	4.3×10^{-5}
	Confined	3.8	0.0063	24	0.16	5.7×10^{-5}
TW4-7	Unconfined	4.7	0.011	39	0.12	4.3×10^{-5}
	Confined	3.3	0.011	24	0.14	5.0×10^{-5}
TW4-8	Unconfined	4.5	0.010	39	0.12	4.3×10^{-5}
	Confined	3.9	0.010	24	0.16	5.7×10^{-5}
MW-4A	Unconfined	5.8	0.019	39	0.15	5.4×10^{-5}
	Confined	3.5	0.019	24	0.15	5.4×10^{-5}
MW-4A (early time)	Unconfined	12.4	0.0029	39	0.32	1.1×10^{-4}
	Confined	9.1	0.0031	24	0.38	1.4×10^{-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	4.6×10^{-4}
	Confined	87	0.0043	31	2.8	1.0×10^{-3}
TW4-9	Unconfined	72	0.0043	67	1.1	3.9×10^{-4}
	Confined	71	0.0043	31	2.3	8.2×10^{-4}
TW4-10	Unconfined	48	0.0077	67	0.72	2.6×10^{-4}
	Confined	46	0.0076	31	1.5	5.4×10^{-4}
TW4-15	Unconfined	15	0.0037	67	0.22	7.9×10^{-5}
	Confined	12	0.0037	31	0.39	1.4×10^{-4}
TW4-16	Unconfined	19	0.0036	67	0.28	1.0×10^{-4}
	Confined	18	0.0035	31	0.58	2.1×10^{-4}
TW4-18	Unconfined	76	0.0046	67	1.1	3.9×10^{-4}
	Confined	74	0.0046	31	2.4	8.6×10^{-4}
TW4-19	Unconfined	44	0.12	67	0.66	2.4×10^{-4}
	Confined	39	0.12	31	1.3	4.6×10^{-4}

Notes:

cm/sec = Centimeters per second

ft/day = Feet per day

ft^2/day = Feet squared per day

TABLE 6
Estimated Perched Zone Hydraulic Properties and Pore Velocities for TWN-Series Wells

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

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

PROPERTY BOUNDARY

WESTWATER CREEK

US 191 TO BLANDING

US 191 TO WHITE MESA

TWN-11 TWN-12 TWN-19 TWN-16 TWN-15 TWN-17 TWN-14 TWN-10 TWN-9 TWN-13 TWN-6 TWN-5 TWN-8 TWN-18 TWN-7 TWN-3 TWN-2 TWN-4 TWN-1

MW-01 MW-18 MW-19 MW-27 MW-24 MW-28 MW-02 MW-26 MW-29 MW-30 MW-31 MW-32 MW-23 MW-12 MW-05 MW-11 MW-25 MW-16 MW-15 MW-14 MW-17 MW-03 MW-21 MW-20 MW-22 MW-04

PIEZ-1 PIEZ-2 PIEZ-3 PIEZ-4 PIEZ-5

TW4-25 TW4-21 TW4-24 TW4-19 TW4-22 TW4-20 TW4-18 TW4-5 TW4-9 TW4-10 TW4-3 TW4-12 TW4-16 TW4-11 TW4-13 TW4-2 TW4-7 TW4-8 TW4-1 TW4-4 TW4-14 TW4-23 TW4-6

MILL SITE

CELL NO. 1

CELL NO. 2

CELL NO. 3

CELL NO. 4A

29 28 32 33 4

T37S

T38S

N

0 3000

SCALE IN FEET

EXPLANATION

MW-20 perched monitoring well

TW4-19 temporary perched monitoring well

PIEZ-1 perched piezometer

MW-31 perched monitoring well installed April, 2005

TW4-20 temporary perched monitoring well installed April, 2005

TW4-23 temporary perched monitoring well installed May, 2007

TWN-1 temporary perched nitrate monitoring well

wildlife pond

HYDRO GEO CHEM, INC.

SITE PLAN AND PERCHED WELL LOCATIONS WHITE MESA SITE

APPROVED	DATE	REFERENCE	FIGURE
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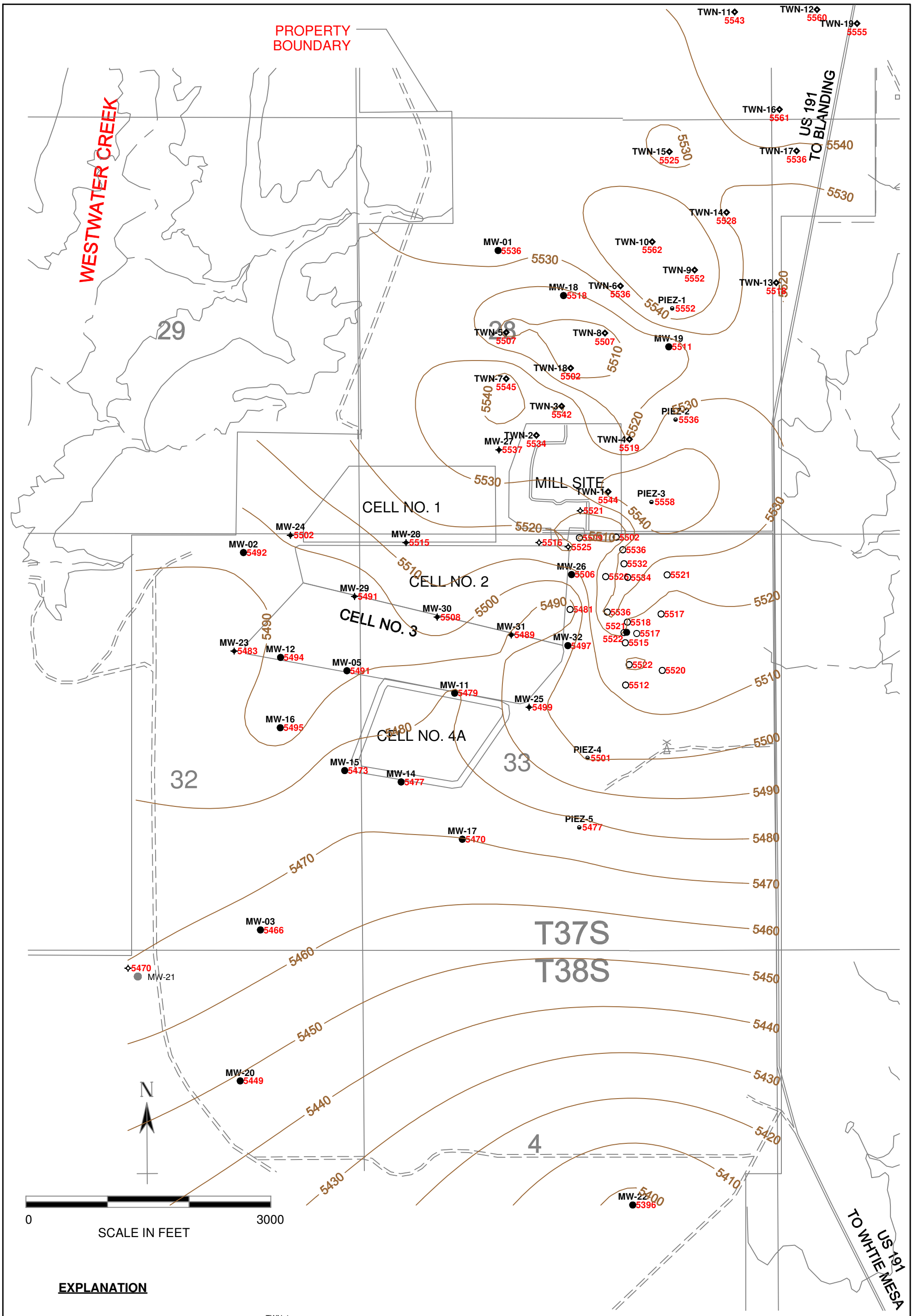

EXPLANATION

MW-20 ● 5449	perched monitoring well showing elevation in feet amsl
○ 5512	temporary perched monitoring well showing elevation in feet amsl
PIEZ-1 ◒ 5552	perched piezometer showing elevation in feet amsl
MW-31 ✦ 5489	perched monitoring well installed in 2005 showing elevation in feet amsl
✧ 5525	temporary perched monitoring well installed in 2005 showing elevation in feet amsl
TWN-4 ◇ 5519	temporary perched nitrate monitoring well showing elevation in feet amsl

HYDRO GEO CHEM, INC.

APPROXIMATE ELEVATION OF TOP OF BRUSHY BASIN (Contours Generated by Kriging)

APPROVED	DATE	REFERENCE	FIGURE
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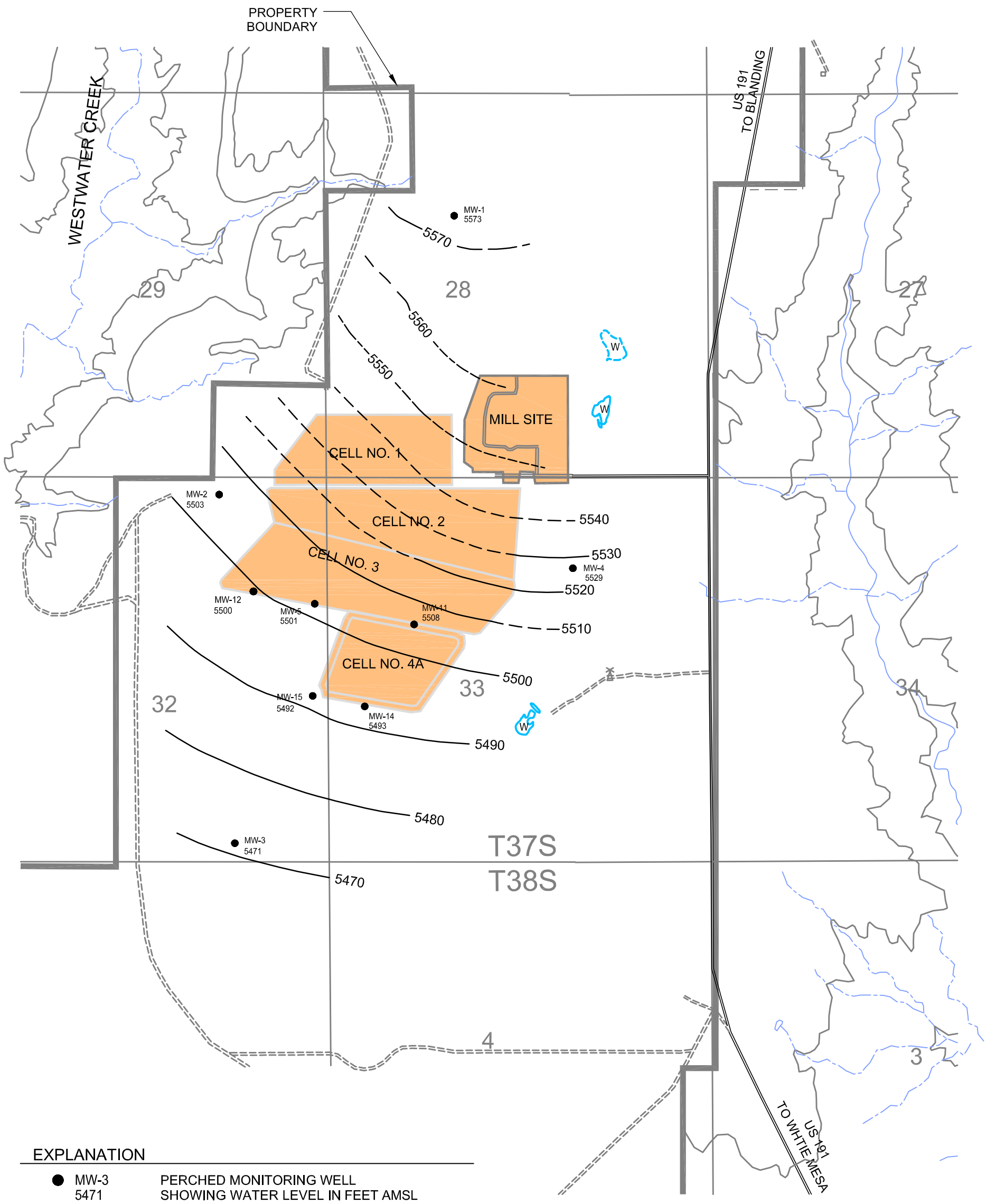

EXPLANATION

● MW-3 5471	PERCHED MONITORING WELL SHOWING WATER LEVEL IN FEET AMSL
W	WILDLIFE POND
5580 ——— – – –	WATER LEVEL CONTOUR LINE, DASHED WHERE UNCERTAIN

N

0 3000

SCALE IN FEET

HYDRO GEO CHEM, INC.

PERCHED WATER LEVELS
AUGUST 1990

Approved	Date	Author	Date	File Name	Figure
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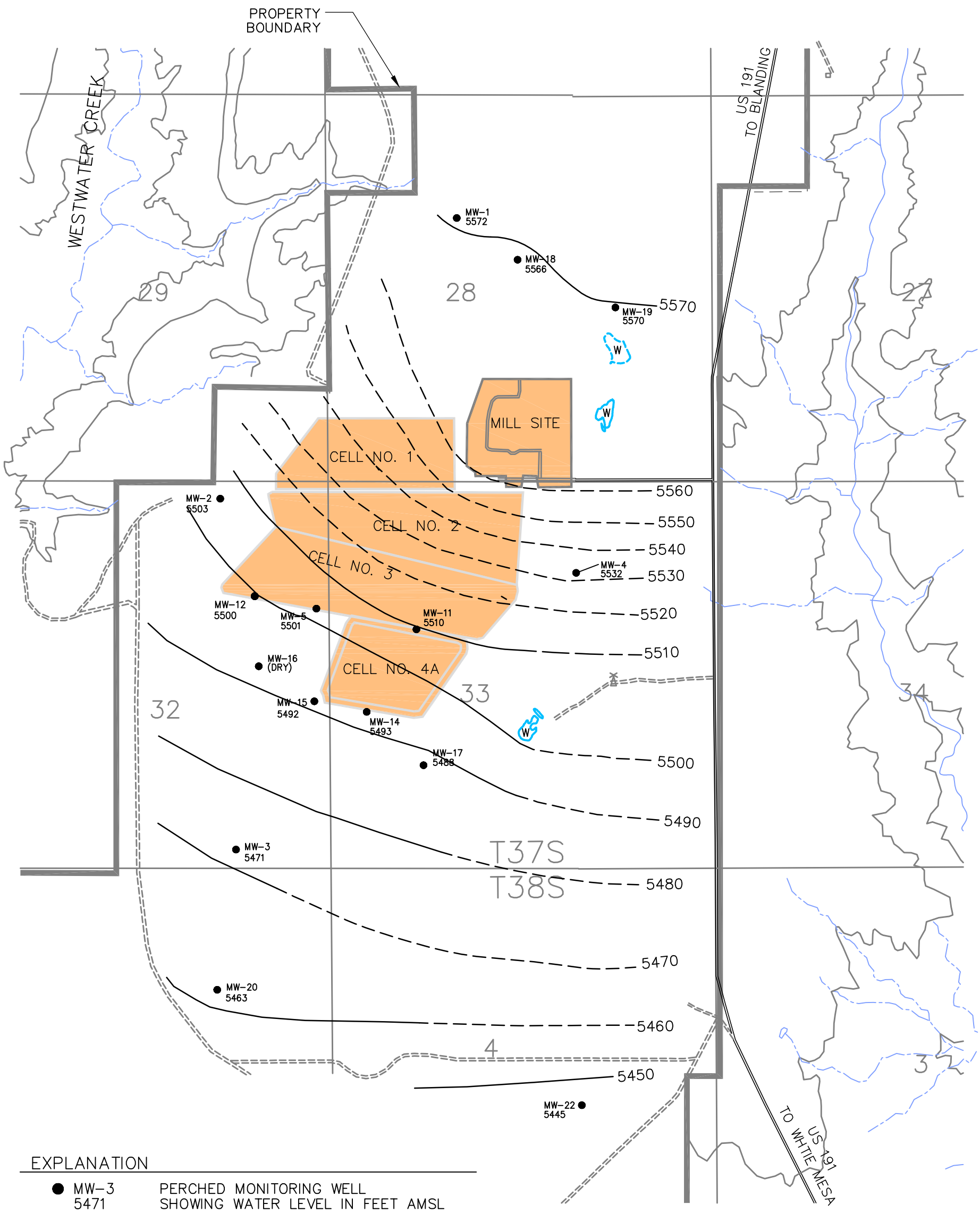

HYDRO GEO CHEM, INC.

PERCHED WATER LEVELS
AUGUST 1994

Approved	Date	Author	Date	File Name	Figure
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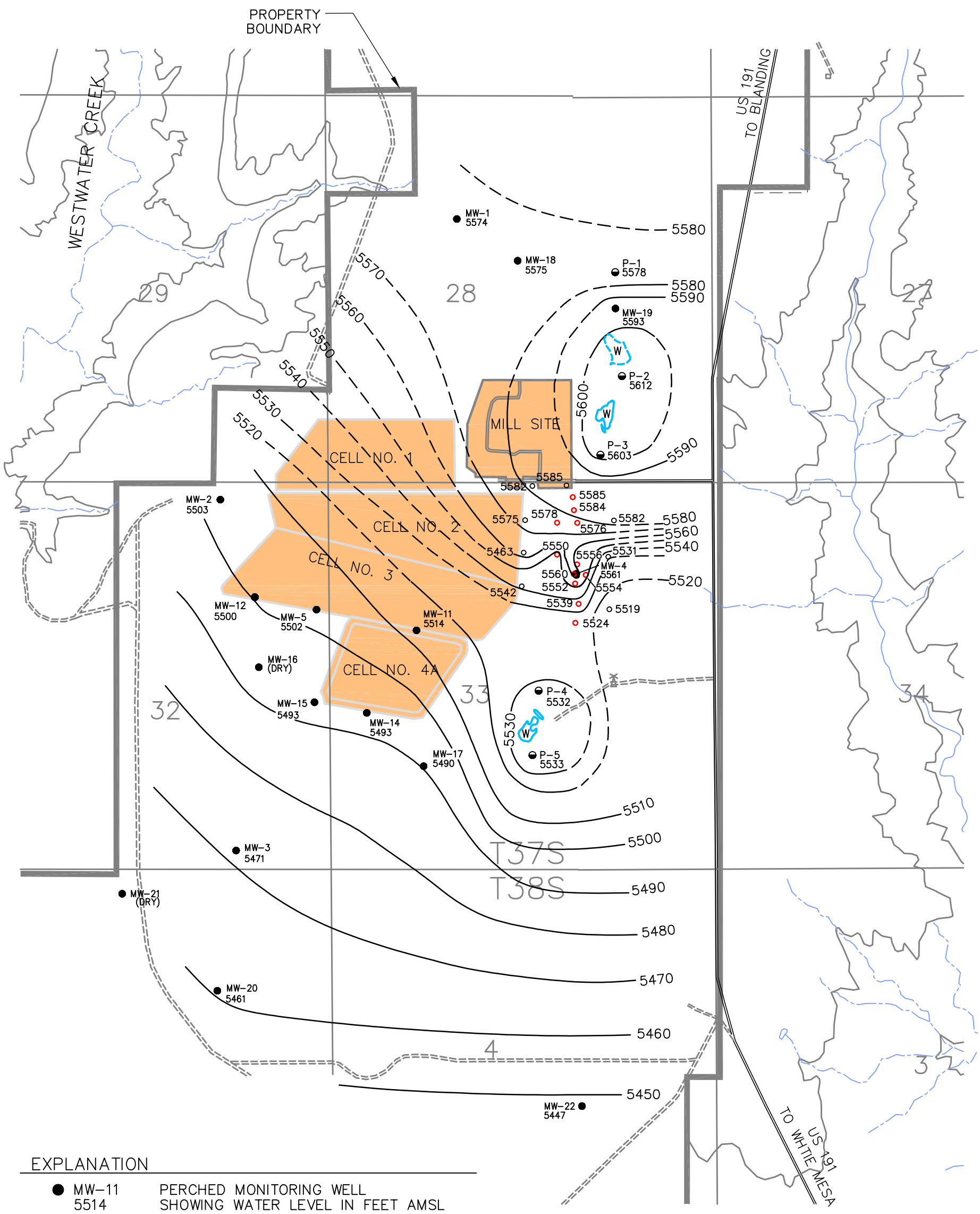

EXPLANATION

● MW-11 5514	PERCHED MONITORING WELL SHOWING WATER LEVEL IN FEET AMSL
○ 5524	TEMPORARY PERCHED MONITORING WELL SHOWING WATER LEVEL IN FEET AMSL
◒ P-5 5533	PIEZOMETER SHOWING WATER LEVEL IN FEET AMSL
5580 ——— – – –	WATER LEVEL CONTOUR LINE, DASHED WHERE UNCERTAIN
W	WILDLIFE POND

NOTE: WATER LEVELS FOR PIEZOMETERS ARE FROM AUGUST, 2002

N

0 3000

SCALE IN FEET

HYDRO GEO CHEM, INC.

PERCHED WATER LEVELS SEPTEMBER 2002

Approved	Date	Author	Date	File Name	Figure
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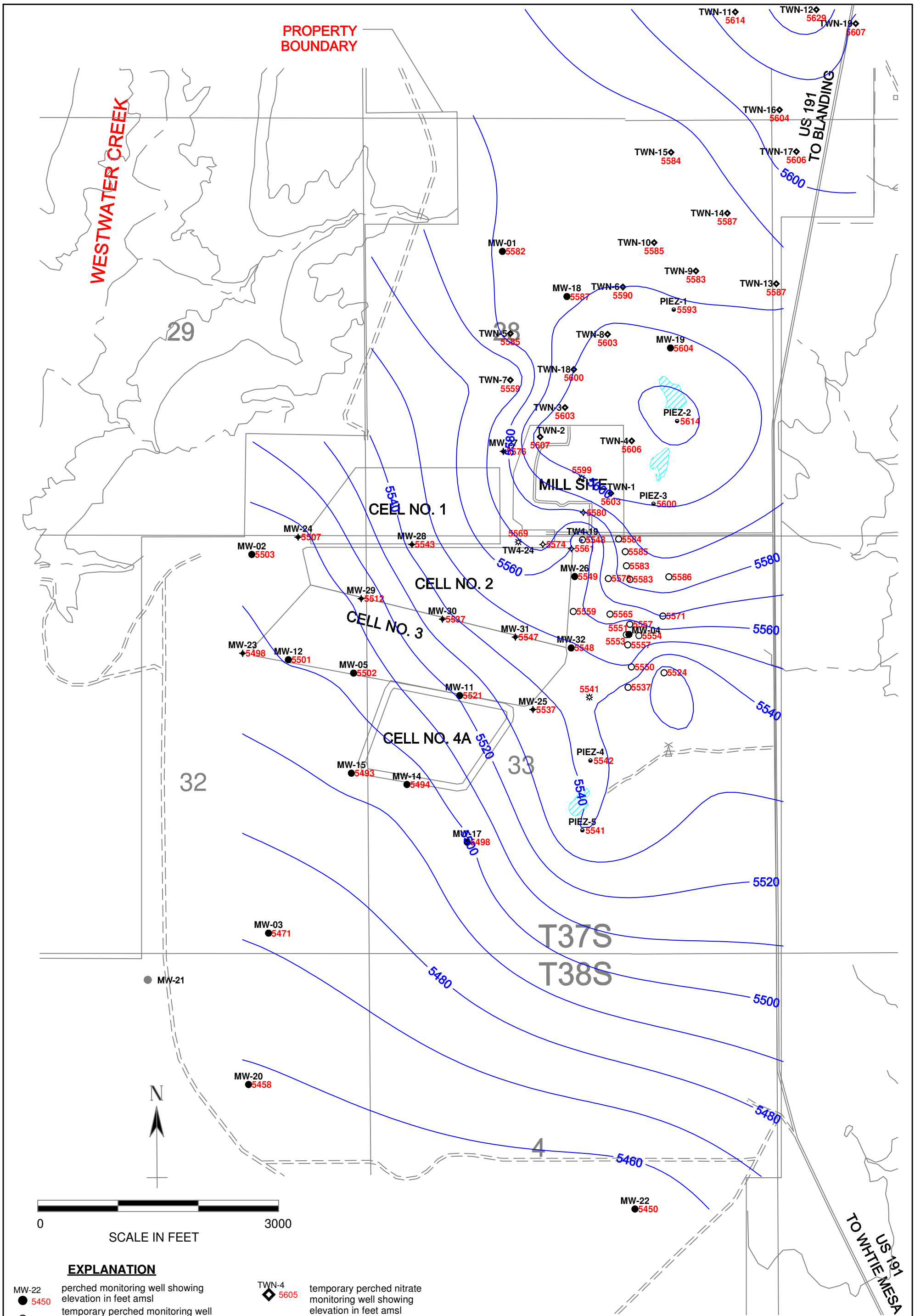

EXPLANATION

MW-22 5450	perched monitoring well showing elevation in feet amsl
5556	temporary perched monitoring well showing elevation in feet amsl
PIEZ-1 5592	perched piezometer showing elevation in feet amsl
MW-31 5546	perched monitoring well installed April, 2005 showing elevation in feet amsl
5573	temporary perched monitoring well installed April, 2005 showing elevation in feet amsl
5541	temporary perched monitoring well installed May, 2007 showing elevation in feet amsl
TWN-4 5605	temporary perched nitrate monitoring well showing elevation in feet amsl

HYDRO GEO CHEM, INC.

KRIGED DECEMBER 2009 WATER LEVELS
WHITE MESA SITE

APPROVED	DATE	REFERENCE	FIGURE
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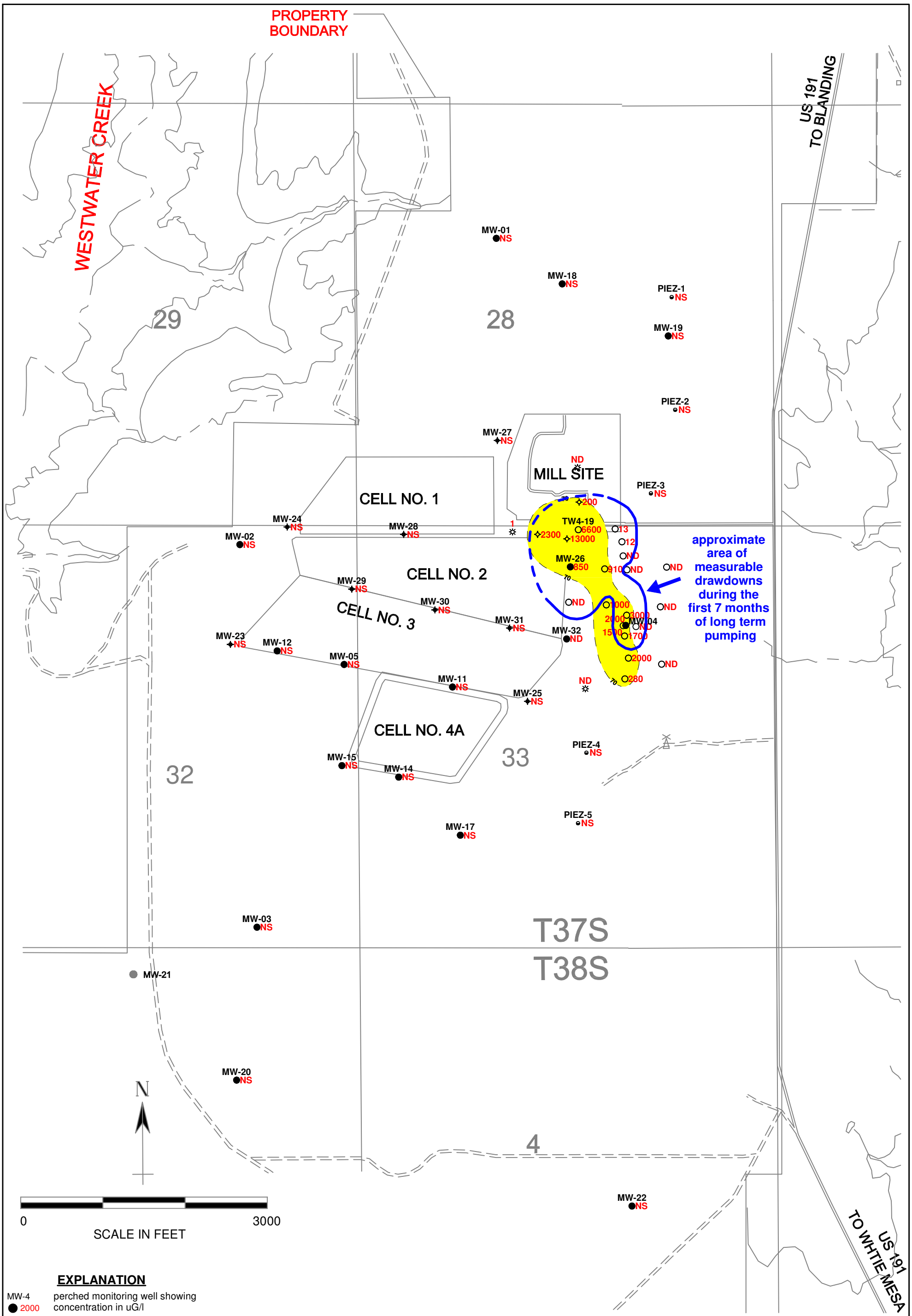


EXPLANATION

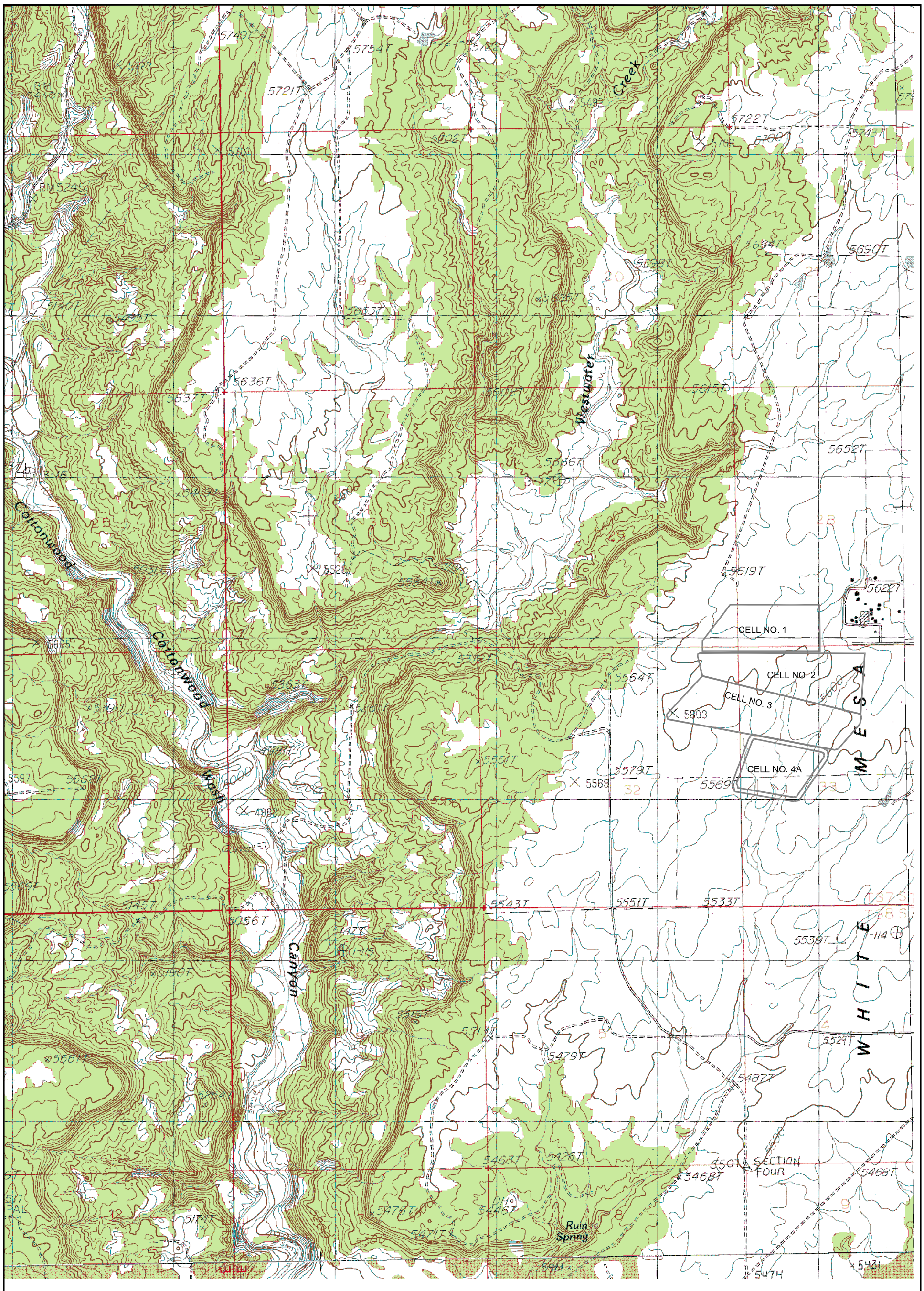
MW-4 ● 2000	perched monitoring well showing concentration in uG/l
○ 1700	temporary perched monitoring well showing concentration in uG/l
PIEZ-1 NS	perched piezometer (not sampled)
MW-32 ND	perched monitoring well installed April, 2005 showing concentration in uG/l
200	temporary perched monitoring well installed April, 2005 showing concentration in uG/l
ND	temporary perched monitoring well installed May, 2007 showing concentration in uG/l

NOTES: ND = not detected, NS = not sampled;

HYDRO GEO CHEM, INC.

3rd QUARTER, 2009 CHLOROFORM PLUME SHOWING AREA RESPONDING TO FIRST 7 MONTHS OF LONG-TERM PUMPING WHITE MESA SITE

APPROVED	DATE	REFERENCE	FIGURE
SJS	12/29/09	H:/718000/nov09/chldwn2c.srf	7



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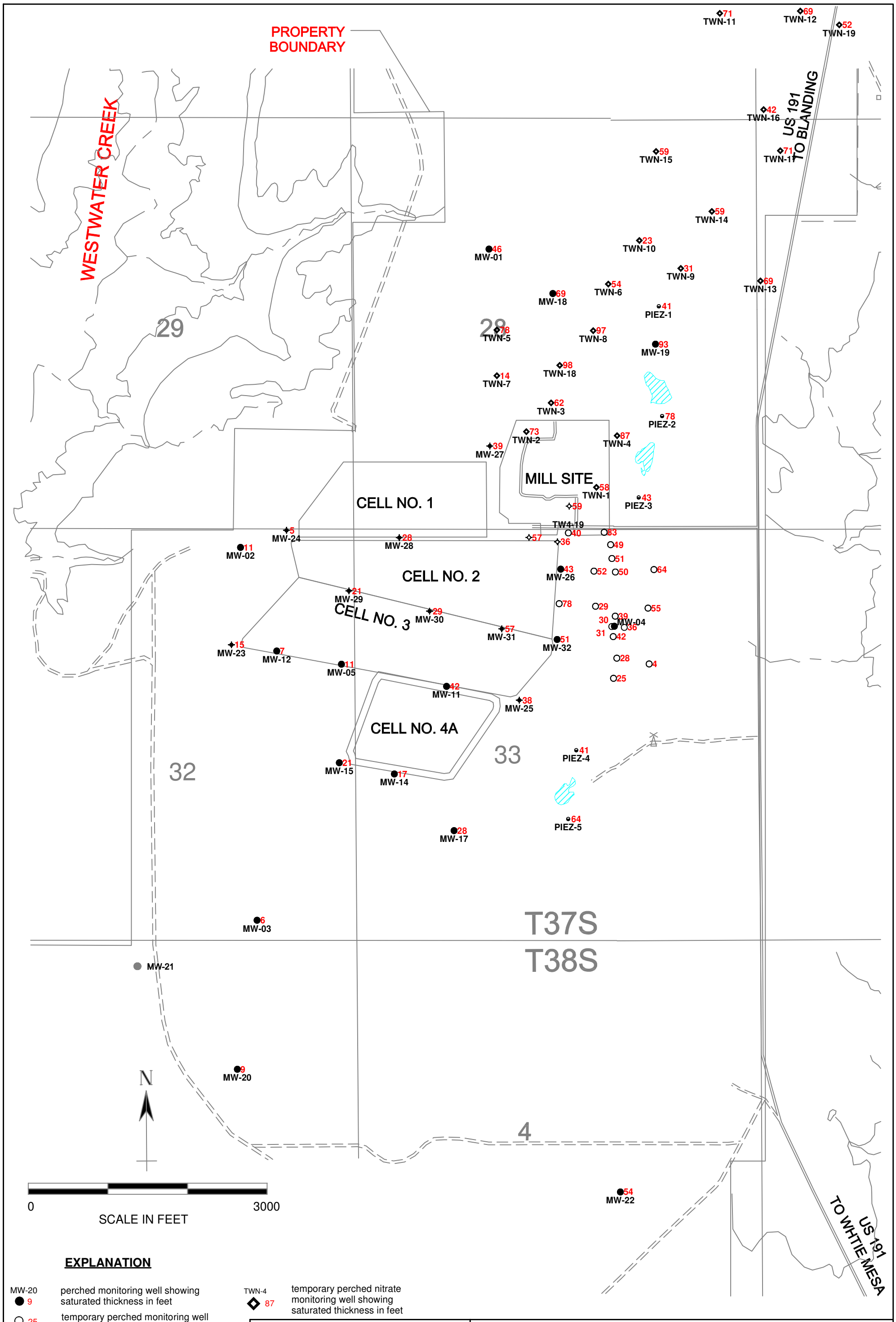
PORTION OF USGS BLACK MESA 7.5' SHEET SHOWING APPROXIMATE LOCATION OF TAILING CELLS IN RELATION TO NEARBY CANYONS AND RUIN SPRING

Approved	Date	Author	Date	File Name	Figure
SS	12/18/09	AMC	12/18/09	718000104A	8



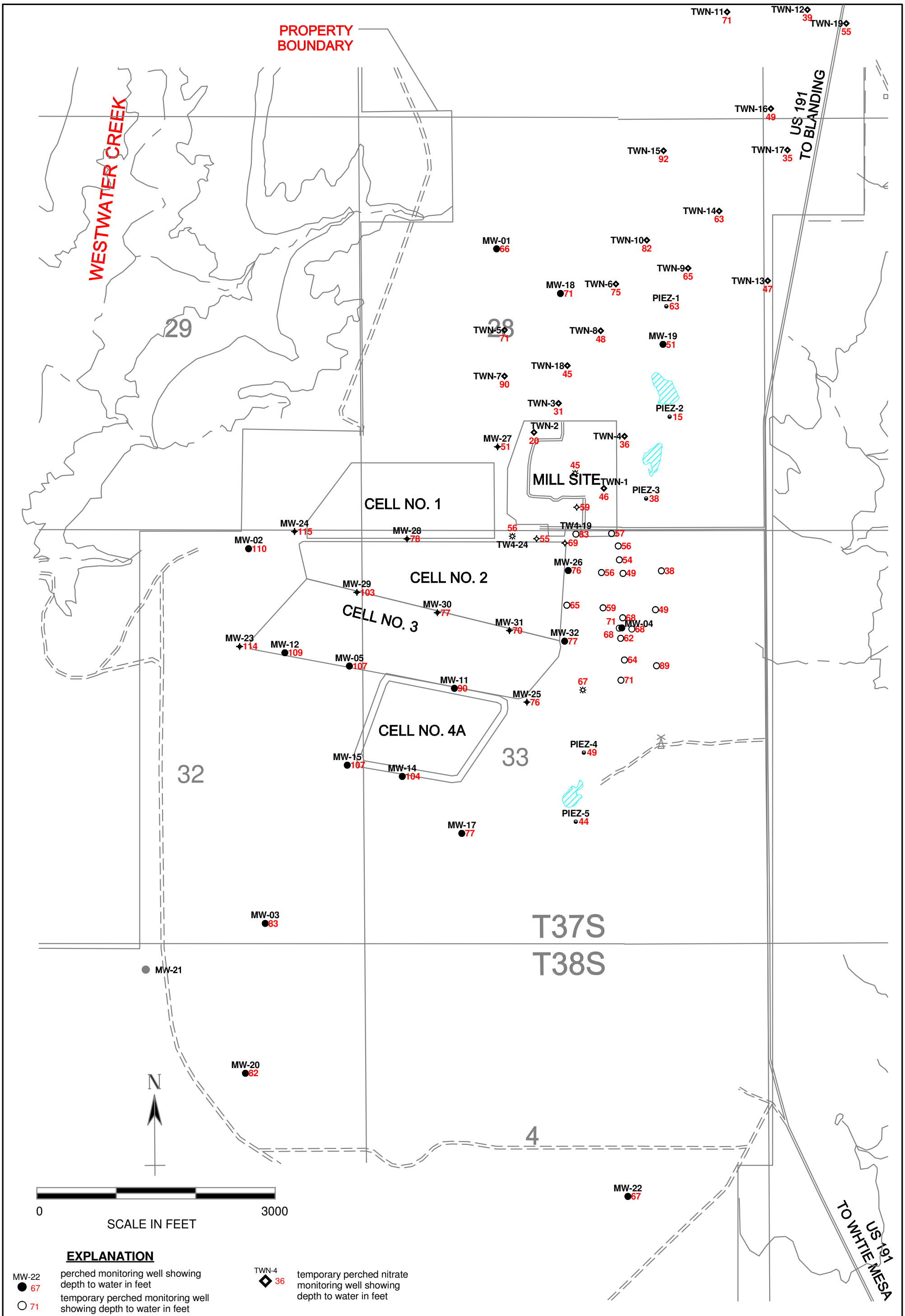
EXPLANATION

MW-20 ● 9	perched monitoring well showing saturated thickness in feet
○ 25	temporary perched monitoring well showing saturated thickness in feet
PIEZ-1 ◒ 41	perched piezometer showing saturated thickness in feet
MW-31 ✦ 57	perched monitoring well installed April, 2005 showing saturated thickness in feet
✧ 57	temporary perched monitoring well installed April, 2005 saturated thickness in feet
TWN-4 ◇ 87	temporary perched nitrate monitoring well showing saturated thickness in feet

HYDRO GEO CHEM, INC.

PERCHED ZONE SATURATED THICKNESS
DECEMBER 2009
WHITE MESA SITE

APPROVED	DATE	REFERENCE	FIGURE
SJS	12/29/09	H:/718000/hydrpt09b/satthck09.srf	9



EXPLANATION

MW-22 ● 67	perched monitoring well showing depth to water in feet
○ 71	temporary perched monitoring well showing depth to water in feet
PIEZ-1 ◒ 63	perched piezometer showing depth to water in feet
MW-31 ✦ 70	perched monitoring well installed April, 2005 showing depth to water in feet
✧ 55	temporary perched monitoring well installed April, 2005 showing depth to water in feet
☼ 67	temporary perched monitoring well installed May, 2007 showing depth to water in feet
TWN-4 ◇ 36	temporary perched nitrate monitoring well showing depth to water in feet

HYDRO GEO CHEM, INC.

DEPTHS TO PERCHED WATER
DECEMBER 2009
WHITE MESA SITE

APPROVED	DATE	REFERENCE	FIGURE
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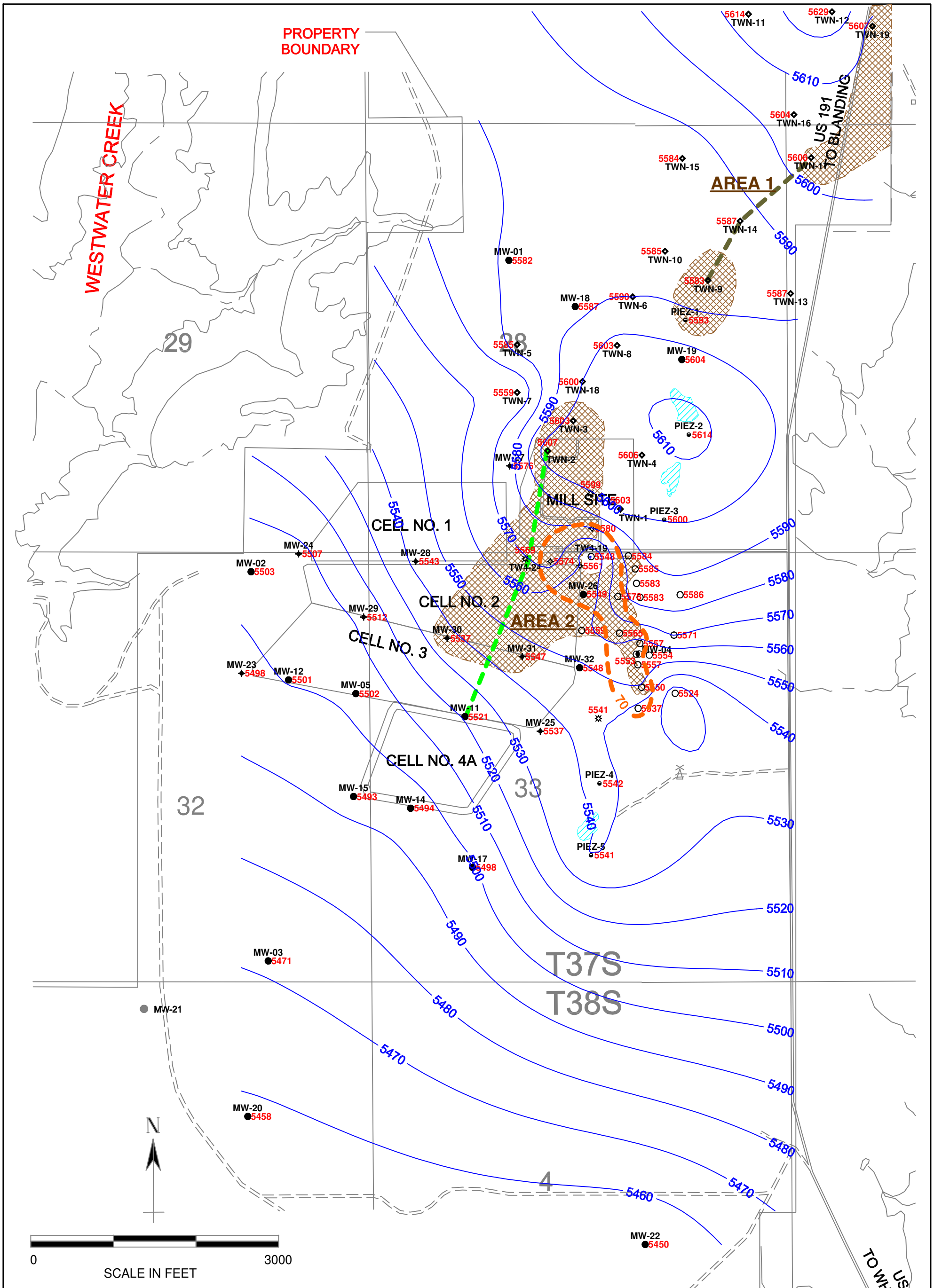

EXPLANATION

- MW-20 5460 — perched monitoring well showing elevation in feet amsl
- 5556 — temporary perched monitoring well showing elevation in feet amsl
- PIEZ-1 5593 — perched piezometer showing elevation in feet amsl
- MW-31 5546 — perched monitoring well installed April, 2005 showing elevation in feet amsl
- 5573 — temporary perched monitoring well installed April, 2005 showing elevation in feet amsl
- 5540 — temporary perched monitoring well installed May, 2007 showing elevation in feet amsl
- TWN-1 5601 — temporary perched nitrate monitoring well showing elevation in feet amsl
- pathlines for Areas 1 and 2
- area with nitrate > 5 mg/L
- area with chloroform > 70 ug/L

HYDRO GEO CHEM, INC.

KRIGED DECEMBER 2009 WATER LEVEL MAP SHOWING HYPOTHETICAL PATHLINES WHITE MESA SITE

APPROVED	DATE	REFERENCE	FIGURE
SJS	12/29/09	H:/718000/hydtst09b/nitrpath2c.srf	11

APPENDIX A

PERCHED NITRATE MONITORING WELL HYDRAULIC TESTS
WHITE MESA URANIUM MILL
OCTOBER 2009

APPENDIX A

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.

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 500™ 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 Aqtesolv™ (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 BaroTroll™ 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 Aqtesolve™ 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 x 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.

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. Based on hydraulic test data and drilling logs at or near MW-4, the 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 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.

TABLES

TABLE A.1
Parameters Used in Hydraulic Test Analyses

Well	Depth to Brushy Basin (ft)	Depth to Water (ft)	Depth to Top of Screen (ft)	Depth to Base of Screen (ft)	Saturated Thickness Above Brushy Basin (ft)
TWN-1	102	48	55.0	105.0	54.0
TWN-2	92	18	15.0	95.0	74.0
TWN-3	92	32	45.0	95.0	60.0
TWN-4	123	37	45.0	125.0	85.5
TWN-5	147	70	80.0	150.0	77.0
TWN-6	127	75	60.0	130.0	52.0
TWN-7	102	91	25.0	105.0	11.0
TWN-8	142	62	75.5	145.5	80.0
TWN-9	94	65	47.0	97.0	29.0
TWN-10	102	82	55.0	105.0	20.0
TWN-11	140	72	62.0	142.0	68.0
TWN-12	107	40	30.0	110.0	67.0
TWN-13	115	47	46.0	116.0	68.0
TWN-14	120	63	53.0	123.0	57.0
TWN-15	150	92	85.0	155.0	58.0
TWN-16	90	49	43.0	93.0	41.0
TWN-17	104	35	24.0	104.0	69.0
TWN-18	142	59	55.0	145.0	83.0
TWN-19	105	55	56.0	106.0	50.0

Note:
ft = feet

TABLE A.2
Slug Test Results

		Automatically Logged Data			Hand Collected Data		
		KGS		Bouwer-Rice	KGS		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

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 .

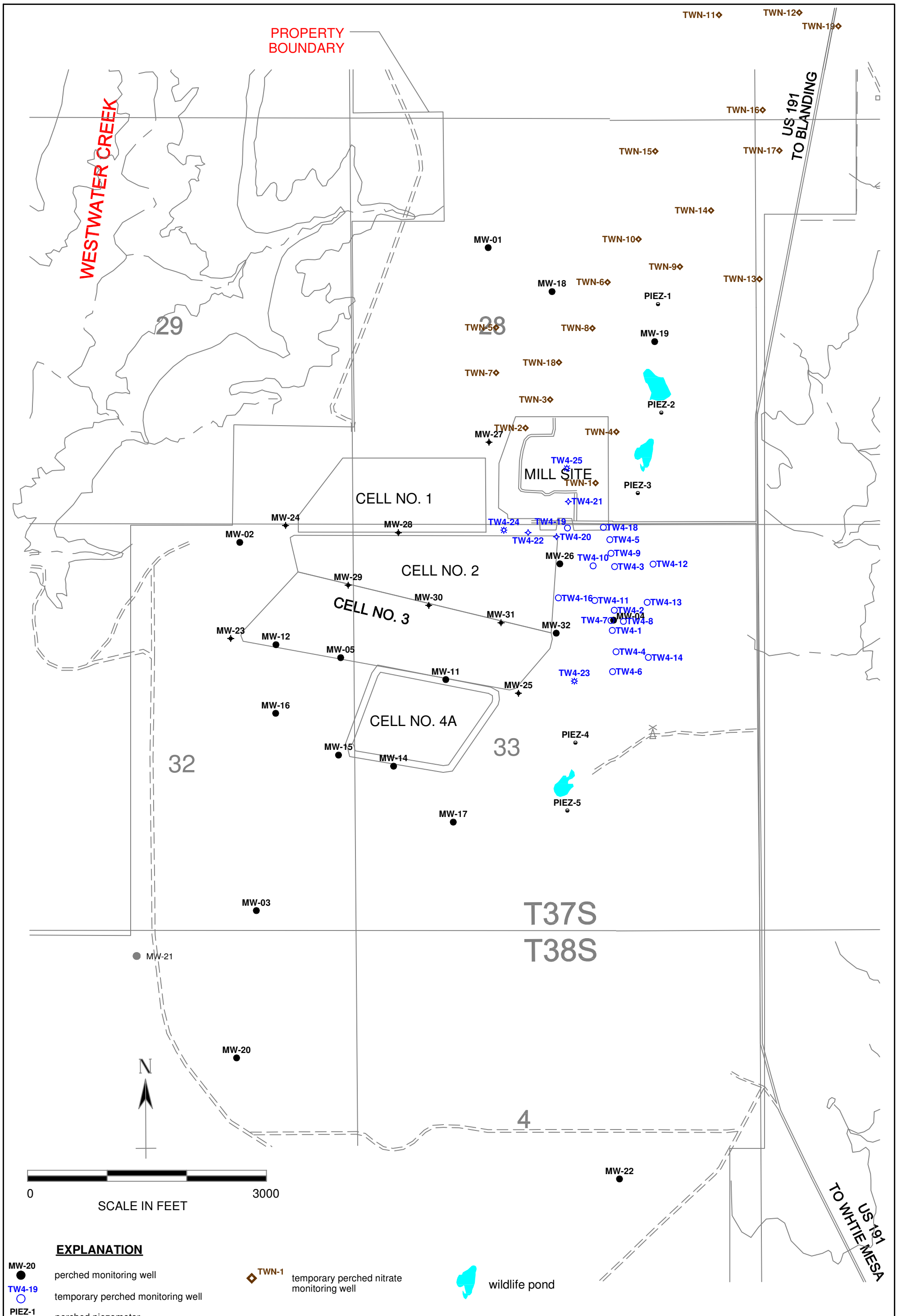
TABLE A.3
Estimated Hydraulic Conductivities and Perched Zone Pore Velocities

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

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



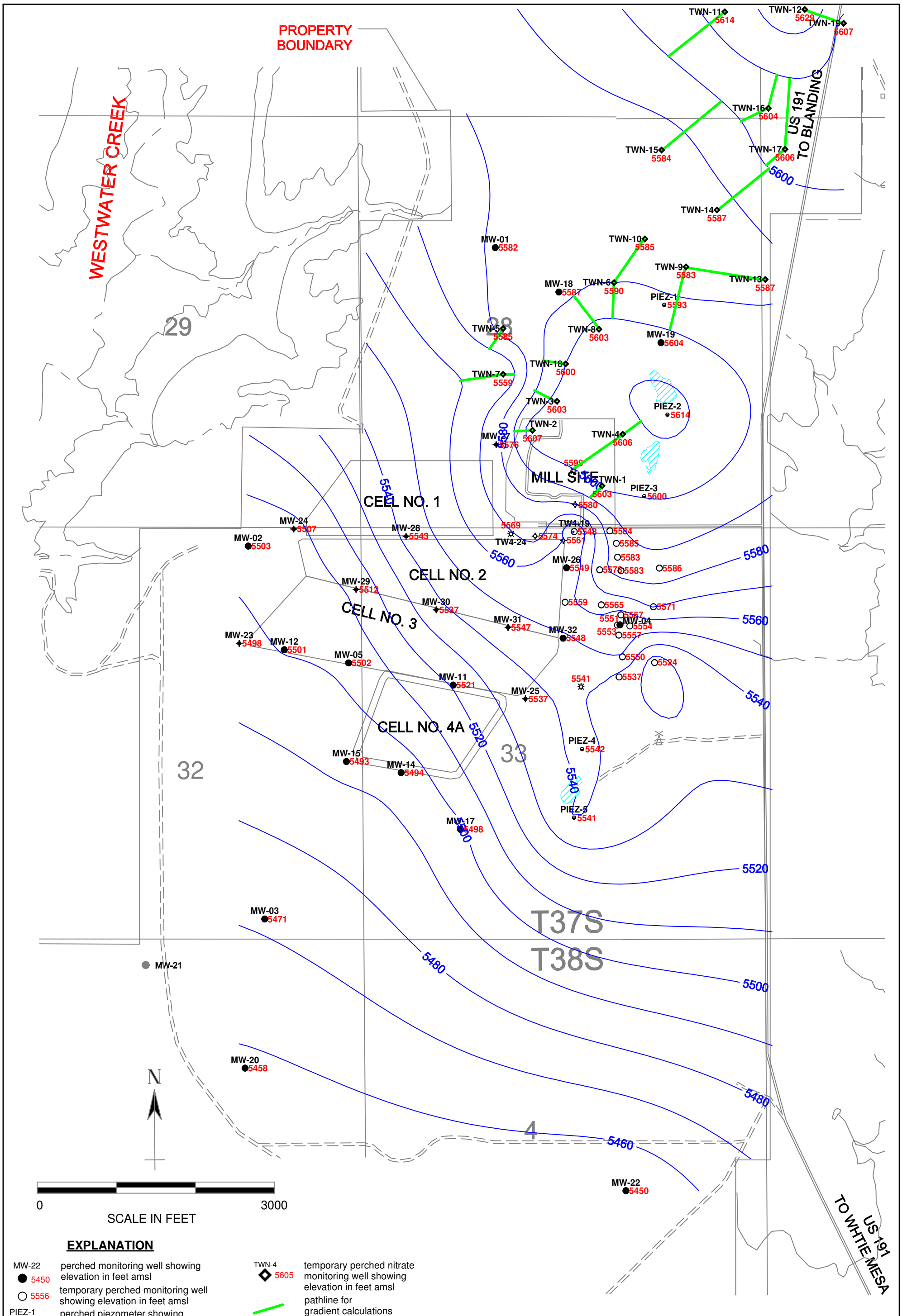
EXPLANATION

- MW-20 — perched monitoring well
- TW4-19 — temporary perched monitoring well
- PIEZ-1 — perched piezometer
- MW-31 — perched monitoring well installed April, 2005
- TW4-20 — temporary perched monitoring well installed April, 2005
- TW4-23 — temporary perched monitoring well installed May, 2007
- TWN-1 — temporary perched nitrate monitoring well
- wildlife pond

HYDRO GEO CHEM, INC.

SITE PLAN AND PERCHED WELL LOCATIONS WHITE MESA SITE

APPROVED	DATE	REFERENCE	FIGURE
SJS	12/29/09	H:/718000/hydrpt09b/TWNloc.srf	A.1



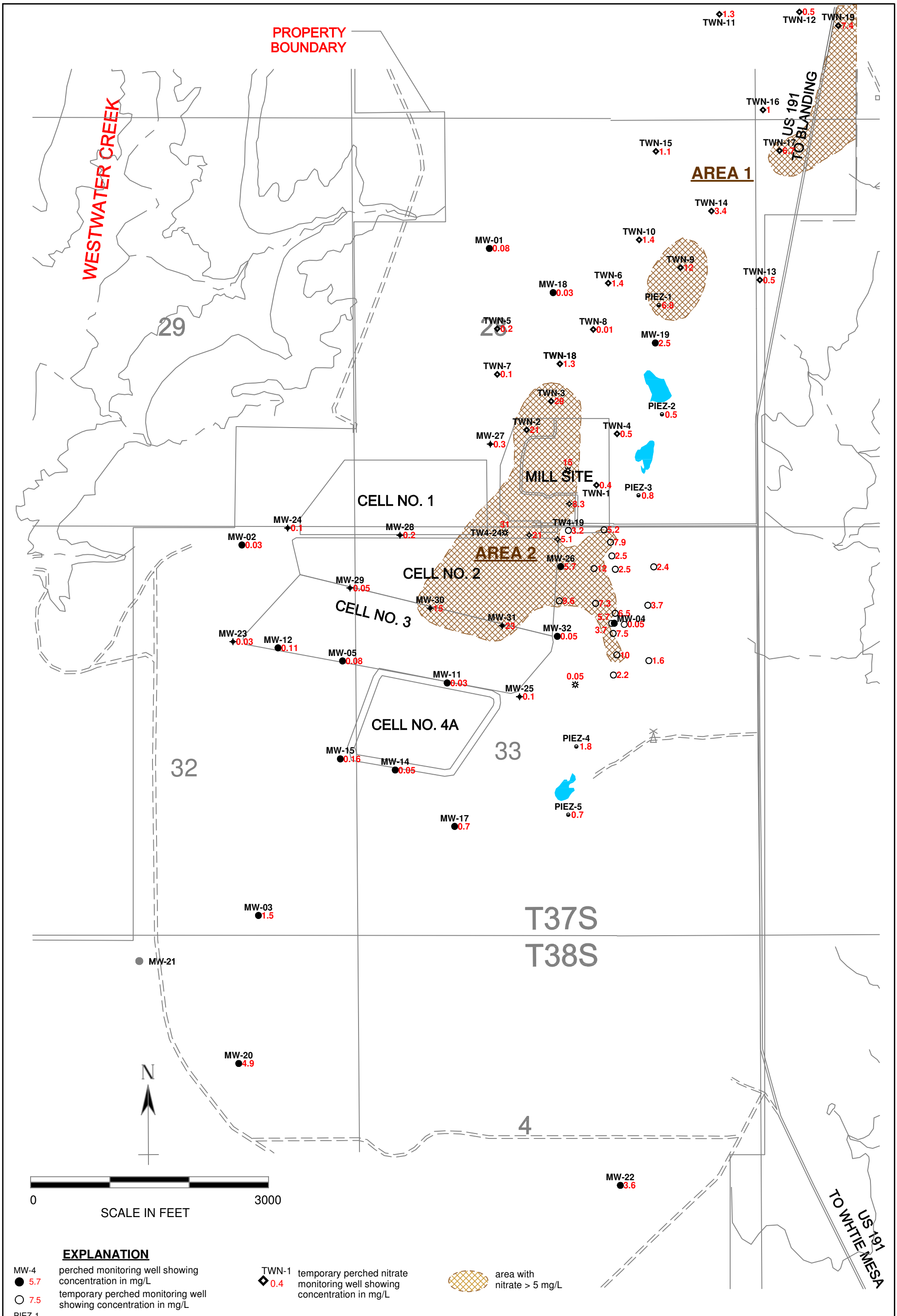
EXPLANATION

MW-22 ● 5450	perched monitoring well showing elevation in feet amsl
○ 5556	temporary perched monitoring well showing elevation in feet amsl
PIEZ-1 ⊖ 5592	perched piezometer showing elevation in feet amsl
MW-31 ✦ 5546	perched monitoring well installed April, 2005 showing elevation in feet amsl
✧ 5573	temporary perched monitoring well installed April, 2005 showing elevation in feet amsl
☼ 5541	temporary perched monitoring well installed May, 2007 showing elevation in feet amsl
TWN-4 ◇ 5605	temporary perched nitrate monitoring well showing elevation in feet amsl
	pathline for gradient calculations

HYDRO GEO CHEM, INC.

KRIGED DECEMBER 2009 WATER LEVELS SHOWING LOCATIONS OF HYDRAULIC GRADIENT CALCULATIONS WHITE MESA SITE

APPROVED	DATE	REFERENCE	FIGURE
SJS	12/29/09	H:/718000/hydrrpt09b/wlq4pathc.srf	A.2



EXPLANATION

MW-4 ● 5.7	perched monitoring well showing concentration in mg/L
○ 7.5	temporary perched monitoring well showing concentration in mg/L
PIEZ-1 ◒ NS	perched piezometer (not sampled)
MW-32 ✦ 0.05	perched monitoring well installed April, 2005 showing concentration in mg/L
✧ 5.1	temporary perched monitoring well installed April, 2005 showing concentration in mg/L
✲ ND	temporary perched monitoring well installed May, 2007 showing concentration in mg/L
TWN-1 ◇ 0.4	temporary perched nitrate monitoring well showing concentration in mg/L
area with nitrate > 5 mg/L	

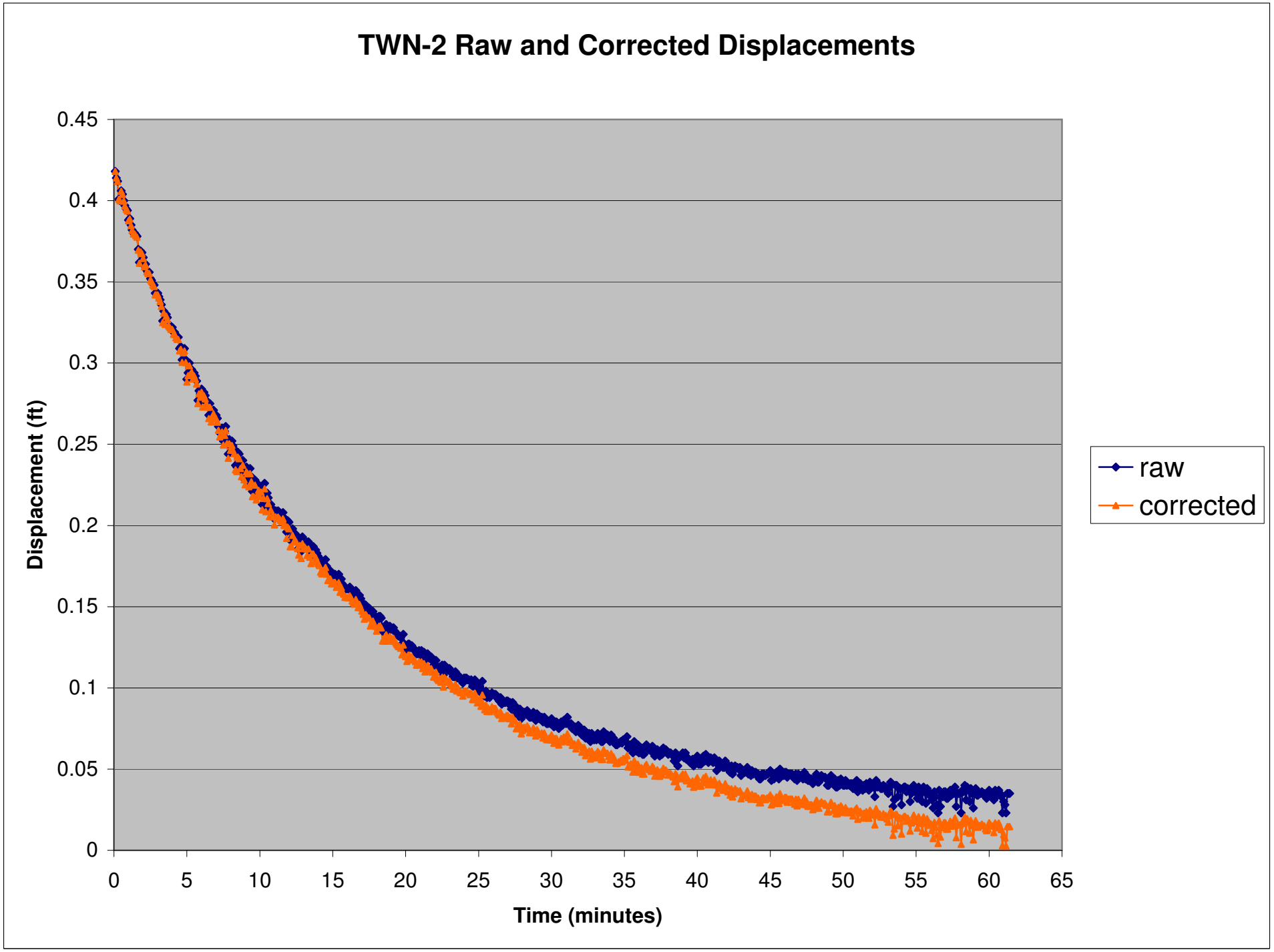
HYDRO GEO CHEM, INC.

PERCHED ZONE NITRATE (mg/L)
WHITE MESA SITE

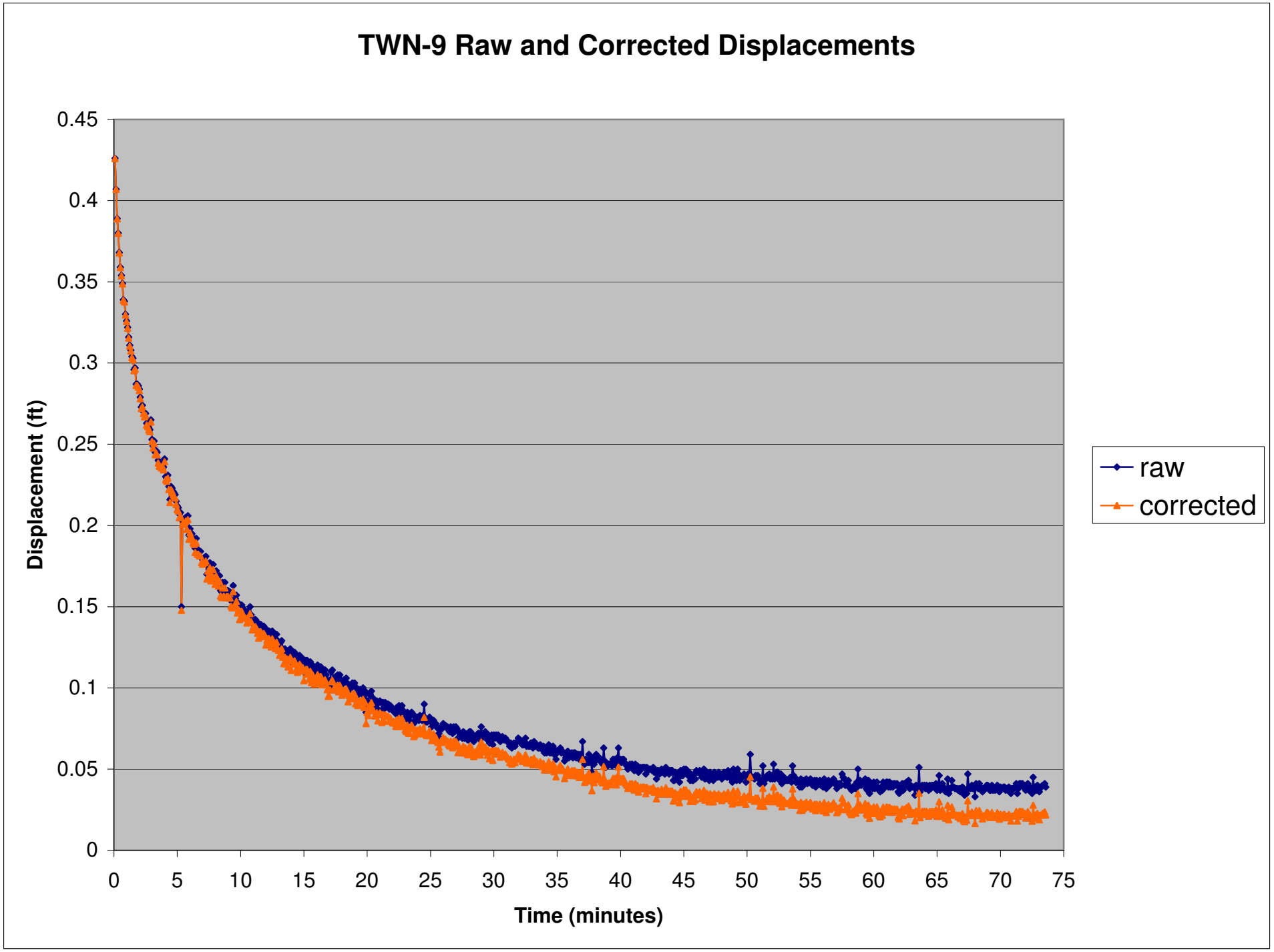
APPROVED	DATE	REFERENCE	FIGURE
SJS	12/29/09	H:/718000/hydrpt09b/no3postc.srf	A.3

APPENDIX A.1

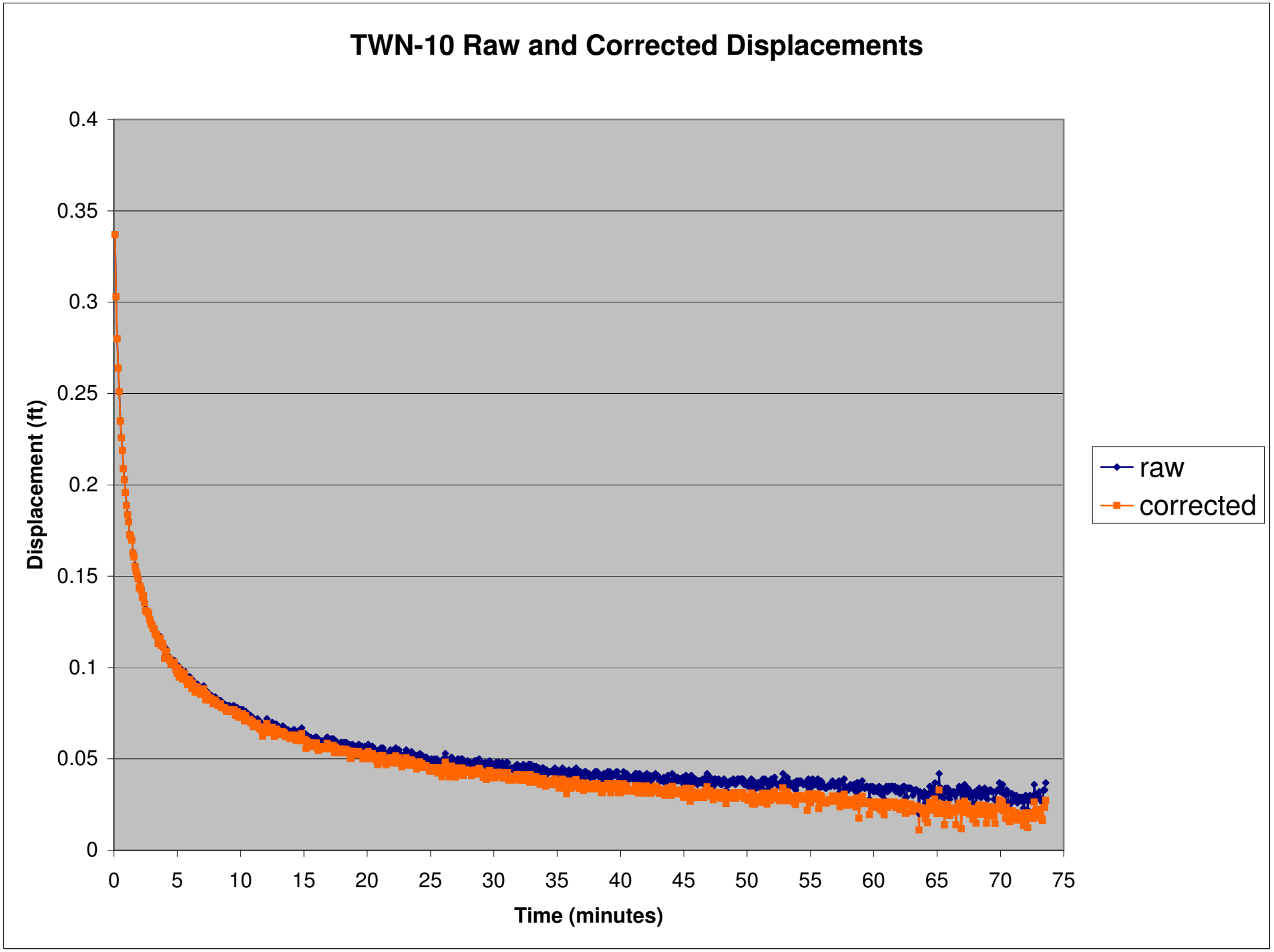
BACKGROUND CORRECTIONS



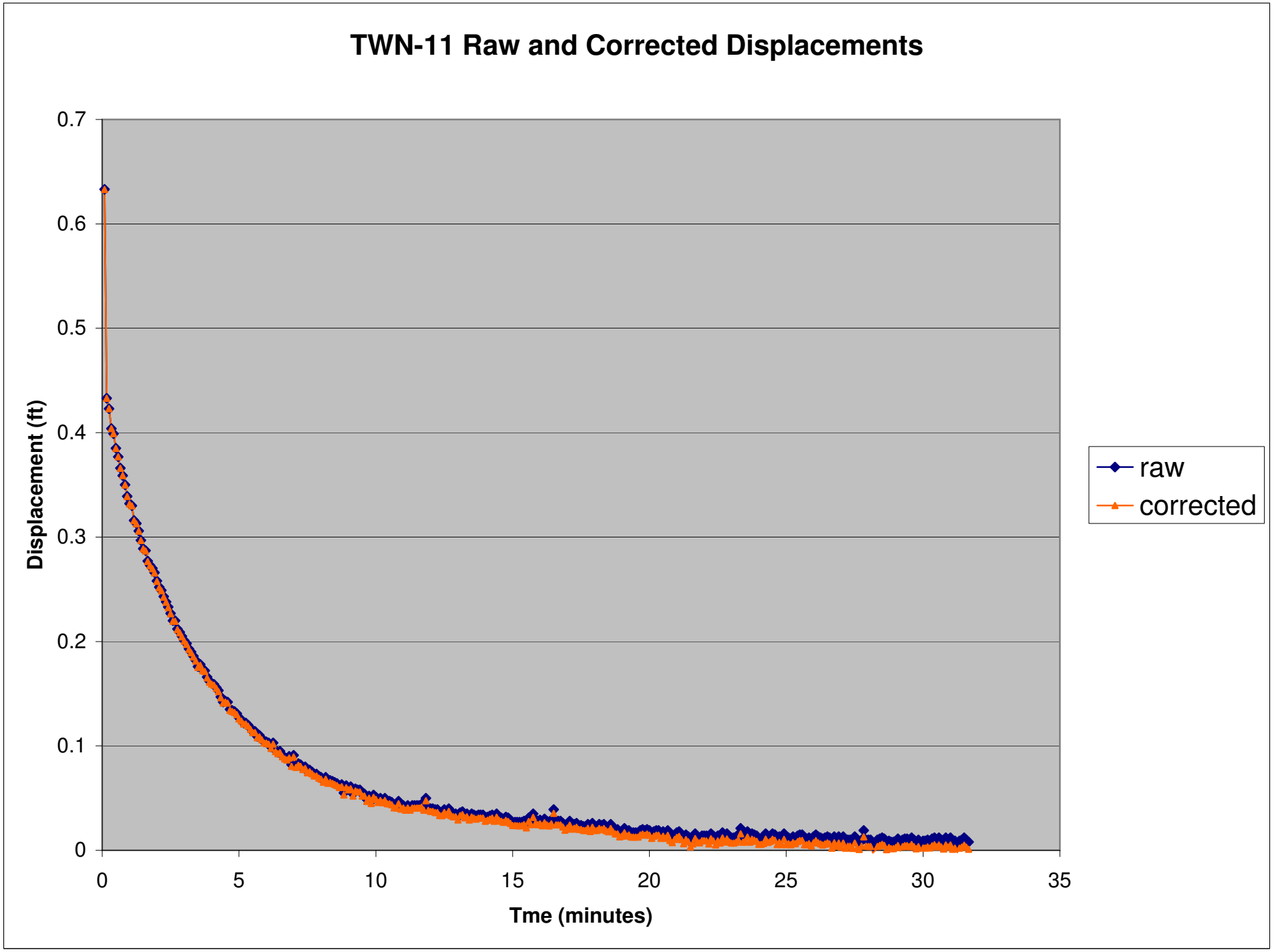
H:\718000\hydtst09\report\AppendixA\TWN-2 correction.xls: graph Chart 1



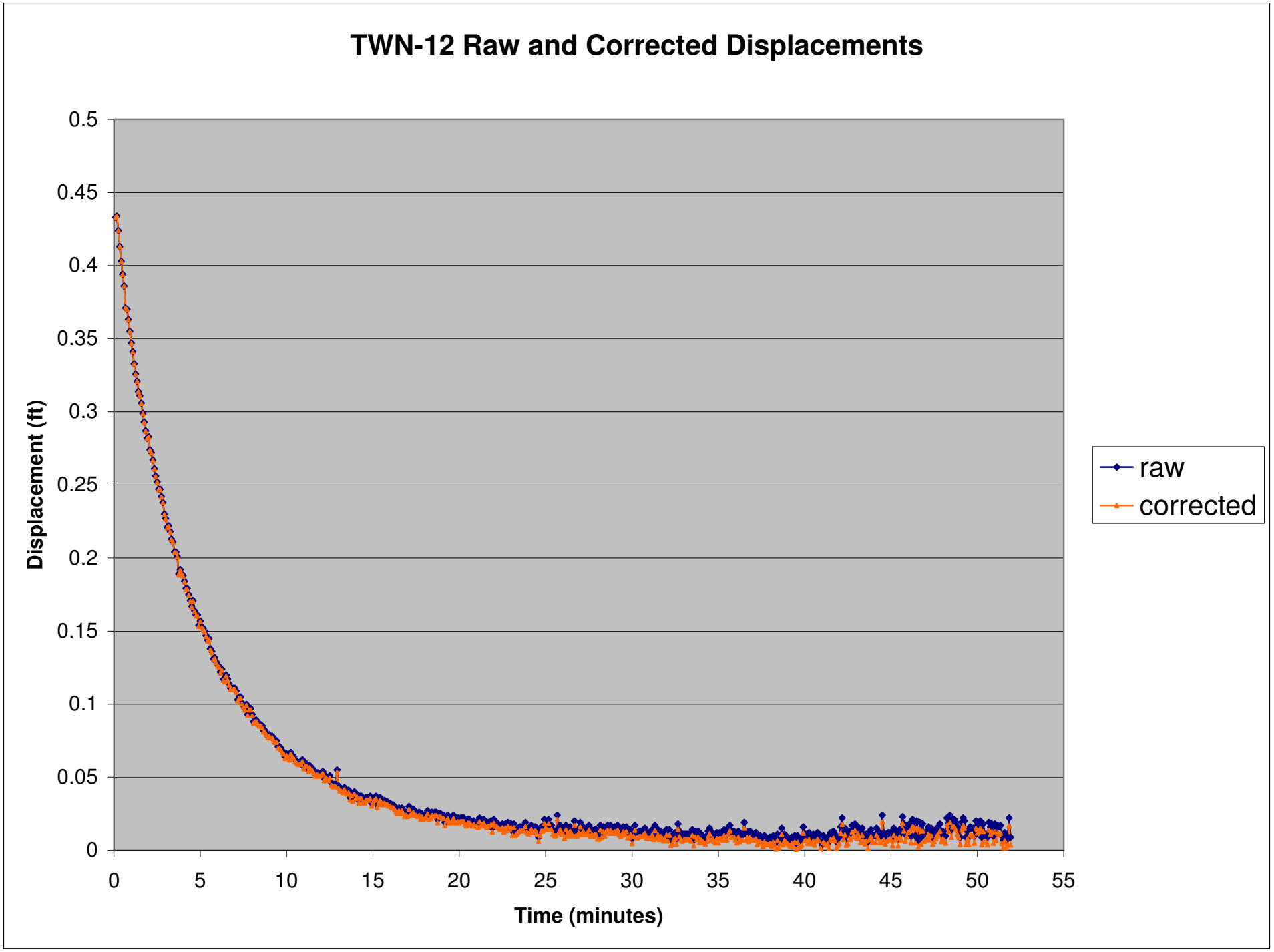
H:\718000\hydtst09\report\AppendixA\TWN-9 correction.xls: graph Chart 1



H:\718000\hydtst09\report\AppendixA\TWN-10 correction.xls: graph Chart 1



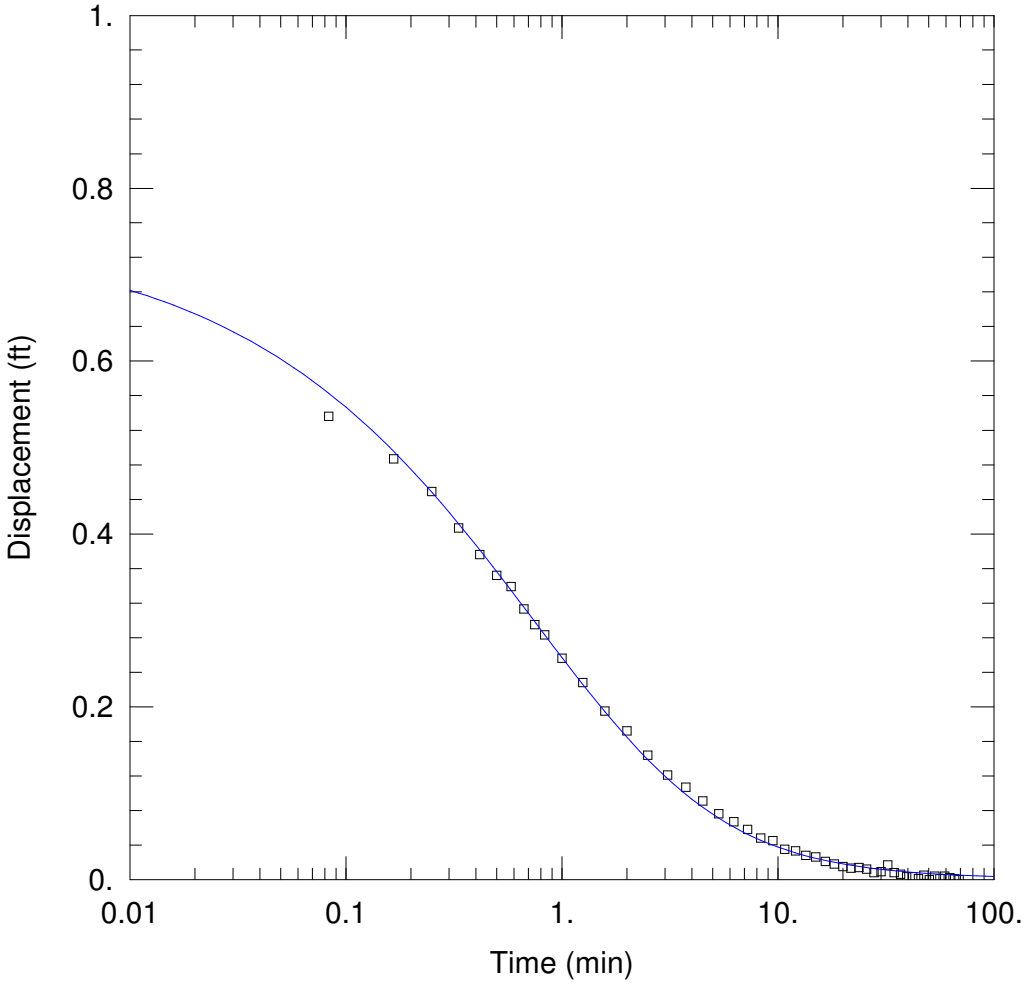
H:\718000\hydtst09\report\AppendixA\TWN-11 correction.xls: graph Chart 1



H:\718000\hydtst09\report\AppendixA\TWN-12 correction.xls: graph Chart 1

APPENDIX A.2

SLUG TEST ANALYSIS PLOTS



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn1\twn1.aqt
Date: 11/12/09 Time: 11:44:37

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-1

AQUIFER DATA

Saturated Thickness: 54. ft

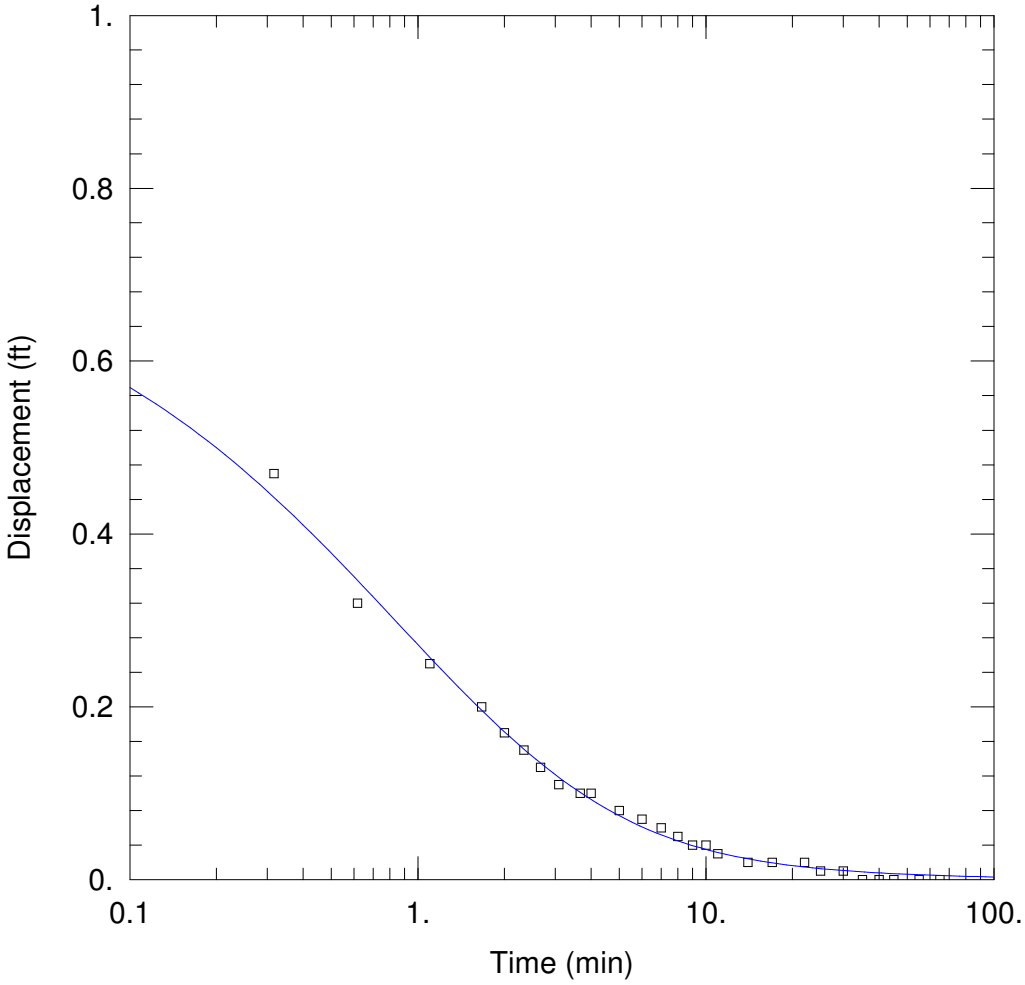
WELL DATA (twn1)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 54. ft
Casing Radius: 0.167 ft
Static Water Column Height: 54. ft
Screen Length: 47. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0001702 cm/sec
Kz/Kr = 0.1
Ss = 0.002215 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn1\twn1h.aqt
Date: 11/12/09 Time: 11:45:12

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-1

AQUIFER DATA

Saturated Thickness: 54. ft

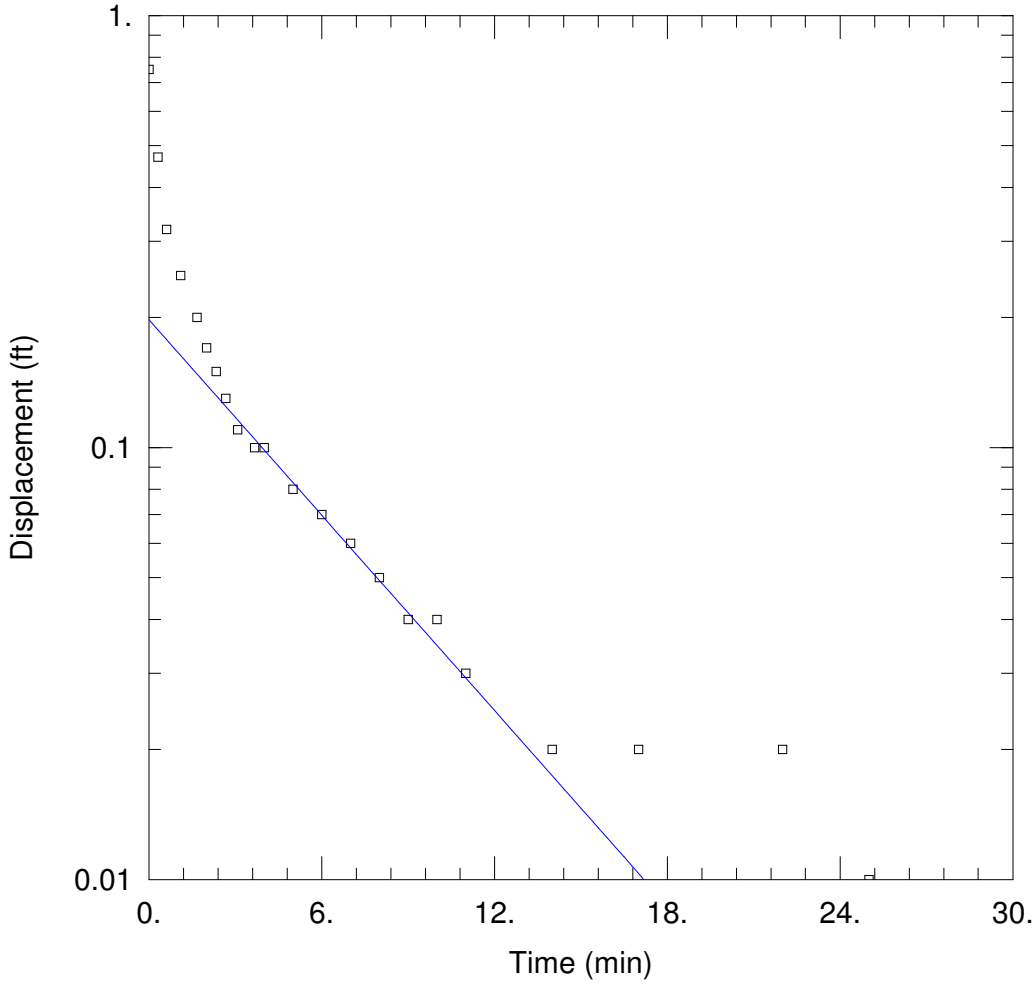
WELL DATA (twn1)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 54. ft
Casing Radius: 0.167 ft
Static Water Column Height: 54. ft
Screen Length: 47. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0001971 cm/sec
Kz/Kr = 0.1
Ss = 0.001247 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn1\twn1hbr.aqt
Date: 11/12/09 Time: 11:45:27

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-1

AQUIFER DATA

Saturated Thickness: 54. ft Anisotropy Ratio (Kz/Kr): 0.1

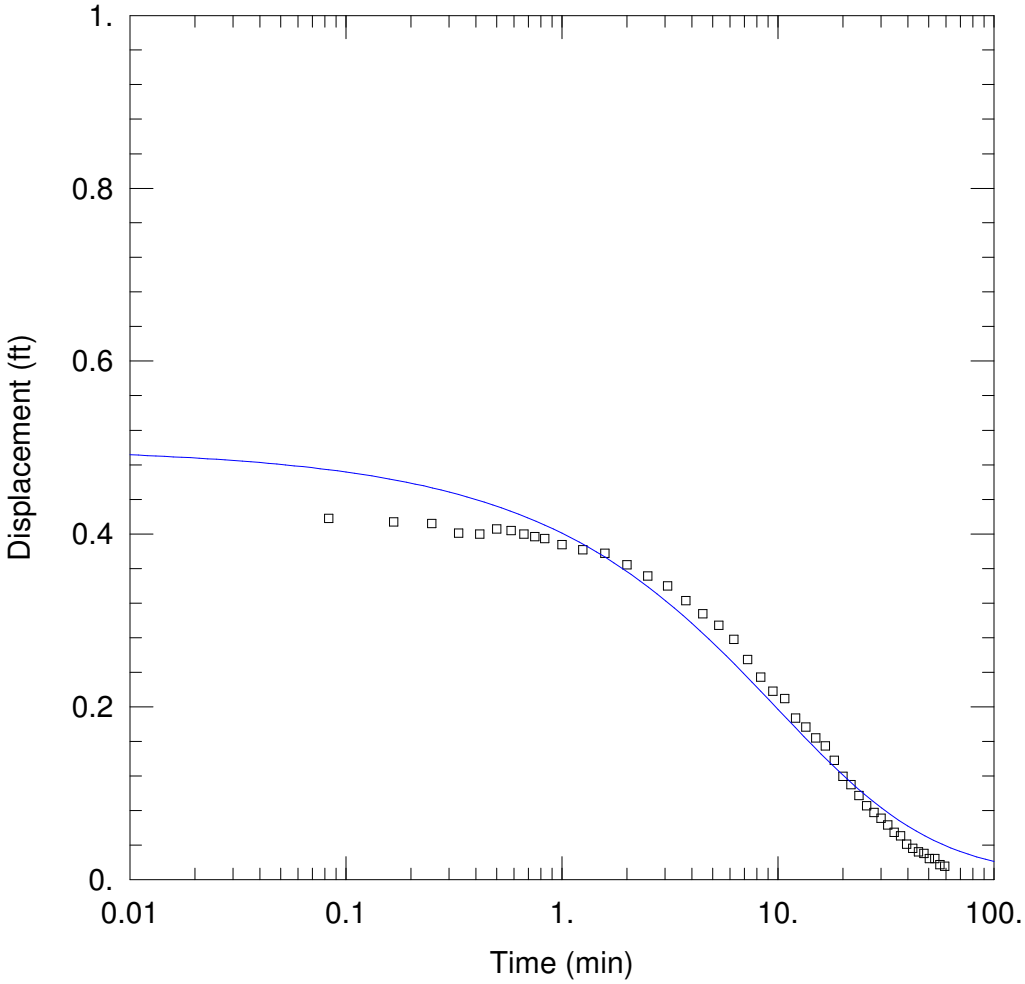
WELL DATA (twn1)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 54. ft
Casing Radius: 0.167 ft
Static Water Column Height: 54. ft
Screen Length: 47. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001364 cm/sec
y0 = 0.1976 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn2\twn2c.aqt
Date: 11/12/09 Time: 11:48:04

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-2

AQUIFER DATA

Saturated Thickness: 74. ft

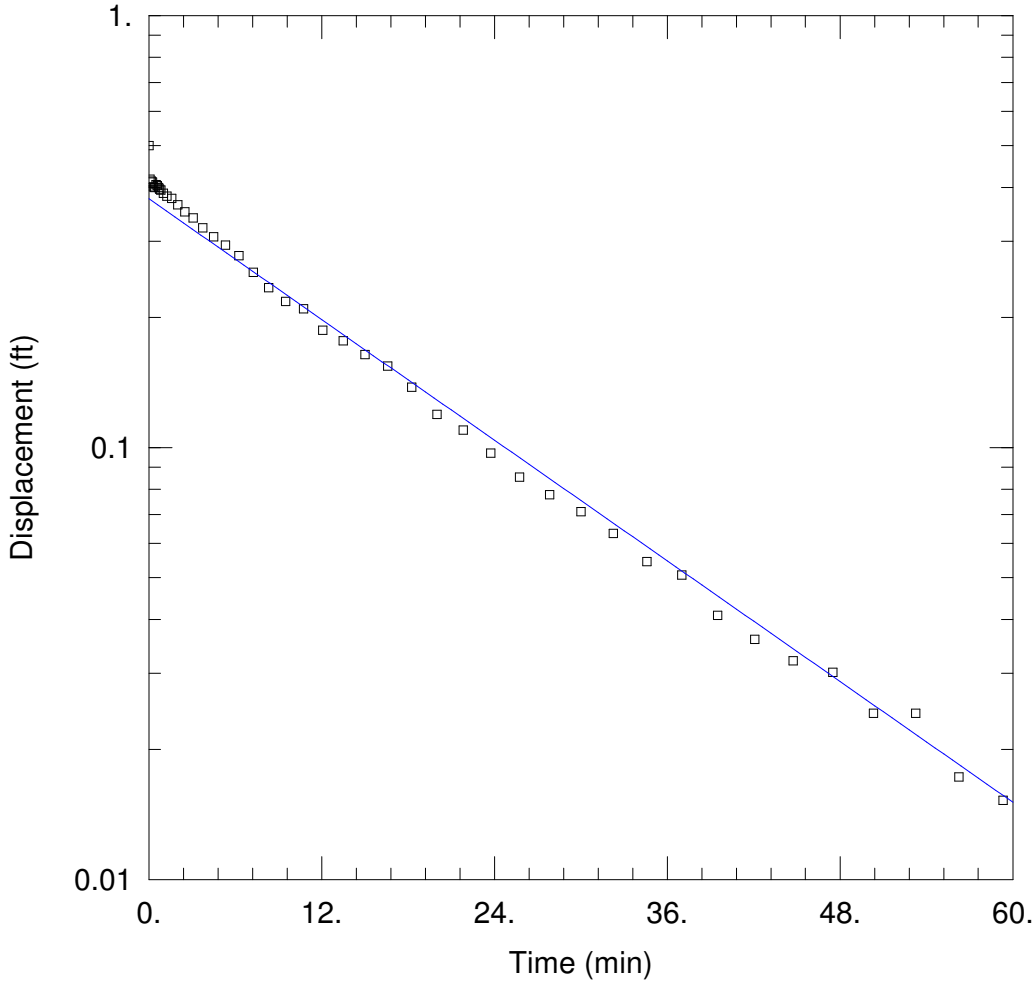
WELL DATA (twn2)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 74. ft
Casing Radius: 0.167 ft
Static Water Column Height: 74. ft
Screen Length: 74. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 1.499E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.0003201 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn2\twn2cbr.aqt
Date: 11/12/09 Time: 11:48:21

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-2

AQUIFER DATA

Saturated Thickness: 74. ft Anisotropy Ratio (Kz/Kr): 0.1

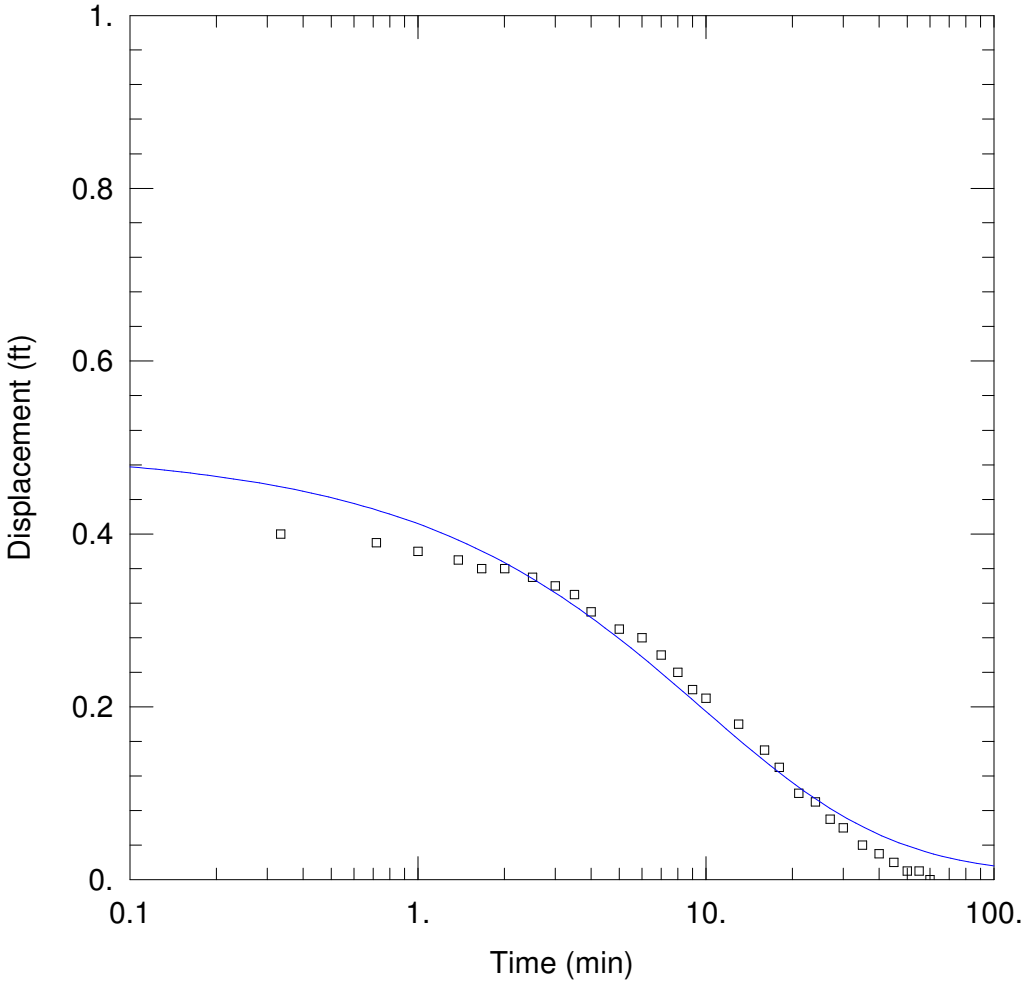
WELL DATA (twn2)

Initial Displacement: 0.5 ft Static Water Column Height: 74. ft
Total Well Penetration Depth: 74. ft Screen Length: 74. ft
Casing Radius: 0.167 ft Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 2.253E-5 cm/sec y0 = 0.3764 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn2\twn2h.aqt
Date: 11/12/09 Time: 11:48:41

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-2

AQUIFER DATA

Saturated Thickness: 74. ft

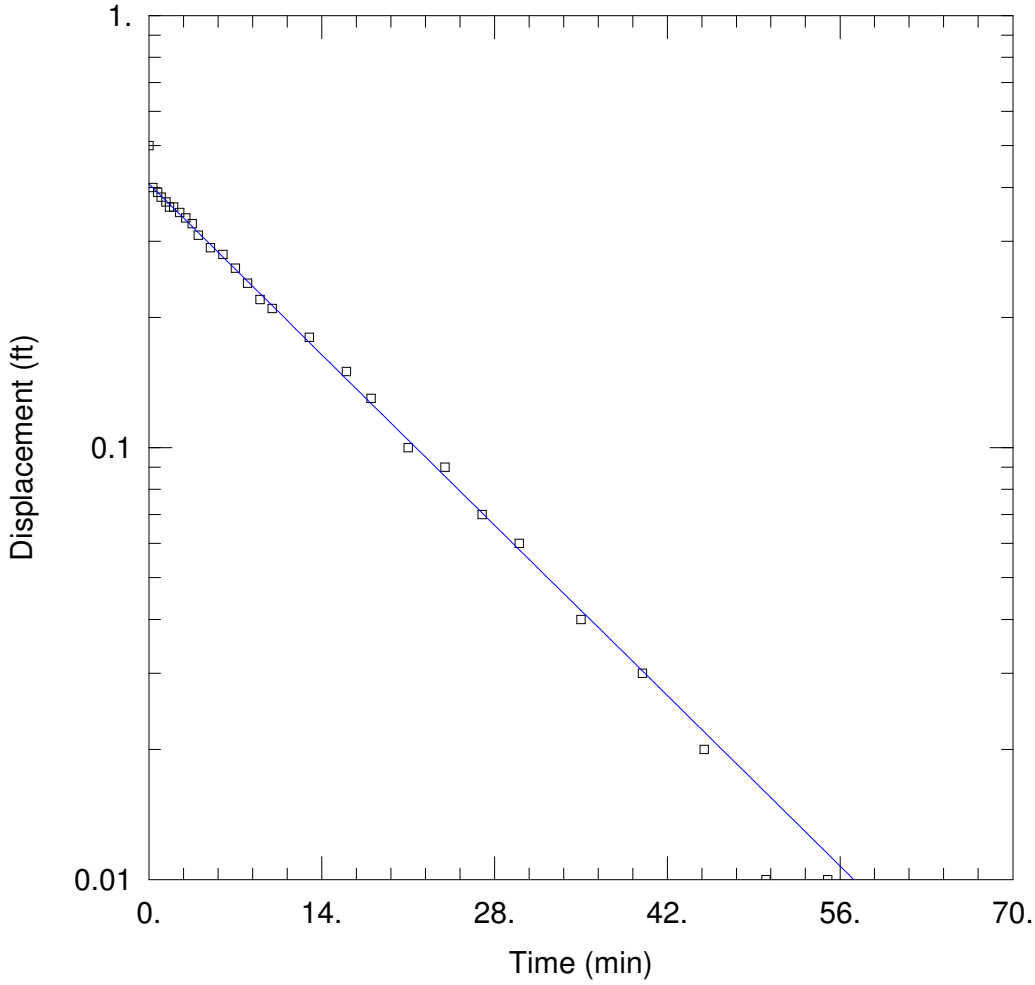
WELL DATA (twn2)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 74. ft
Casing Radius: 0.167 ft
Static Water Column Height: 74. ft
Screen Length: 74. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2.04E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.0001156 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn2\twn2hbr.aqt
Date: 11/12/09 Time: 11:49:04

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-2

AQUIFER DATA

Saturated Thickness: 74. ft Anisotropy Ratio (Kz/Kr): 0.1

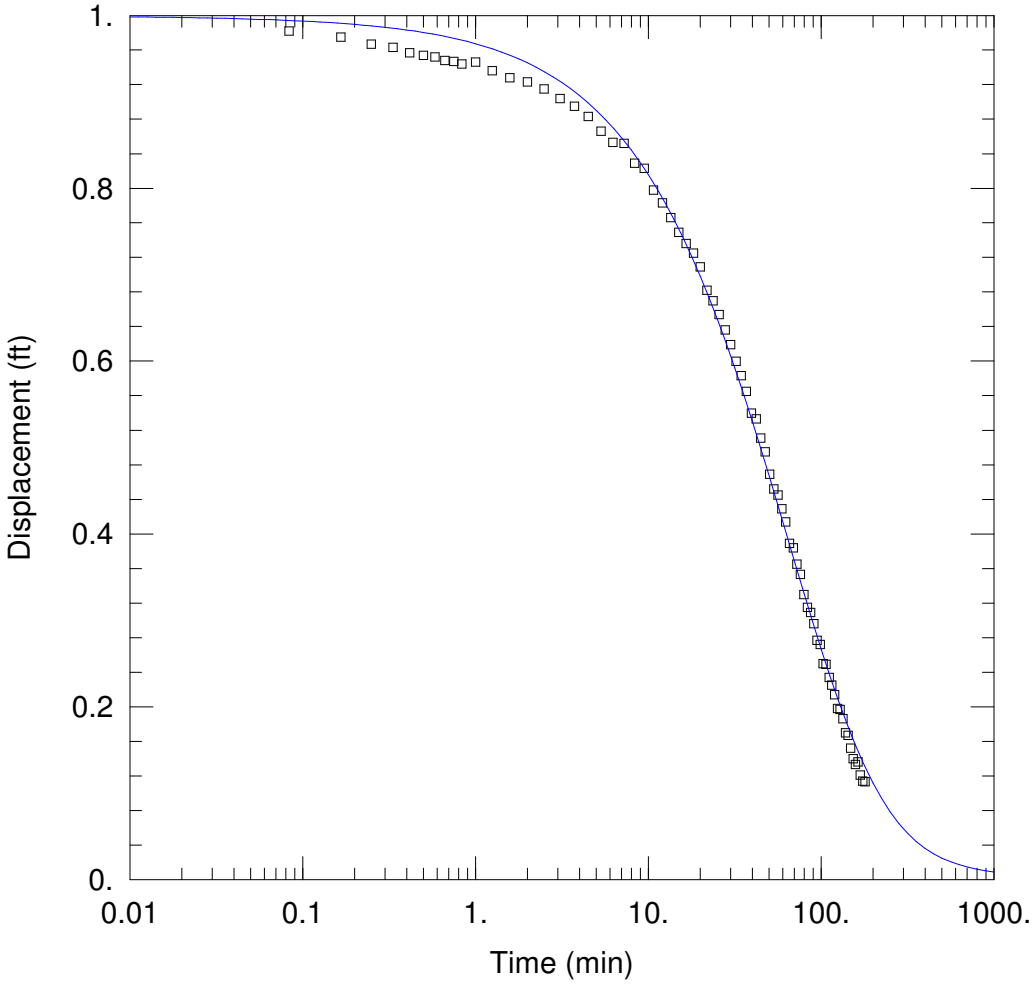
WELL DATA (twn2)

Initial Displacement: 0.5 ft
Static Water Column Height: 74. ft
Total Well Penetration Depth: 74. ft
Screen Length: 74. ft
Casing Radius: 0.167 ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 2.729E-5 cm/sec
y0 = 0.4075 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn3\twn3.aqt
Date: 11/12/09 Time: 11:49:43

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-3

AQUIFER DATA

Saturated Thickness: 60. ft

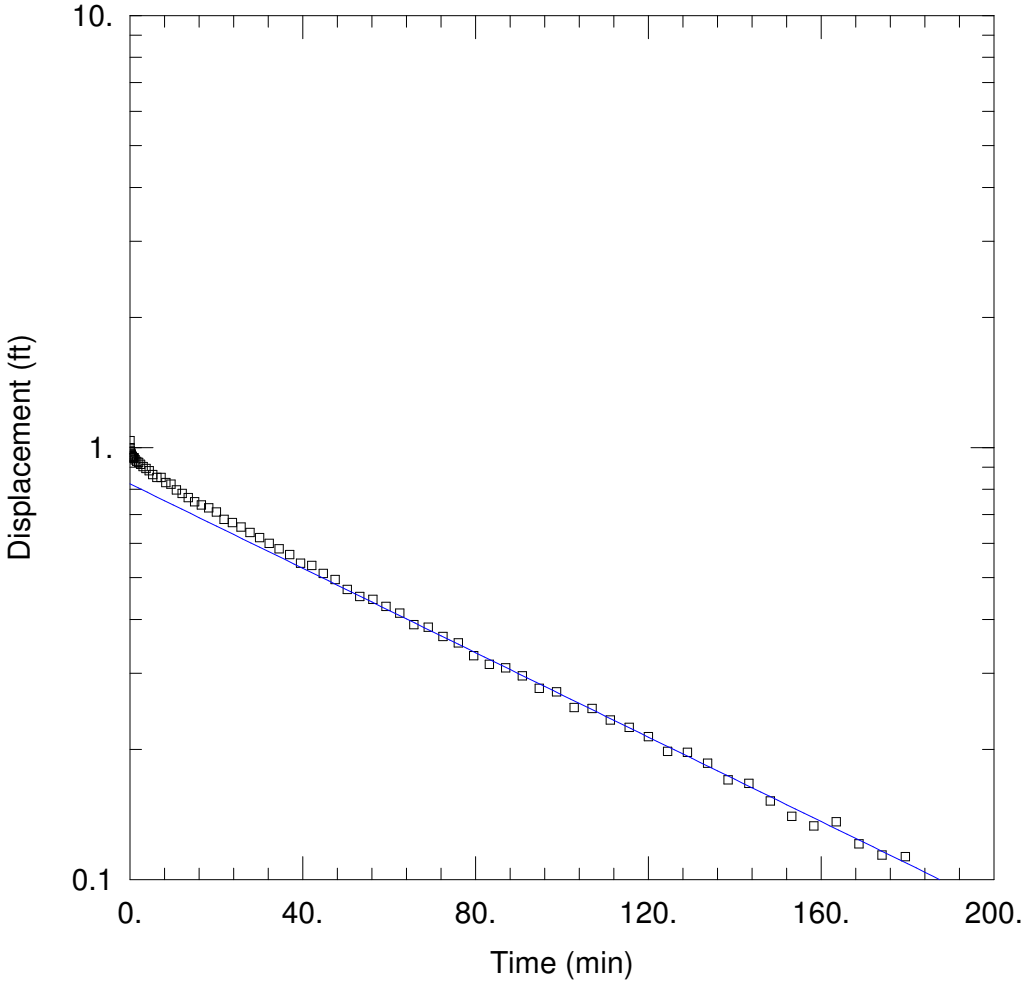
WELL DATA (twn3)

Initial Displacement: 1. ft
Total Well Penetration Depth: 60. ft
Casing Radius: 0.167 ft
Static Water Column Height: 60. ft
Screen Length: 47. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 8.563E-6 cm/sec
Kz/Kr = 0.1
Ss = 8.731E-6 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn3\twn3br.aqt
Date: 11/12/09 Time: 11:49:59

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-3

AQUIFER DATA

Saturated Thickness: 60. ft Anisotropy Ratio (Kz/Kr): 0.1

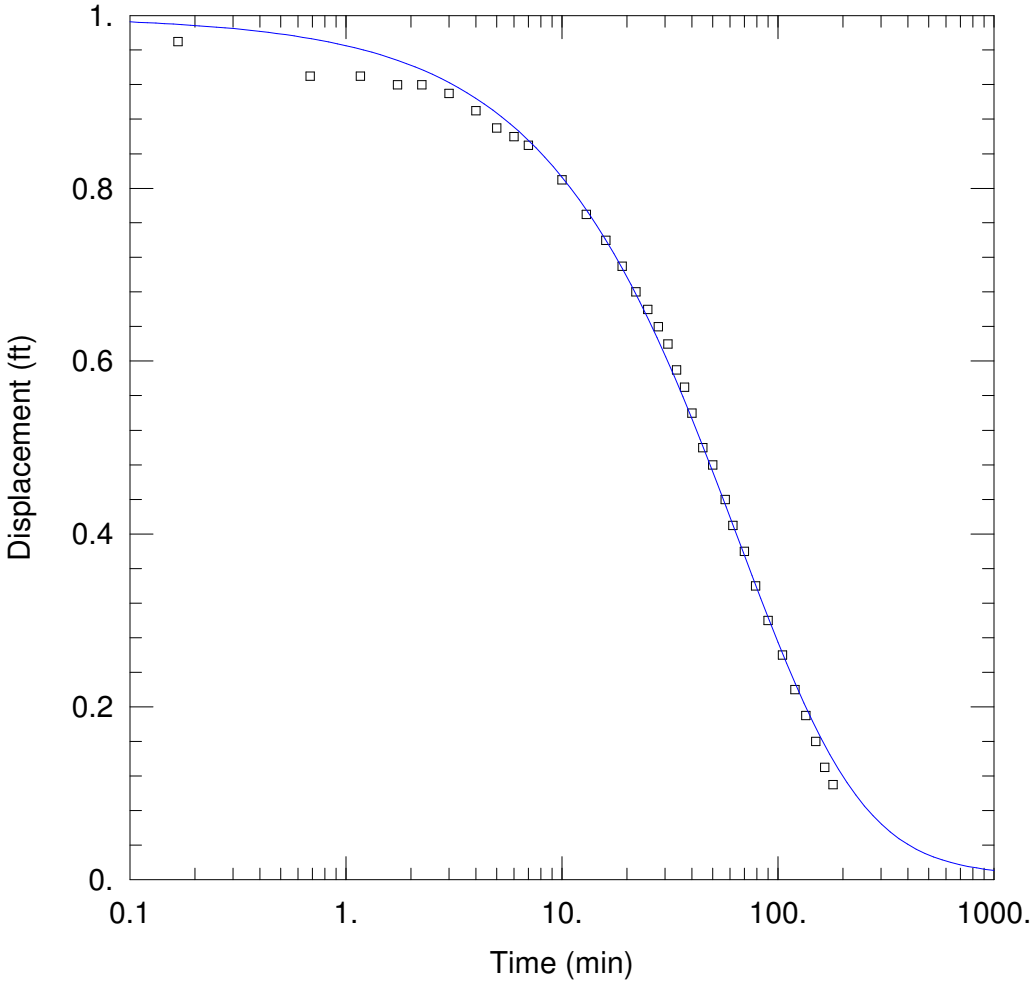
WELL DATA (twn3)

Initial Displacement: 1. ft Static Water Column Height: 60. ft
Total Well Penetration Depth: 60. ft Screen Length: 47. ft
Casing Radius: 0.167 ft Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 8.967E-6 cm/sec y0 = 0.8239 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn3\twn3h.aqt
Date: 11/12/09 Time: 11:50:20

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-3

AQUIFER DATA

Saturated Thickness: 60. ft

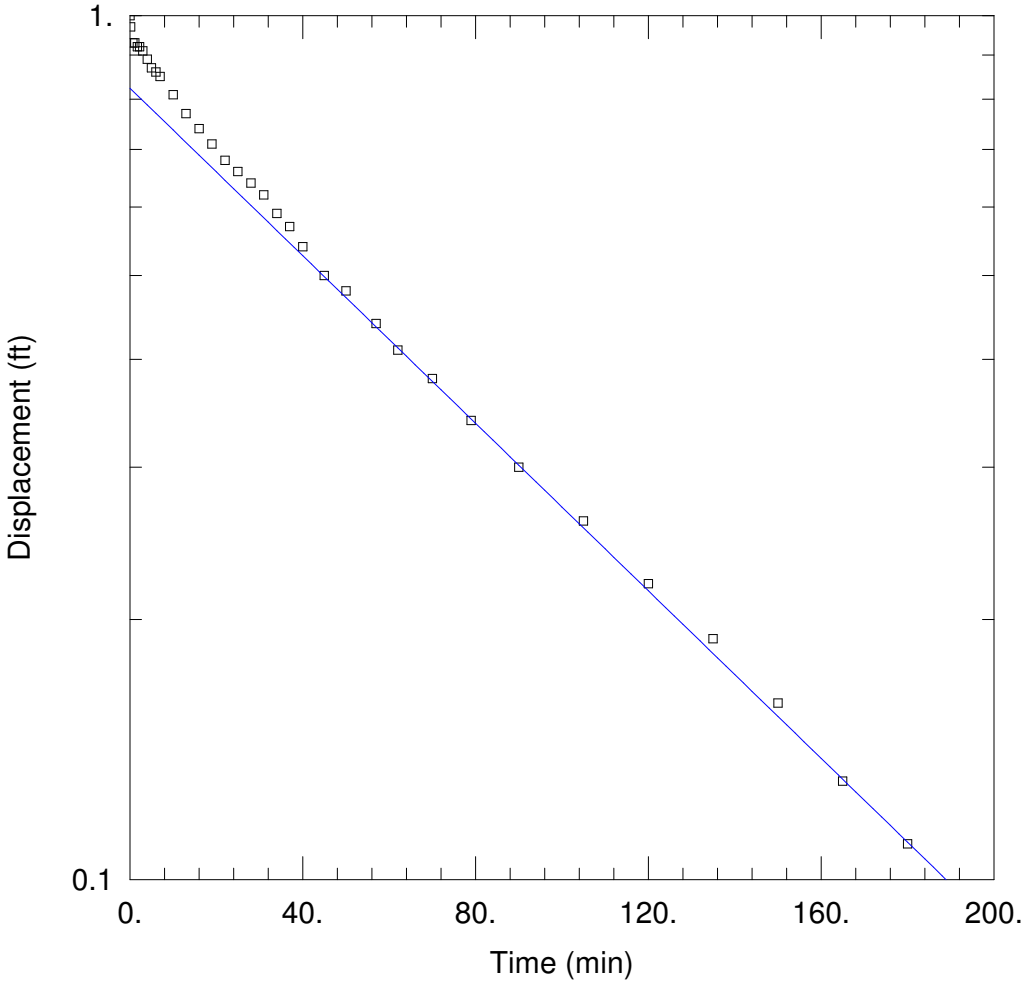
WELL DATA (twn3)

Initial Displacement: 1. ft
Total Well Penetration Depth: 60. ft
Casing Radius: 0.167 ft
Static Water Column Height: 60. ft
Screen Length: 47. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 7.75E-6 cm/sec
Kz/Kr = 0.1
Ss = 1.527E-5 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn3\twn3hbr.aqt
Date: 11/12/09 Time: 11:50:34

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-3

AQUIFER DATA

Saturated Thickness: 60. ft Anisotropy Ratio (Kz/Kr): 0.1

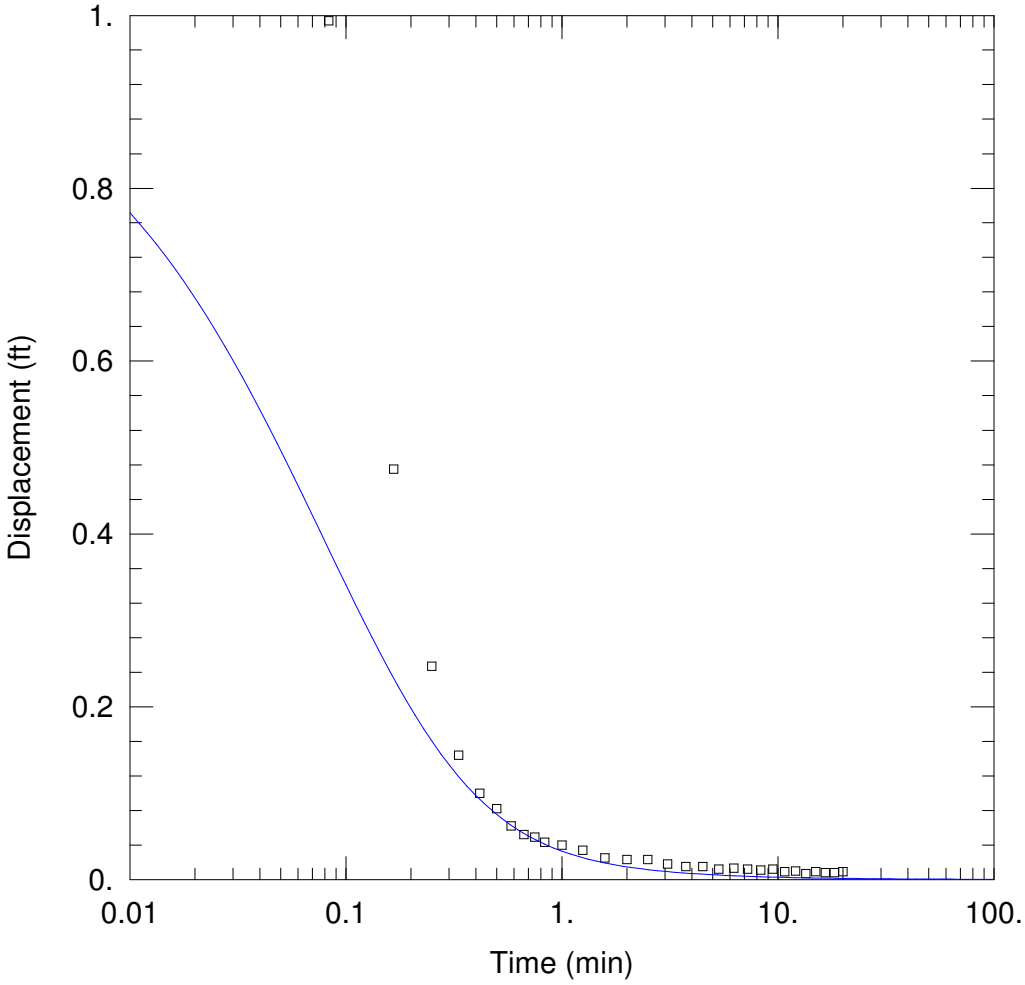
WELL DATA (twn3)

Initial Displacement: 1. ft
Total Well Penetration Depth: 60. ft
Casing Radius: 0.167 ft
Static Water Column Height: 60. ft
Screen Length: 47. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 8.898E-6 cm/sec
y0 = 0.8239 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn4\twn4.aqt
Date: 11/12/09 Time: 11:51:06

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-4

AQUIFER DATA

Saturated Thickness: 85. ft

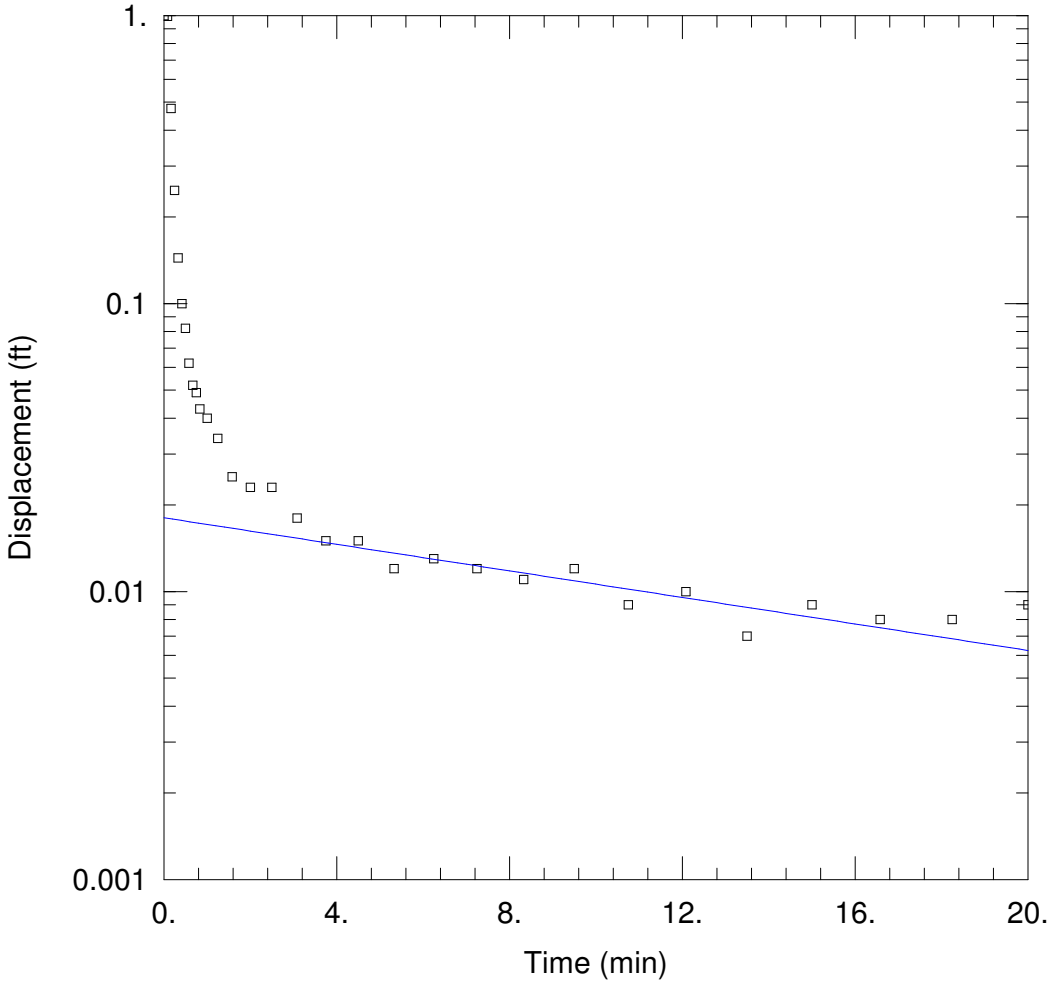
WELL DATA (twn4)

Initial Displacement: 1. ft
Total Well Penetration Depth: 85. ft
Casing Radius: 0.167 ft
Static Water Column Height: 85. ft
Screen Length: 77. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.001763 cm/sec
Kz/Kr = 0.1023
Ss = 0.000343 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn4\twn4br.aqt
Date: 11/12/09 Time: 11:51:20

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-4

AQUIFER DATA

Saturated Thickness: 85. ft Anisotropy Ratio (Kz/Kr): 0.1023

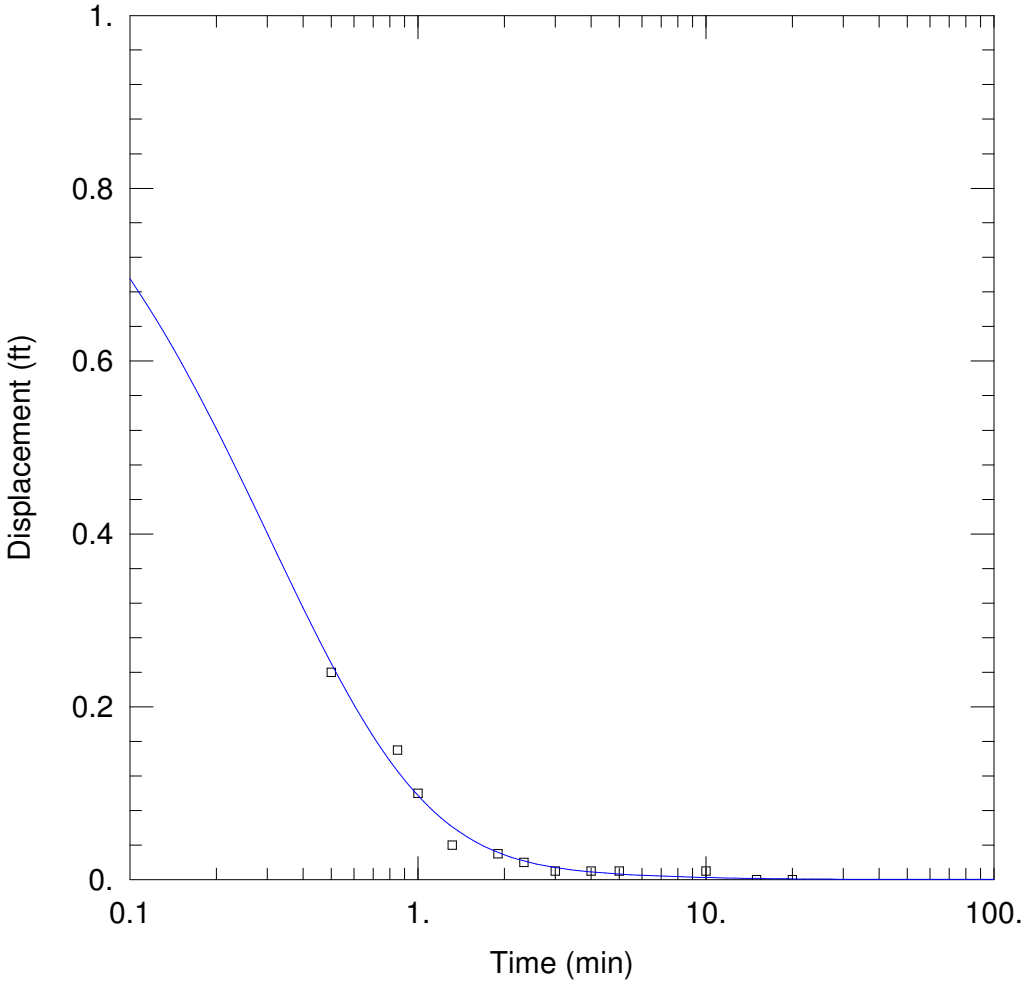
WELL DATA (twn4)

Initial Displacement: 1. ft Static Water Column Height: 85. ft
Total Well Penetration Depth: 85. ft Screen Length: 77. ft
Casing Radius: 0.167 ft Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 2.794E-5 cm/sec y0 = 0.01803 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn4\twn4h.aqt
Date: 11/12/09 Time: 11:51:39

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-4

AQUIFER DATA

Saturated Thickness: 85. ft

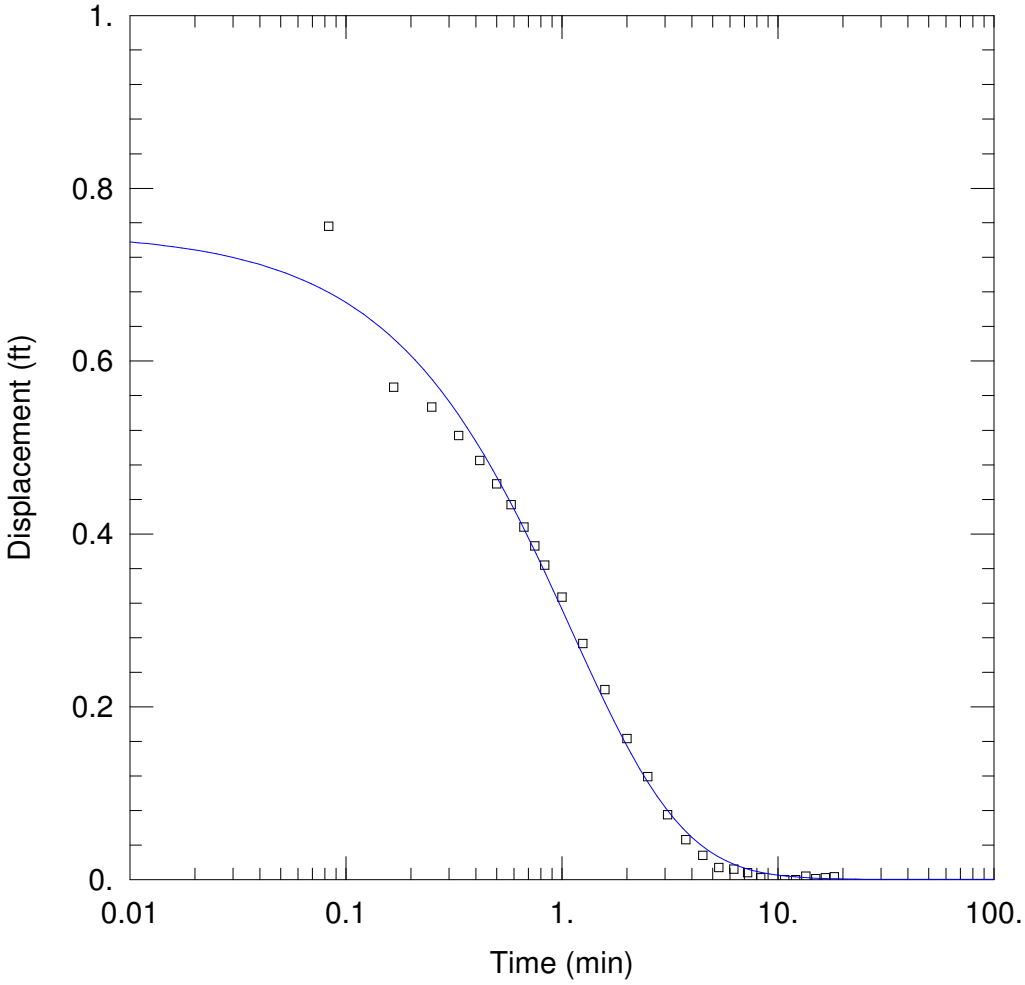
WELL DATA (twn4)

Initial Displacement: 1. ft
Total Well Penetration Depth: 85. ft
Casing Radius: 0.167 ft
Static Water Column Height: 85. ft
Screen Length: 77. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.001257 cm/sec
Kz/Kr = 0.1023
Ss = 1.844E-6 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn5\twn5.aqt
Date: 11/12/09 Time: 11:52:23

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-5

AQUIFER DATA

Saturated Thickness: 77. ft

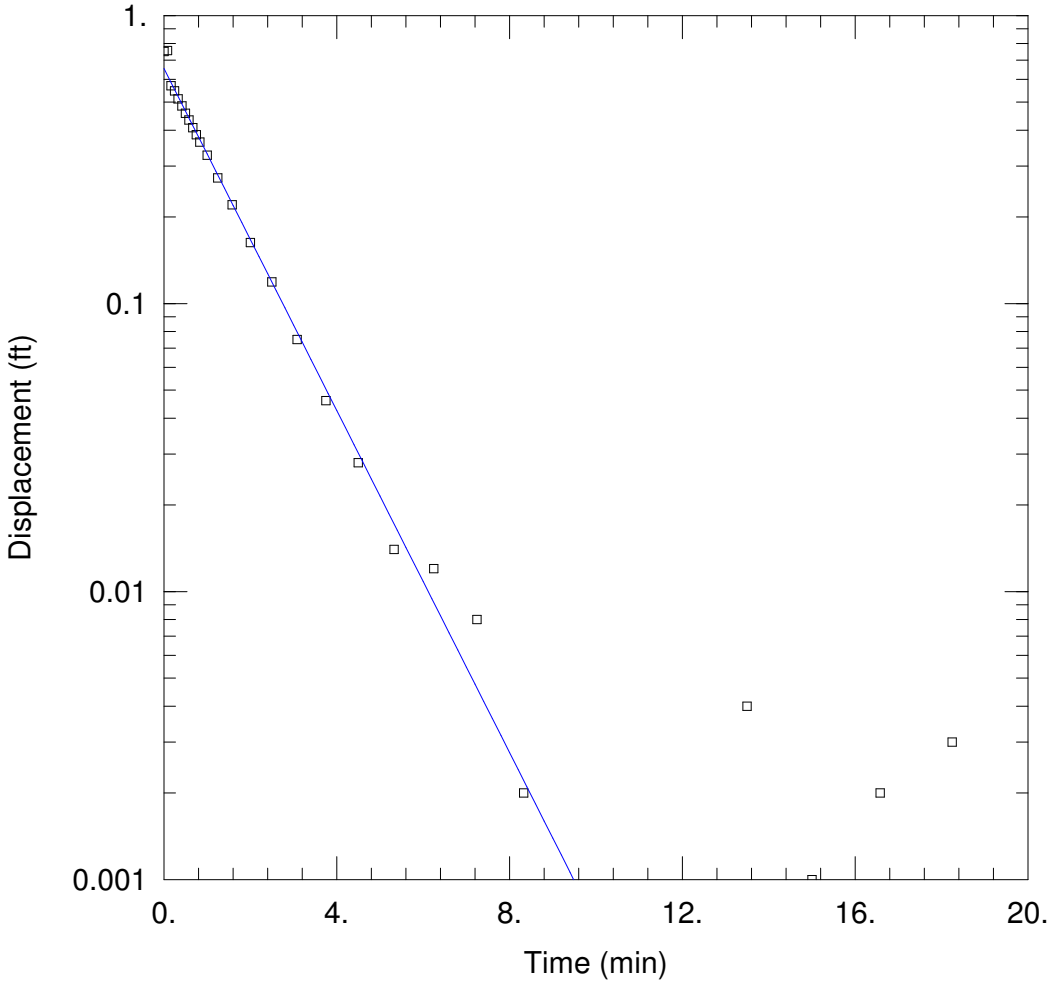
WELL DATA (twn5)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 77. ft
Casing Radius: 0.167 ft
Static Water Column Height: 77. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0004878 cm/sec
Kz/Kr = 0.1
Ss = 3.884E-7 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn5\twn5br.aqt
Date: 11/12/09 Time: 11:52:51

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-5

AQUIFER DATA

Saturated Thickness: 77. ft Anisotropy Ratio (Kz/Kr): 0.1

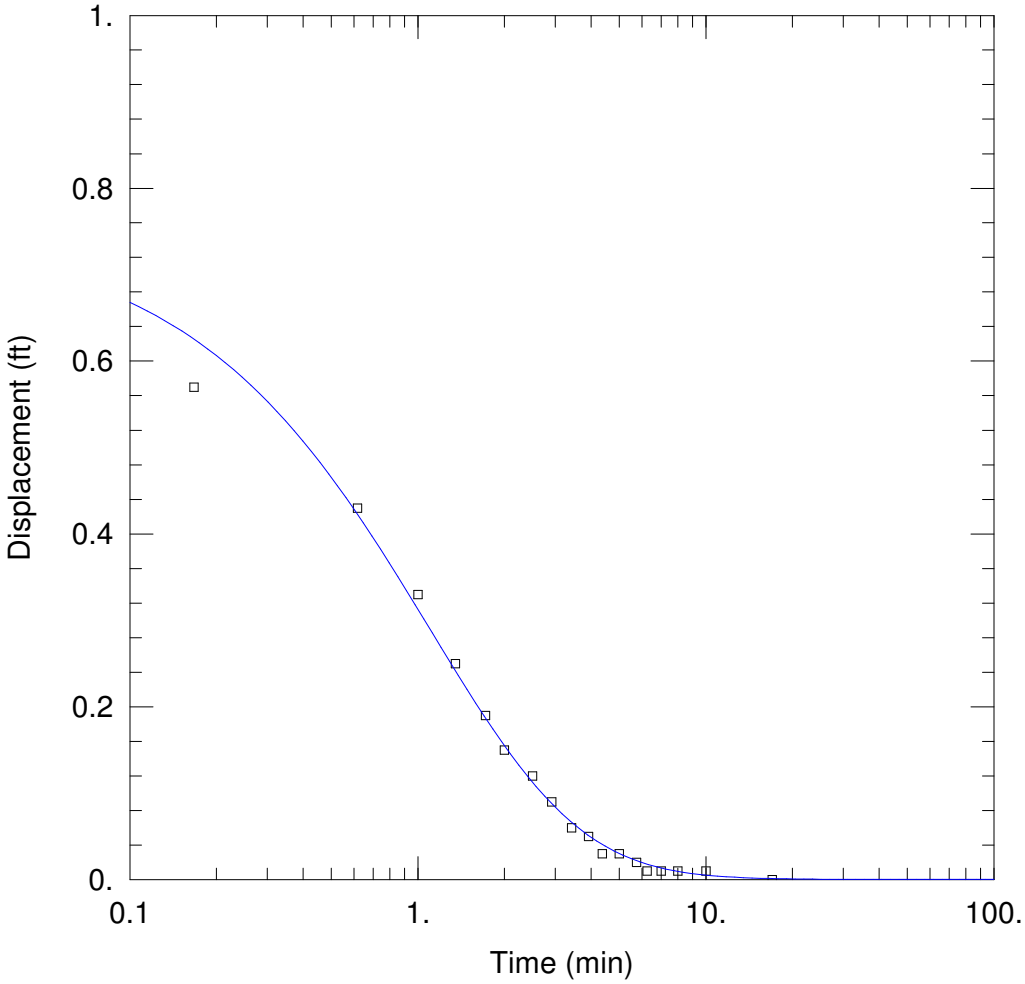
WELL DATA (twn5)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 77. ft
Casing Radius: 0.167 ft
Static Water Column Height: 77. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0004057 cm/sec
y0 = 0.6545 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn5\twn5h.aqt
Date: 11/12/09 Time: 11:53:06

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-5

AQUIFER DATA

Saturated Thickness: 77. ft

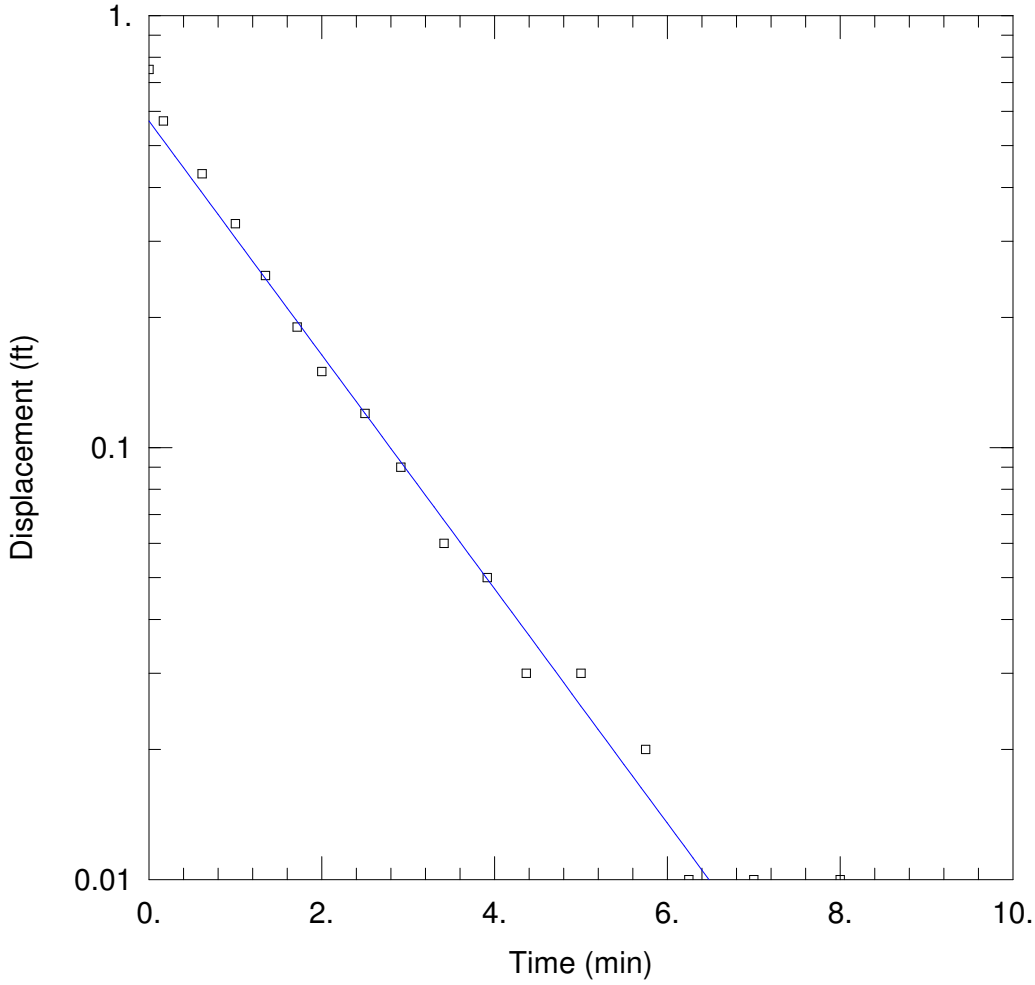
WELL DATA (twn5)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 77. ft
Casing Radius: 0.167 ft
Static Water Column Height: 77. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0004878 cm/sec
Kz/Kr = 0.1
Ss = 3.884E-7 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn5\twn5hbr.aqt
Date: 11/12/09 Time: 11:53:20

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-5

AQUIFER DATA

Saturated Thickness: 77. ft Anisotropy Ratio (Kz/Kr): 0.1

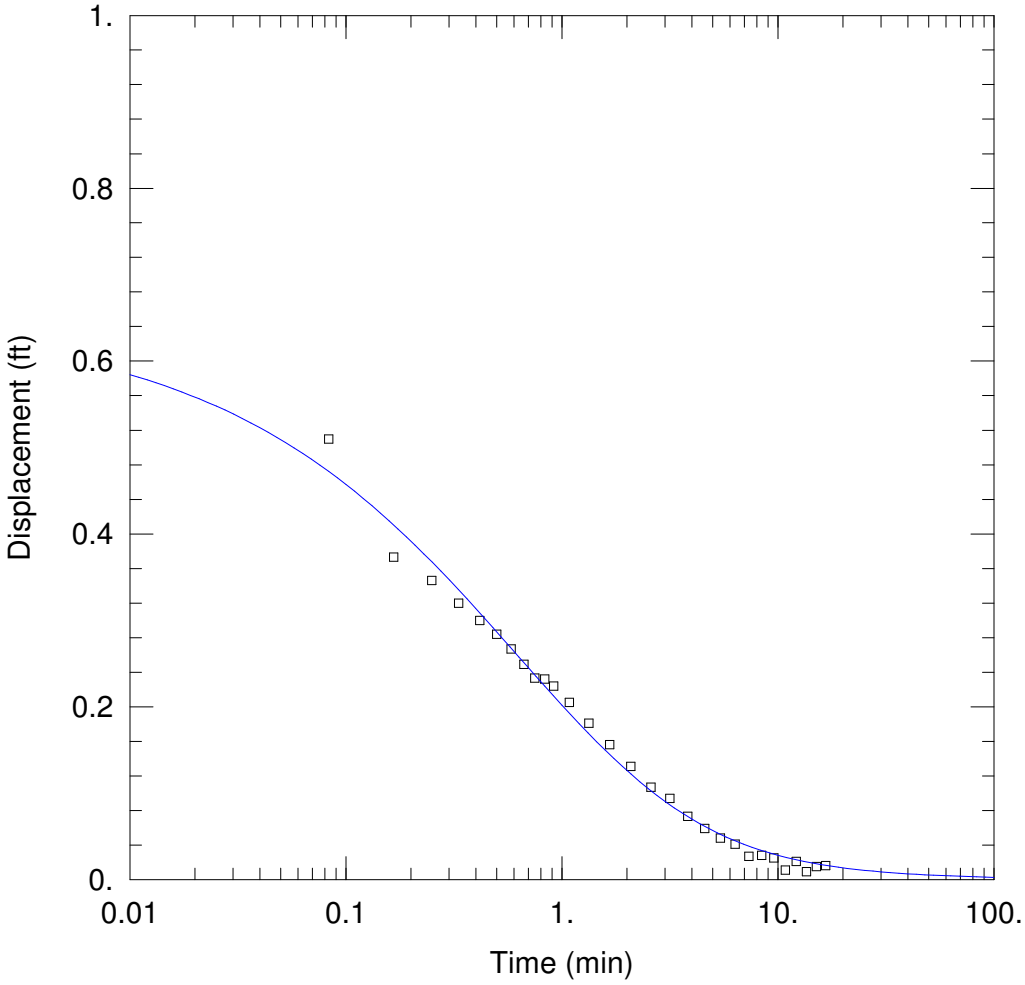
WELL DATA (twn5)

Initial Displacement: 0.75 ft Static Water Column Height: 77. ft
Total Well Penetration Depth: 77. ft Screen Length: 67. ft
Casing Radius: 0.167 ft Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00037 cm/sec y0 = 0.57 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn6\twn6.aqt
Date: 11/12/09 Time: 11:53:41

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-6

AQUIFER DATA

Saturated Thickness: 52. ft

WELL DATA (twn6)

Initial Displacement: 0.65 ft
Total Well Penetration Depth: 52. ft
Casing Radius: 0.167 ft

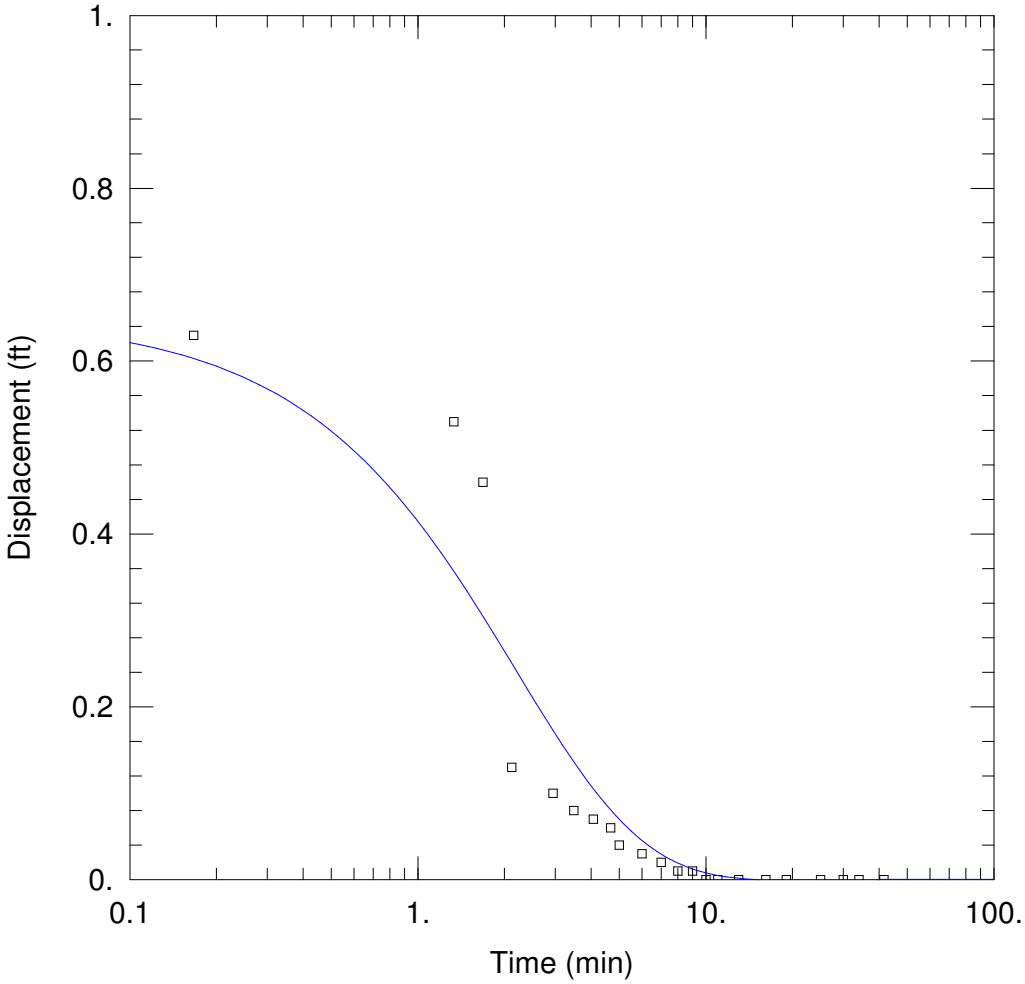
Static Water Column Height: 52. ft
Screen Length: 52. ft
Well Radius: 0.28 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0001743 cm/sec
Kz/Kr = 0.1

Ss = 0.002215 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn6\twn6h.aqt
Date: 11/12/09 Time: 11:53:56

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-6

AQUIFER DATA

Saturated Thickness: 52. ft

WELL DATA (twn6)

Initial Displacement: 0.65 ft
Total Well Penetration Depth: 52. ft
Casing Radius: 0.167 ft

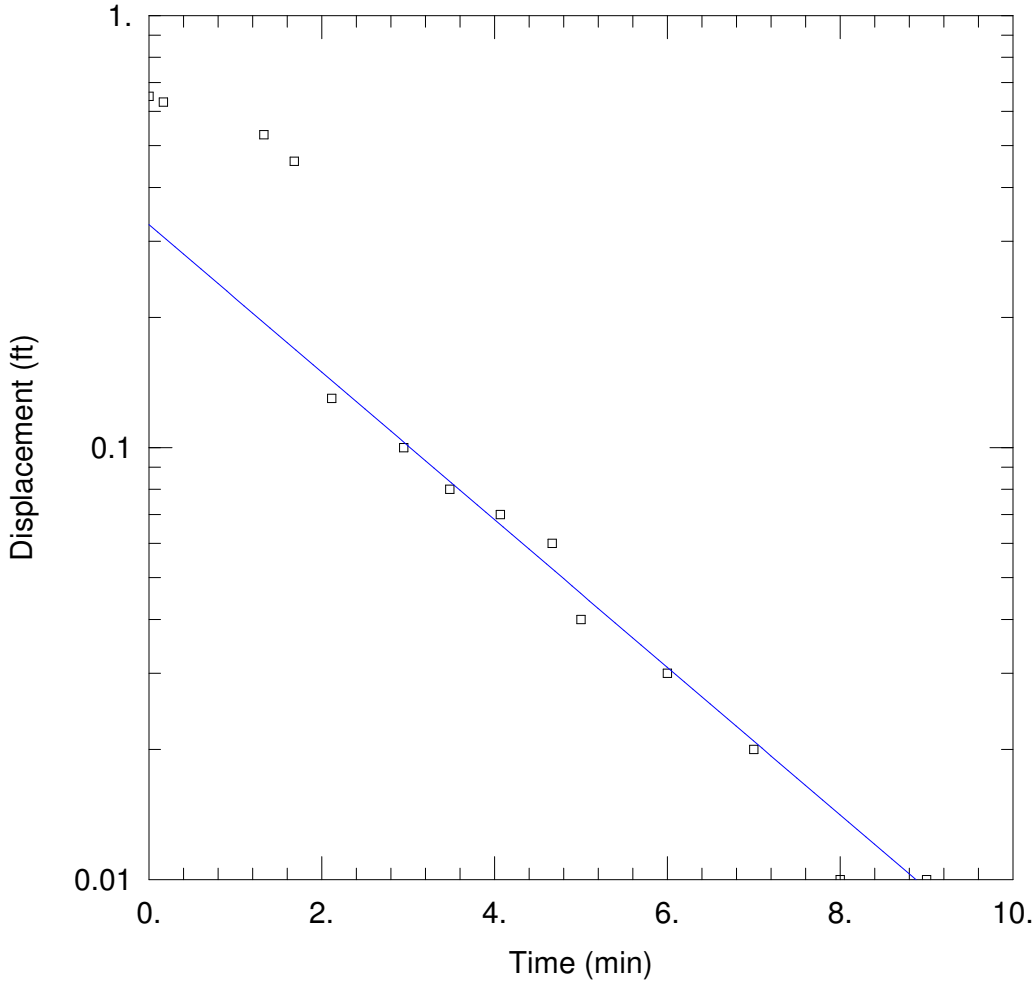
Static Water Column Height: 52. ft
Screen Length: 52. ft
Well Radius: 0.28 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0003495 cm/sec
Kz/Kr = 0.1

Ss = 2.215E-12 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn6\twn6hbr.aqt
Date: 11/12/09 Time: 11:54:07

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-6

AQUIFER DATA

Saturated Thickness: 52. ft
Anisotropy Ratio (Kz/Kr): 0.1

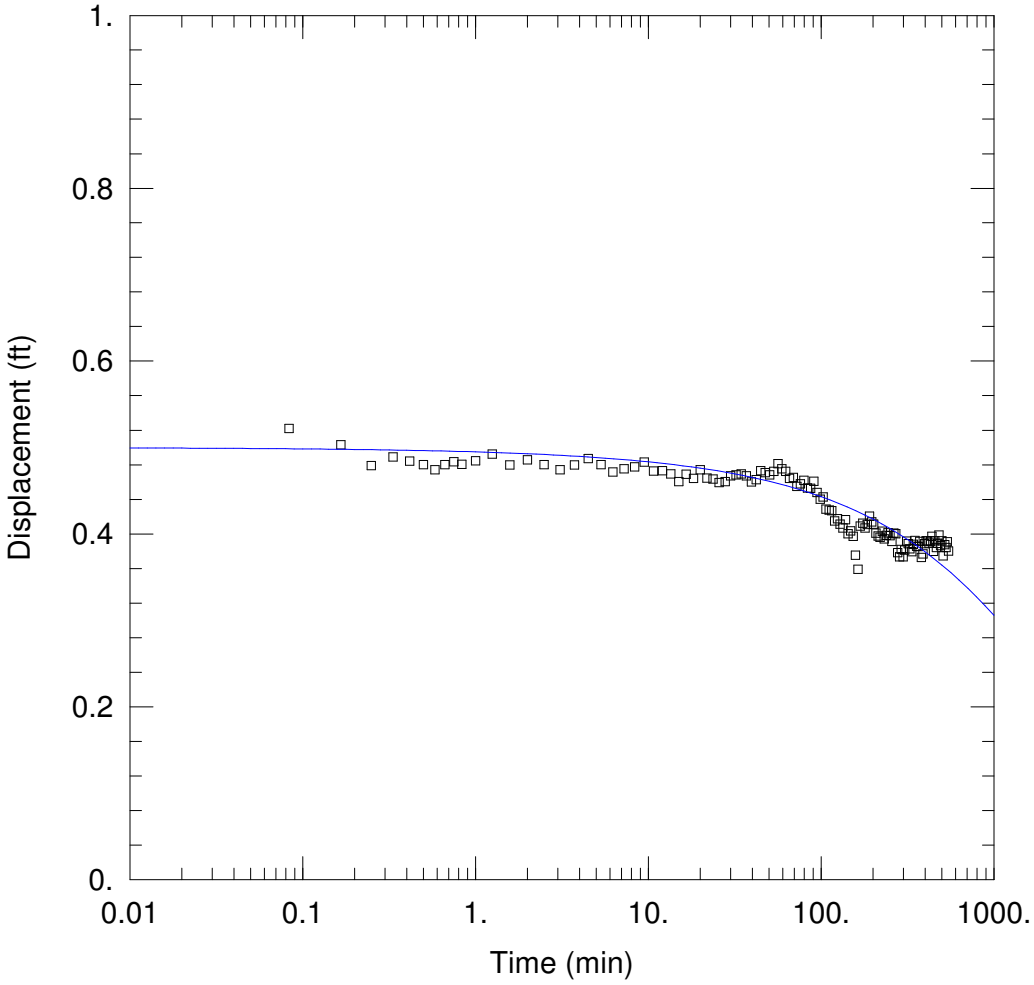
WELL DATA (twn6)

Initial Displacement: 0.65 ft
Total Well Penetration Depth: 52. ft
Casing Radius: 0.167 ft
Static Water Column Height: 52. ft
Screen Length: 52. ft
Well Radius: 0.28 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0003358 cm/sec
y0 = 0.328 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn7\twn7c.aqt
Date: 11/12/09 Time: 11:55:24

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-7

AQUIFER DATA

Saturated Thickness: 11. ft

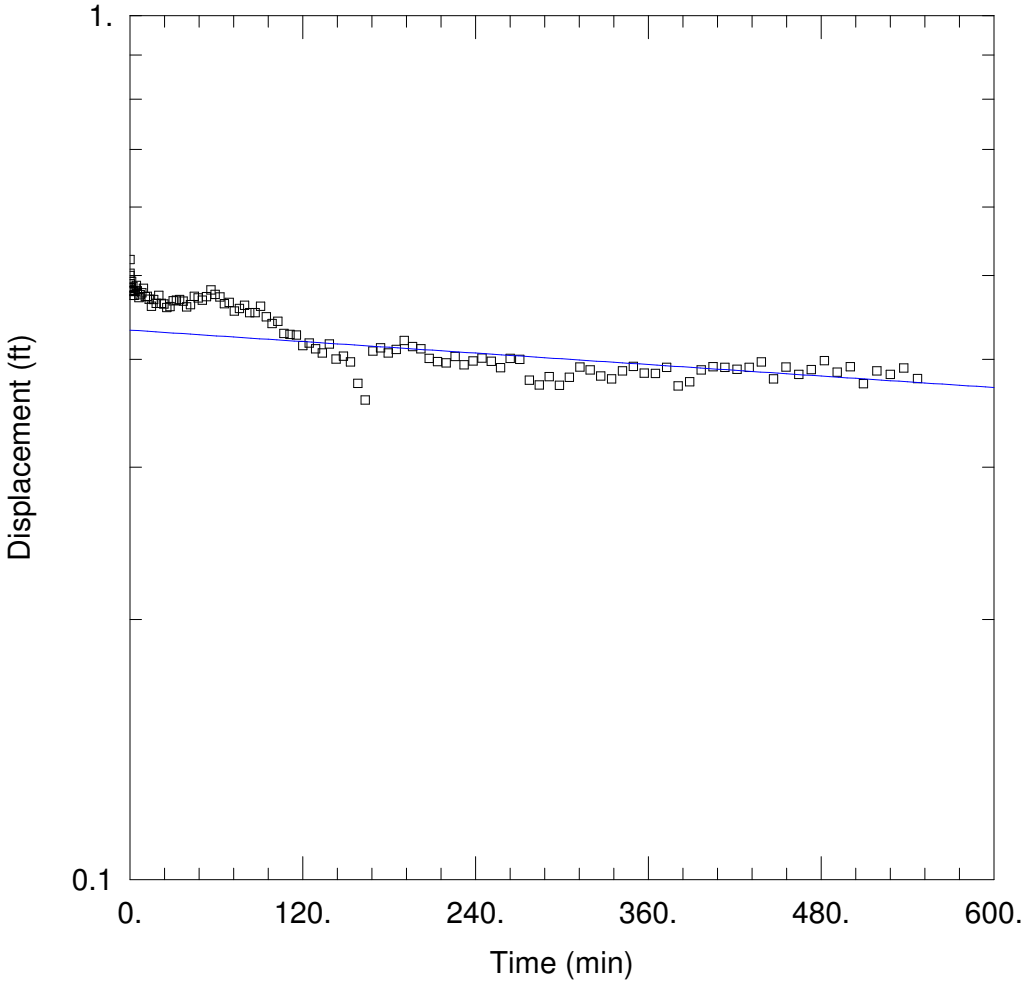
WELL DATA (twn7)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 11. ft
Casing Radius: 0.167 ft
Static Water Column Height: 11. ft
Screen Length: 11. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 3.573E-7 cm/sec
Kz/Kr = 0.1
Ss = 0.002215 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn7\twn7cbr.aqt
Date: 11/12/09 Time: 11:55:37

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-7

AQUIFER DATA

Saturated Thickness: 11. ft Anisotropy Ratio (Kz/Kr): 0.1

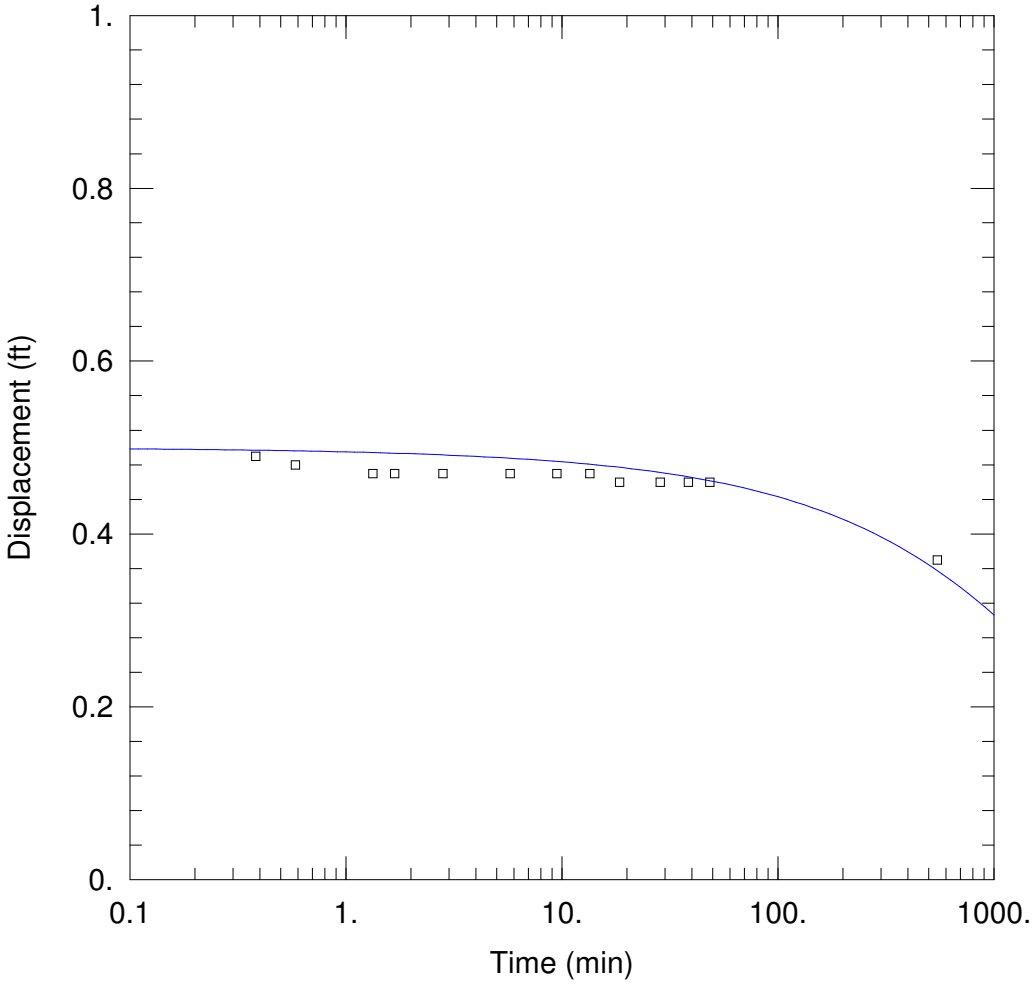
WELL DATA (twn7)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 11. ft
Casing Radius: 0.167 ft
Static Water Column Height: 11. ft
Screen Length: 11. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 4.595E-7 cm/sec
y0 = 0.4324 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn7\twn7hc.aqt
Date: 11/12/09 Time: 11:56:10

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-7

AQUIFER DATA

Saturated Thickness: 11. ft

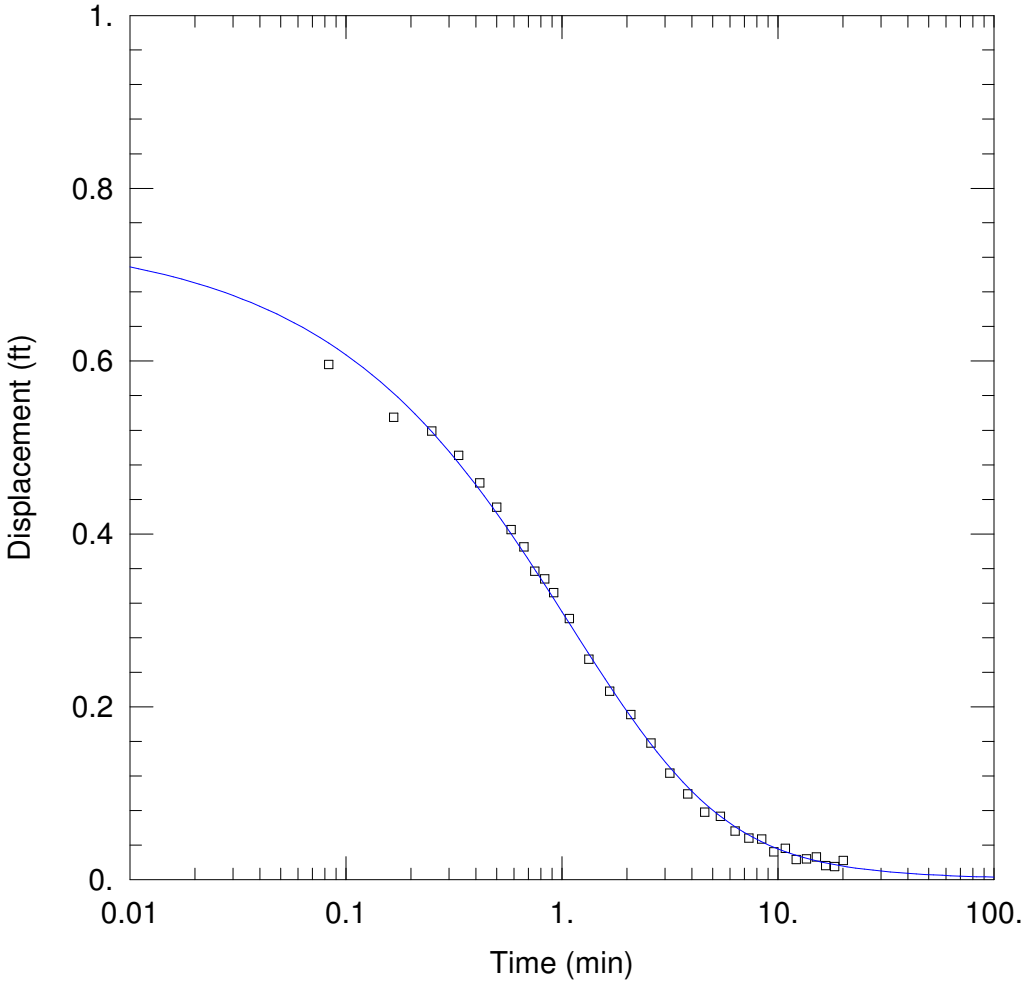
WELL DATA (twn7)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 11. ft
Casing Radius: 0.167 ft
Static Water Column Height: 11. ft
Screen Length: 11. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 3.573E-7 cm/sec
Kz/Kr = 0.1
Ss = 0.002215 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn8\twn8.aqt
Date: 11/12/09 Time: 11:57:13

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-8

AQUIFER DATA

Saturated Thickness: 80. ft

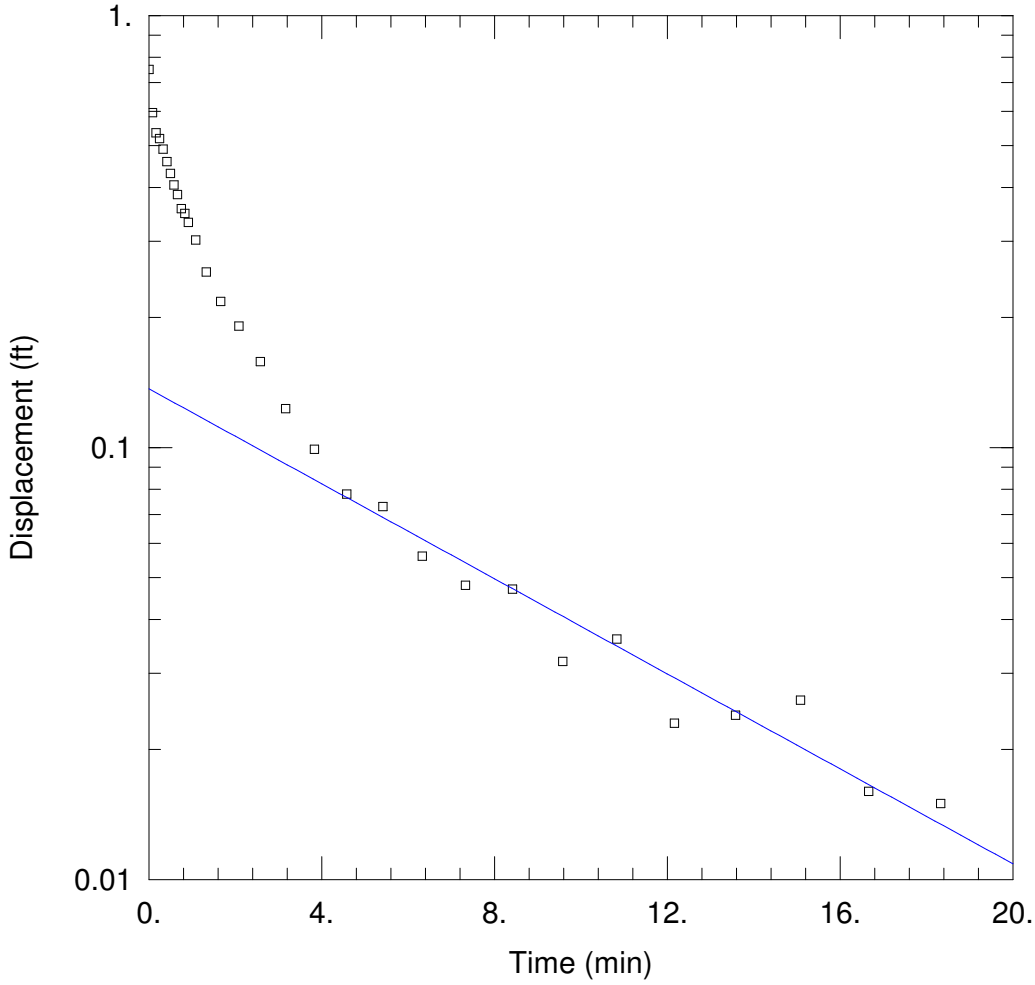
WELL DATA (twn8)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 80. ft
Casing Radius: 0.167 ft
Static Water Column Height: 80. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0001506 cm/sec
Kz/Kr = 0.1
Ss = 0.0003657 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn8\twn8br.aqt
Date: 11/12/09 Time: 11:57:25

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-8

AQUIFER DATA

Saturated Thickness: 80. ft Anisotropy Ratio (Kz/Kr): 0.1

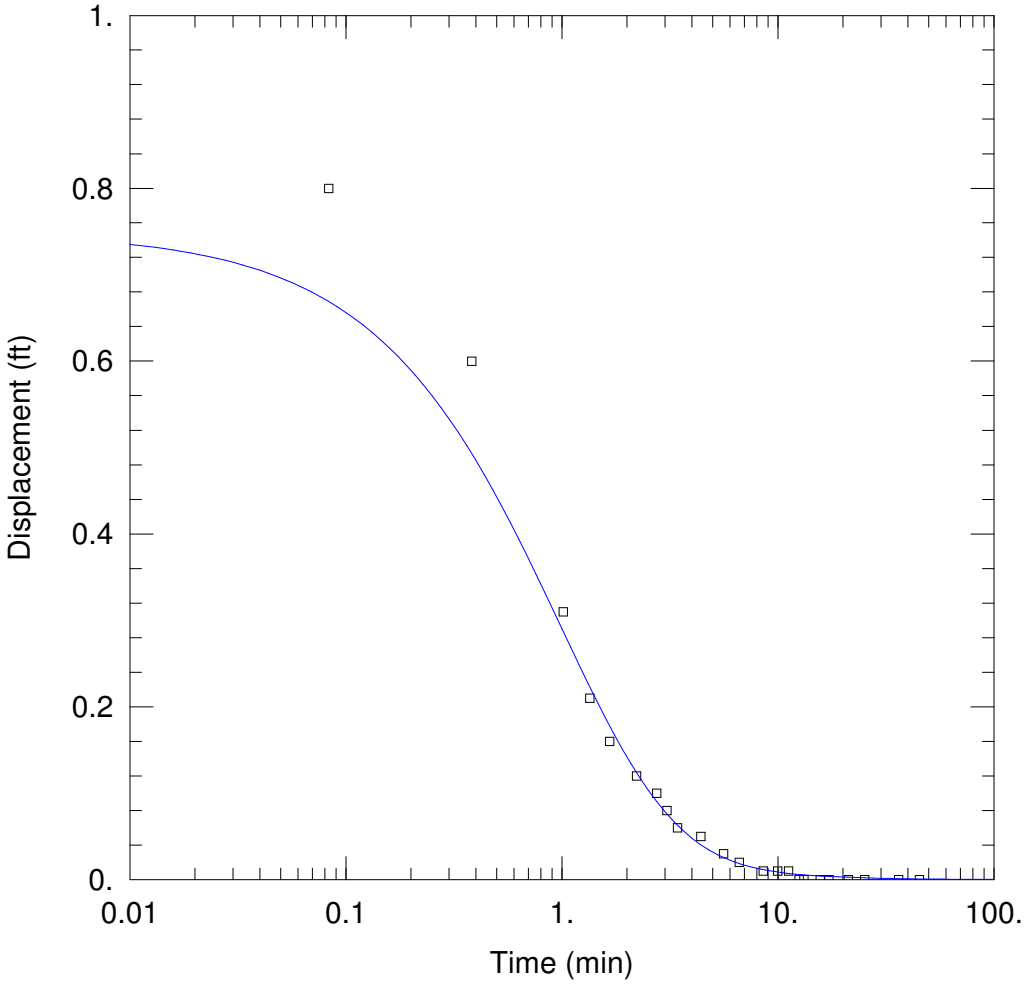
WELL DATA (twn8)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 80. ft
Casing Radius: 0.167 ft
Static Water Column Height: 80. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 7.55E-5 cm/sec
y0 = 0.1367 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn8\twn8h.aqt
Date: 11/12/09 Time: 11:59:32

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-8

AQUIFER DATA

Saturated Thickness: 80. ft

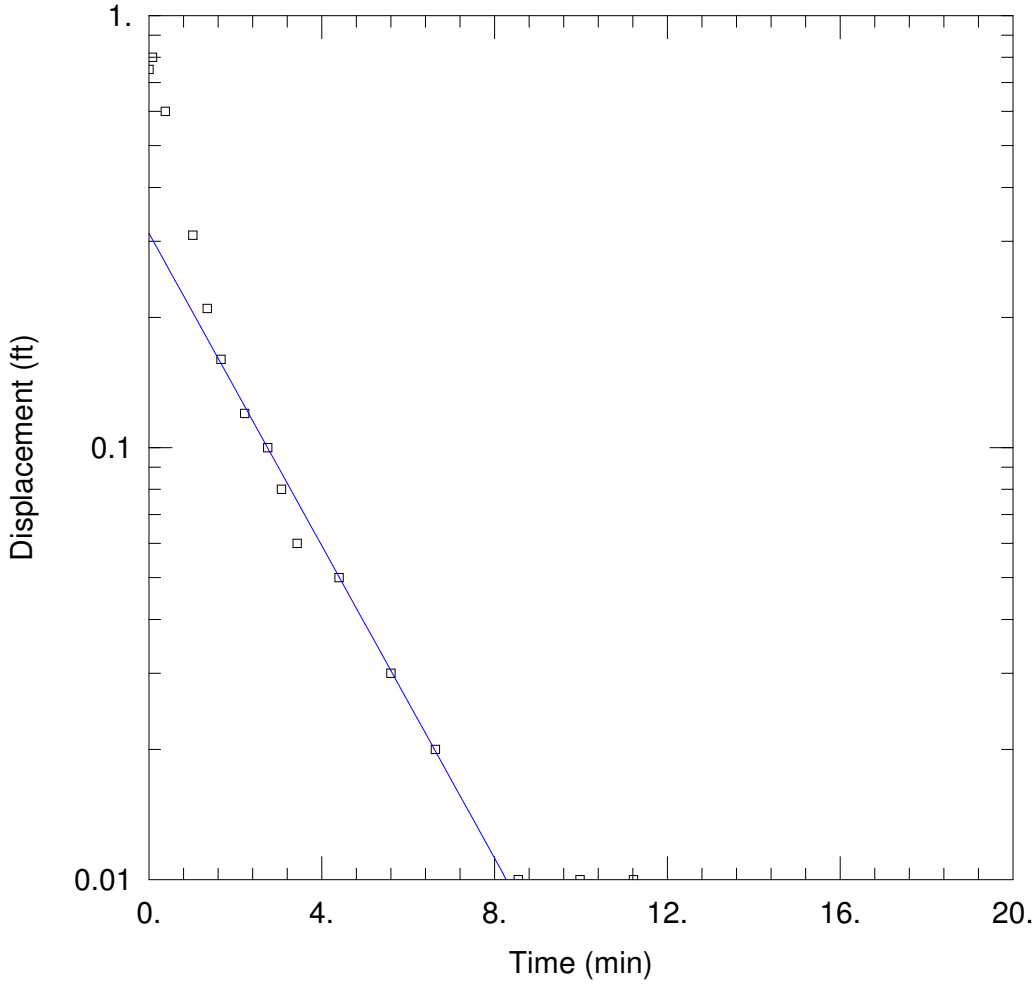
WELL DATA (twn8)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 80. ft
Casing Radius: 0.167 ft
Static Water Column Height: 80. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0004733 cm/sec
Kz/Kr = 0.1
Ss = 1.413E-6 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn8\twn8hbr.aqt
Date: 11/12/09 Time: 11:59:47

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-8

AQUIFER DATA

Saturated Thickness: 80. ft Anisotropy Ratio (Kz/Kr): 0.1

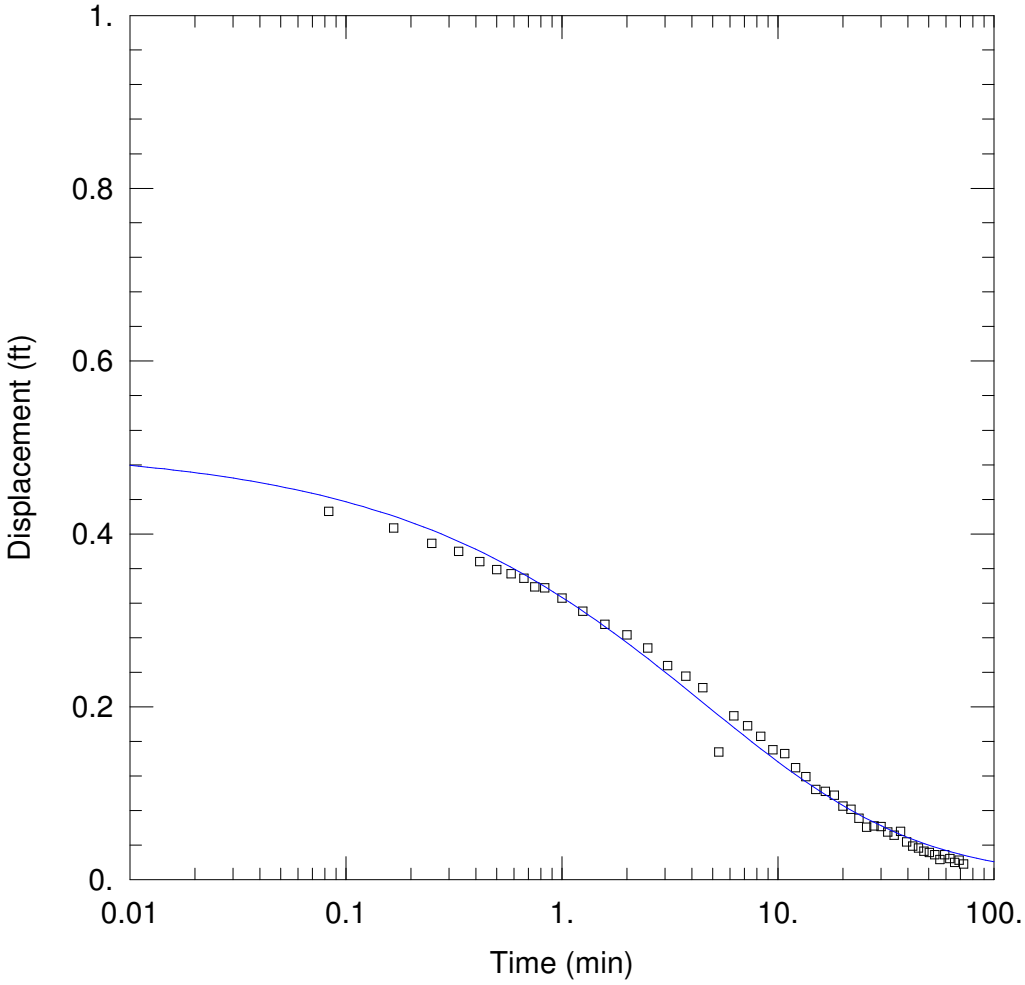
WELL DATA (twn8)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 80. ft
Casing Radius: 0.167 ft
Static Water Column Height: 80. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0002484 cm/sec
y0 = 0.3132 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn9\twn9c.aqt
Date: 11/12/09 Time: 12:00:39

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-9

AQUIFER DATA

Saturated Thickness: 29. ft

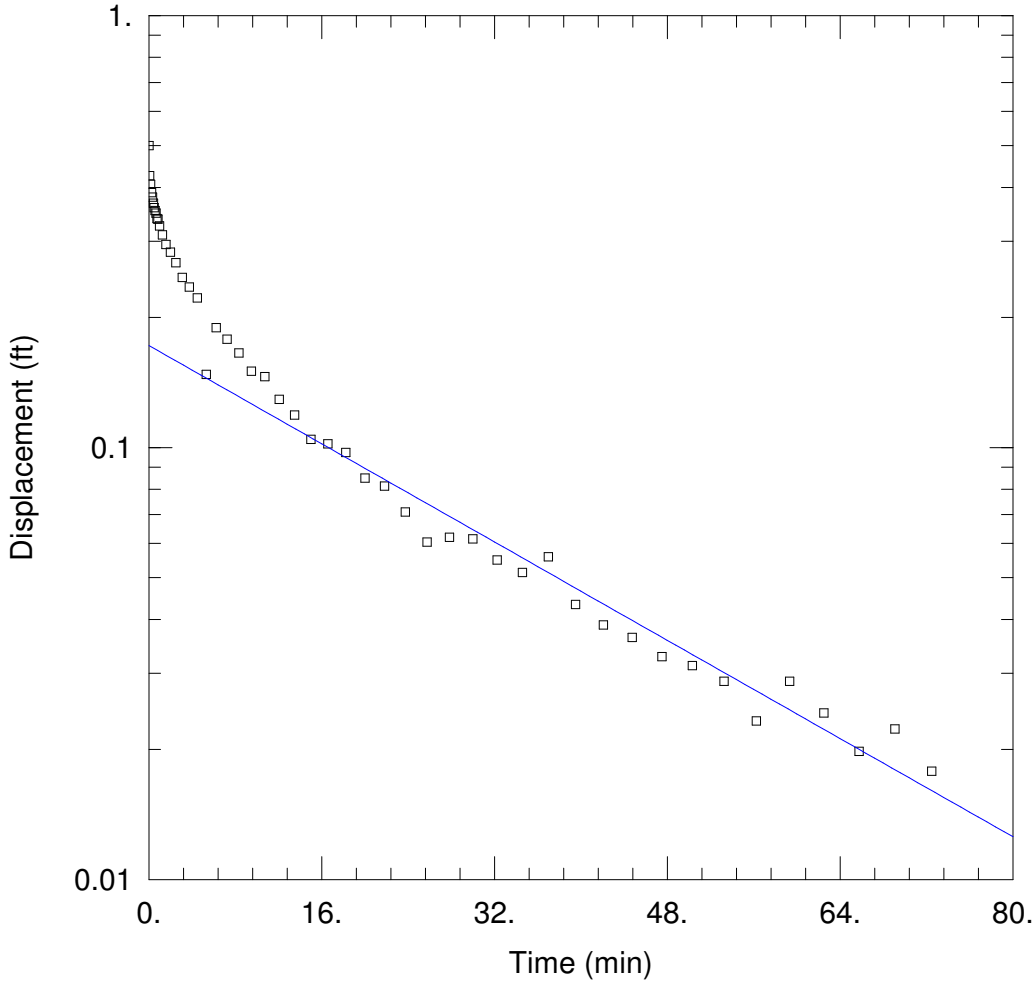
WELL DATA (twn9)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 29. ft
Casing Radius: 0.167 ft
Static Water Column Height: 29. ft
Screen Length: 29. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2.989E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.006923 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn9\twn9cbr.aqt
Date: 11/12/09 Time: 12:00:55

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-9

AQUIFER DATA

Saturated Thickness: 29. ft Anisotropy Ratio (Kz/Kr): 0.1

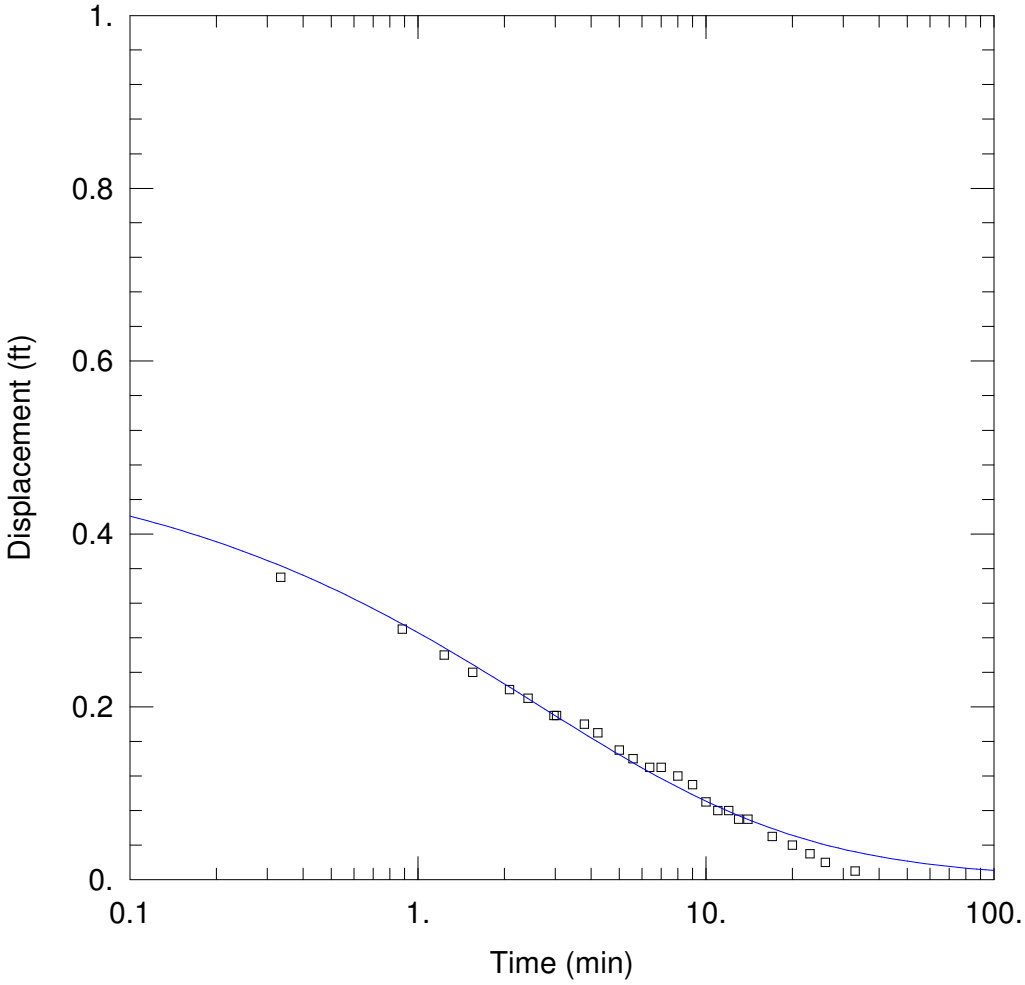
WELL DATA (twn9)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 29. ft
Casing Radius: 0.167 ft
Static Water Column Height: 29. ft
Screen Length: 29. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 2.855E-5 cm/sec
y0 = 0.1721 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn9\twn9h.aqt
Date: 11/12/09 Time: 12:01:11

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-9

AQUIFER DATA

Saturated Thickness: 29. ft

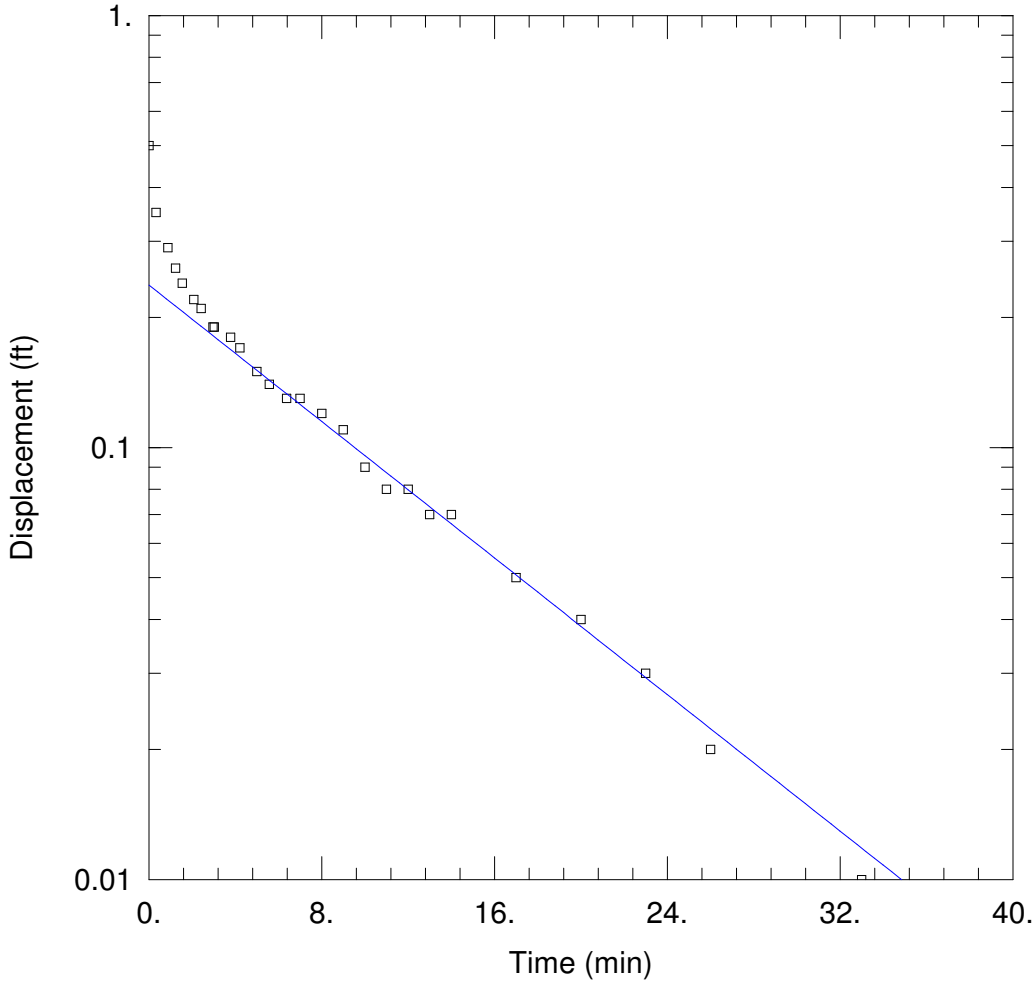
WELL DATA (twn9)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 29. ft
Casing Radius: 0.167 ft
Static Water Column Height: 29. ft
Screen Length: 29. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 6.017E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.005586 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn9\twn9hbr.aqt
Date: 11/12/09 Time: 12:01:24

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-9

AQUIFER DATA

Saturated Thickness: 29. ft Anisotropy Ratio (Kz/Kr): 0.1

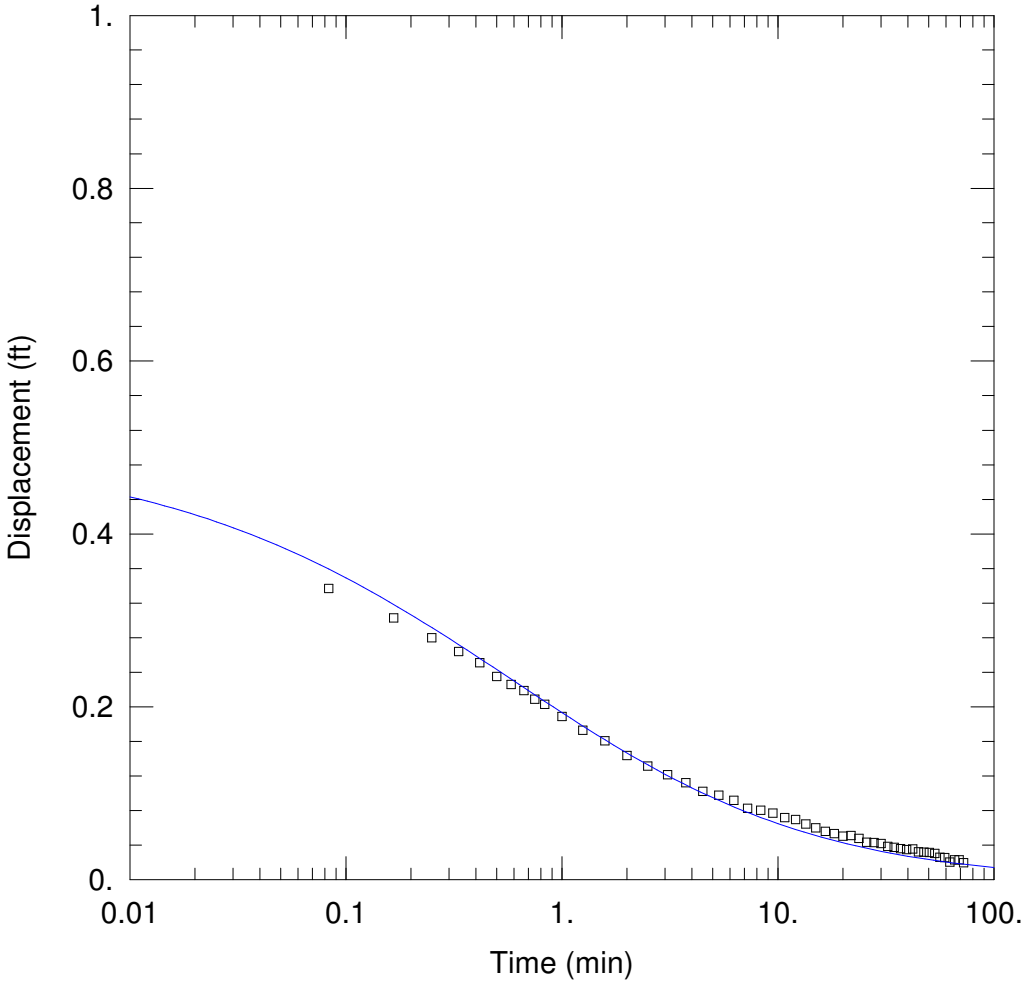
WELL DATA (twn9)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 29. ft
Casing Radius: 0.167 ft
Static Water Column Height: 29. ft
Screen Length: 29. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 7.932E-5 cm/sec
y0 = 0.2376 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn10\twn10c.aqt
Date: 11/12/09 Time: 12:06:05

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-10

AQUIFER DATA

Saturated Thickness: 20. ft

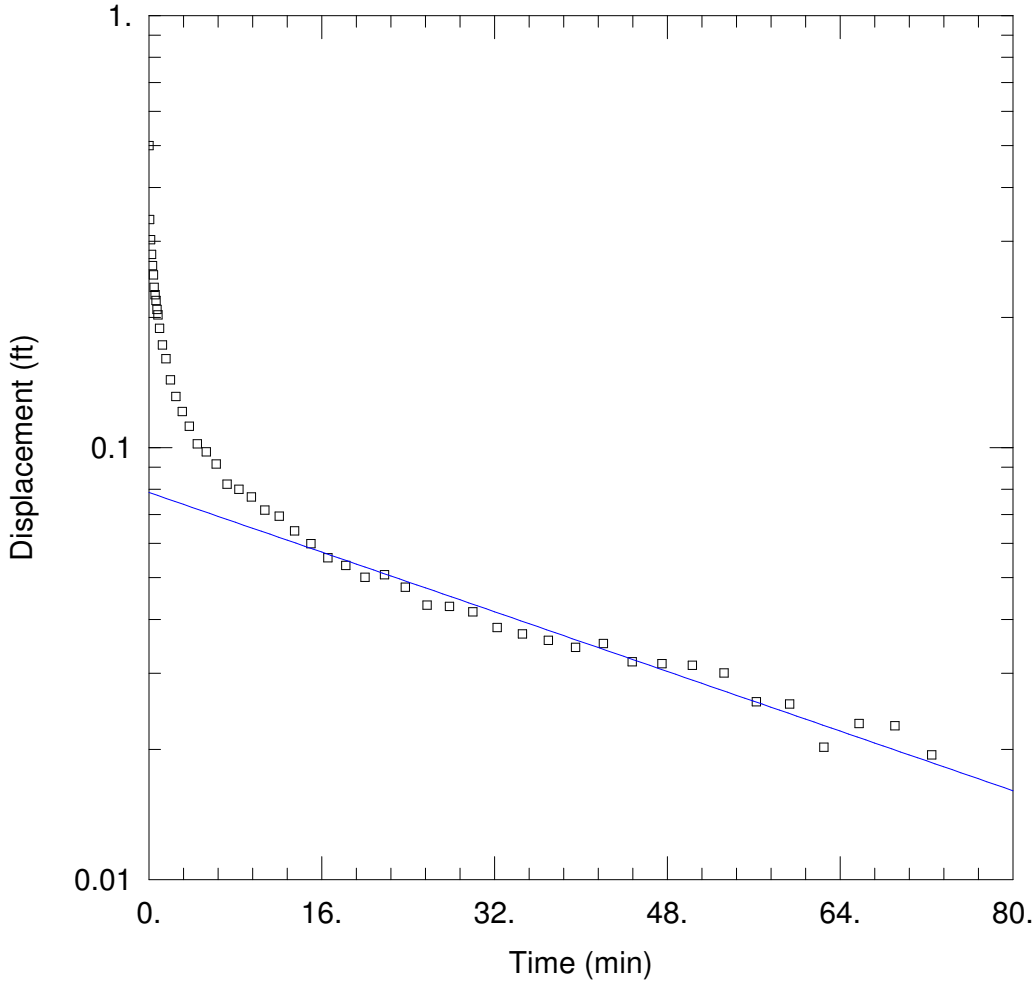
WELL DATA (twn10)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.167 ft
Static Water Column Height: 20. ft
Screen Length: 20. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 3.827E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.1 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn10\twn10cbr.aqt
Date: 11/12/09 Time: 12:06:20

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-10

AQUIFER DATA

Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 0.1

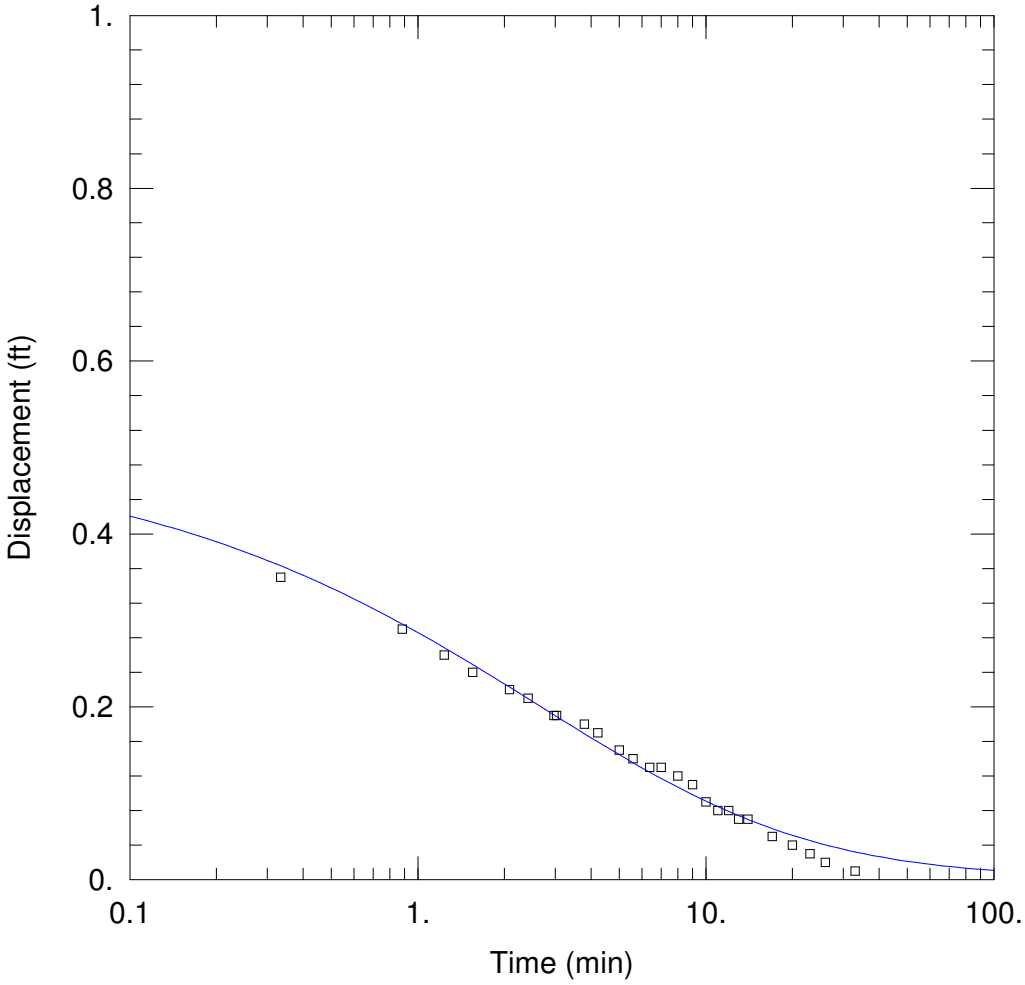
WELL DATA (twn10)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.167 ft
Static Water Column Height: 20. ft
Screen Length: 20. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 2.306E-5 cm/sec
y0 = 0.07868 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn10\twn10h.aqt
Date: 11/12/09 Time: 12:07:32

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-10

AQUIFER DATA

Saturated Thickness: 20. ft

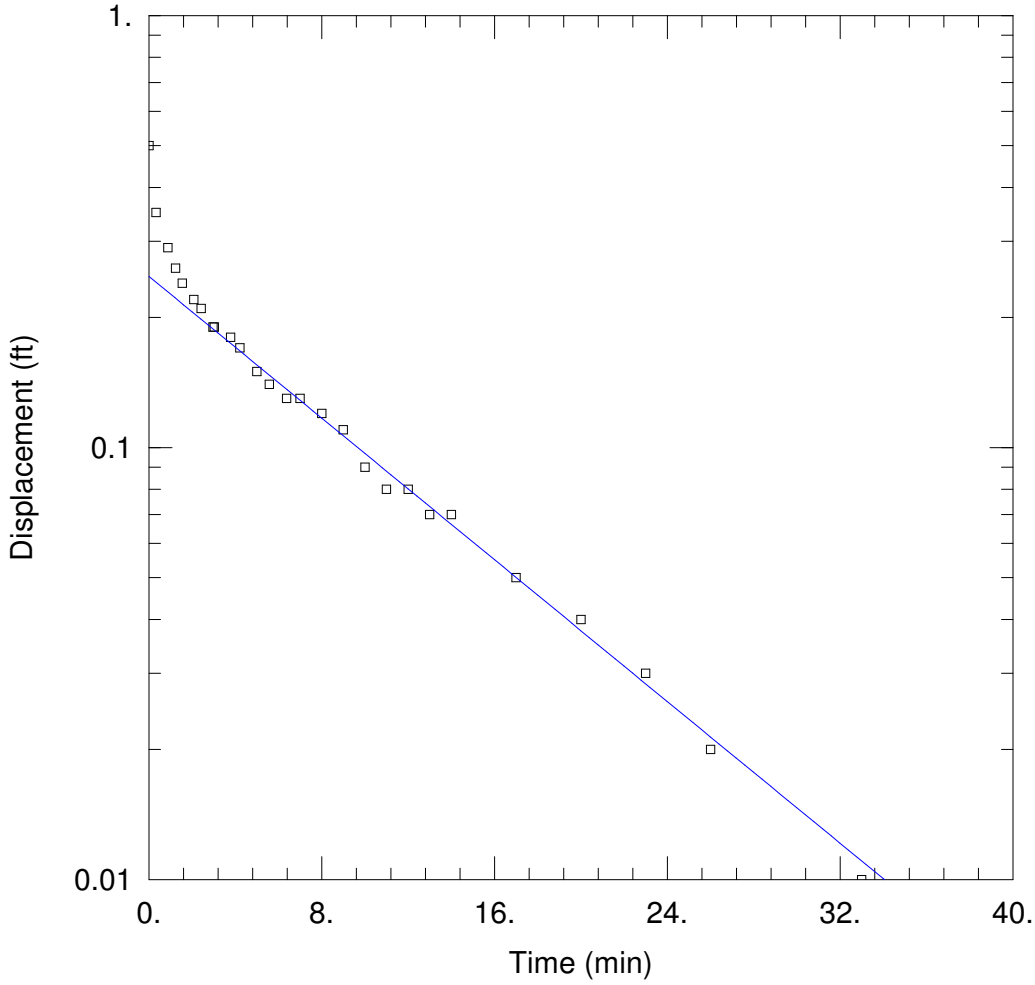
WELL DATA (twn10)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.167 ft
Static Water Column Height: 29. ft
Screen Length: 20. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 8.702E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.008127 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn10\twn10hbr.aqt
Date: 11/12/09 Time: 12:07:45

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-10

AQUIFER DATA

Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 0.1

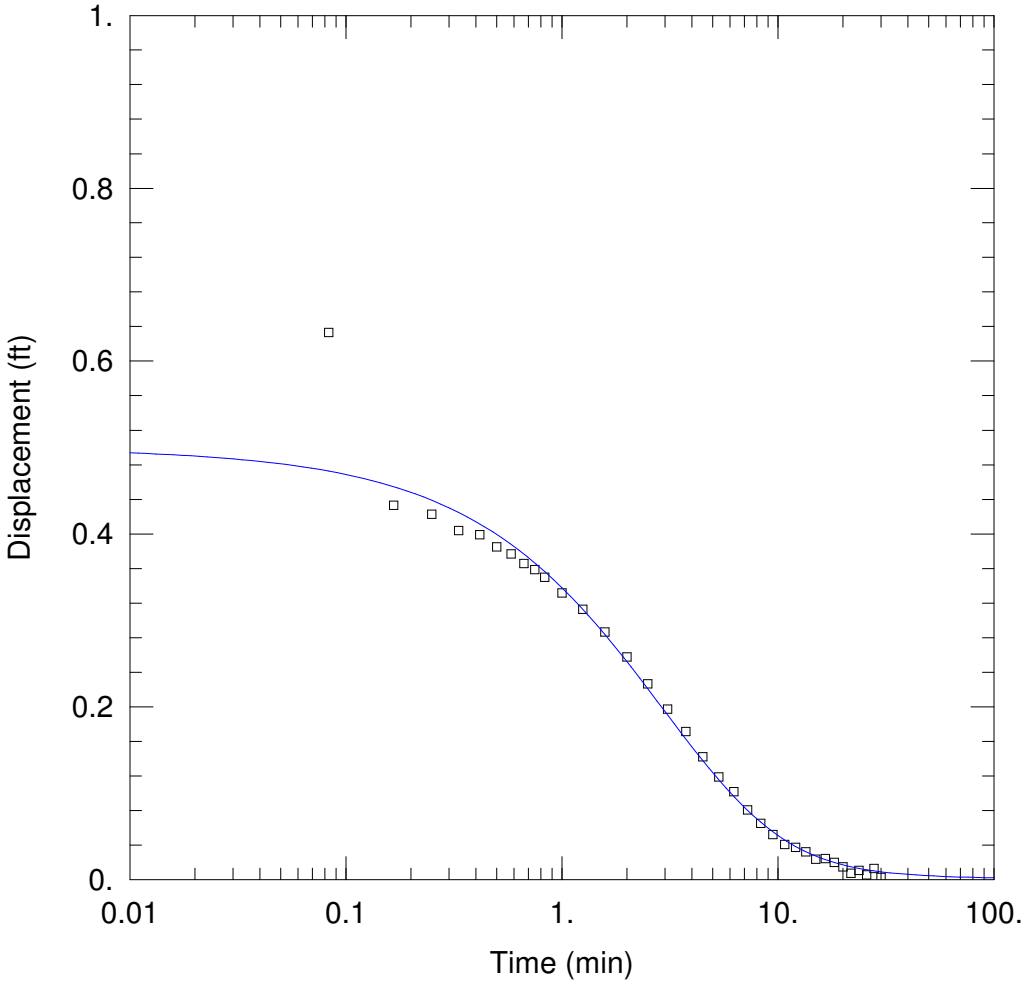
WELL DATA (twn10)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.167 ft
Static Water Column Height: 29. ft
Screen Length: 20. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001096 cm/sec
y0 = 0.2488 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn11\twn11c.aqt
Date: 11/12/09 Time: 12:08:09

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-11

AQUIFER DATA

Saturated Thickness: 68. ft

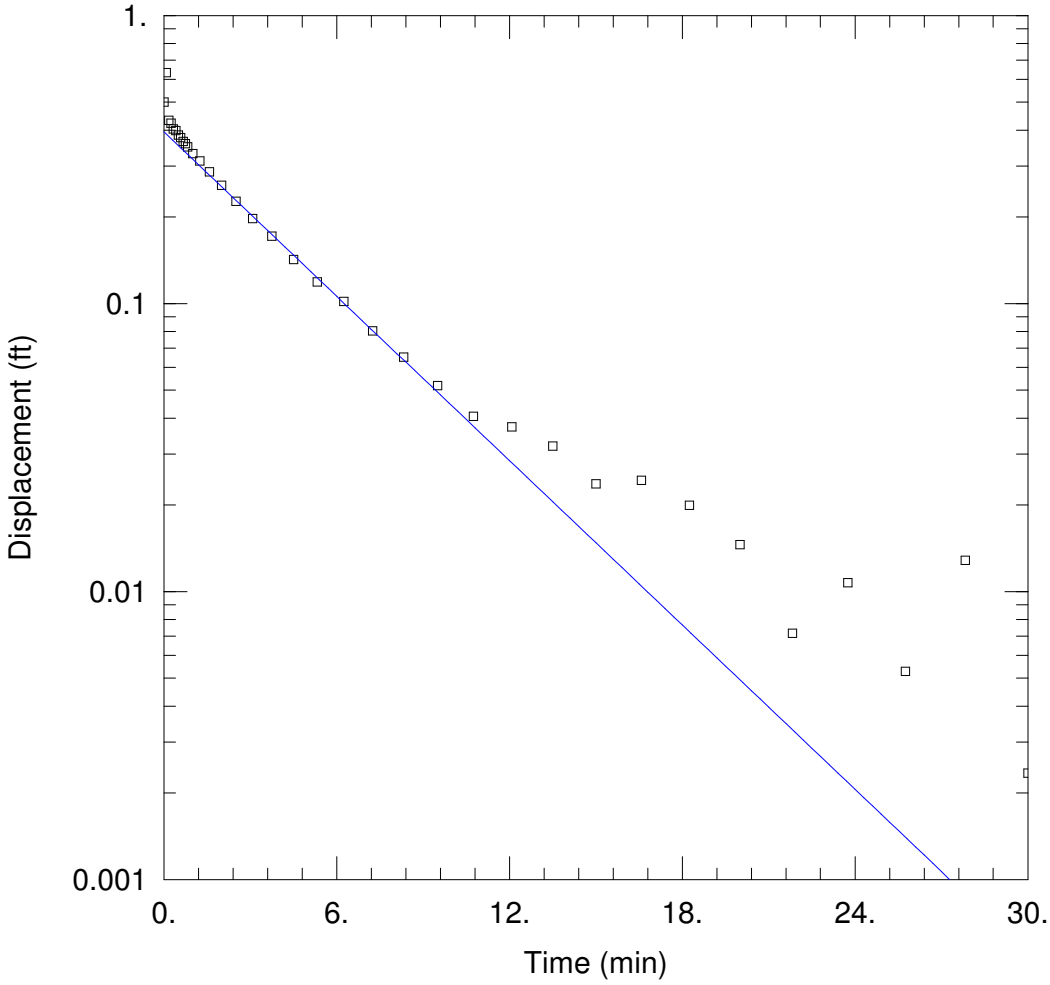
WELL DATA (twn11)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 68. ft
Casing Radius: 0.167 ft
Static Water Column Height: 68. ft
Screen Length: 68. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0001182 cm/sec
Kz/Kr = 0.1
Ss = 1.079E-5 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn11\twn11cbr.aqt
Date: 11/12/09 Time: 12:09:01

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-11

AQUIFER DATA

Saturated Thickness: 68. ft Anisotropy Ratio (Kz/Kr): 0.1

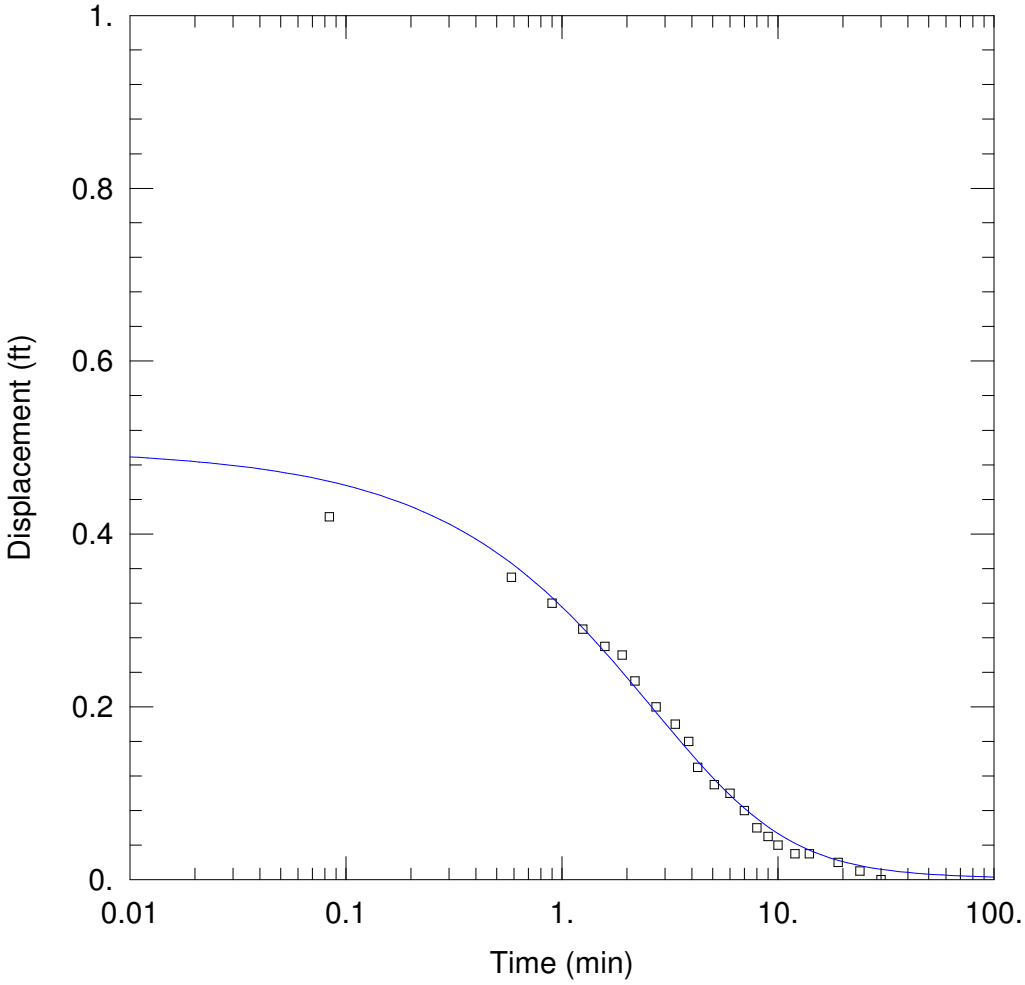
WELL DATA (twn11)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 68. ft
Casing Radius: 0.167 ft
Static Water Column Height: 68. ft
Screen Length: 68. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 9.833E-5 cm/sec
y0 = 0.3944 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn11\twn11h.aqt
Date: 11/12/09 Time: 12:09:16

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-11

AQUIFER DATA

Saturated Thickness: 68. ft

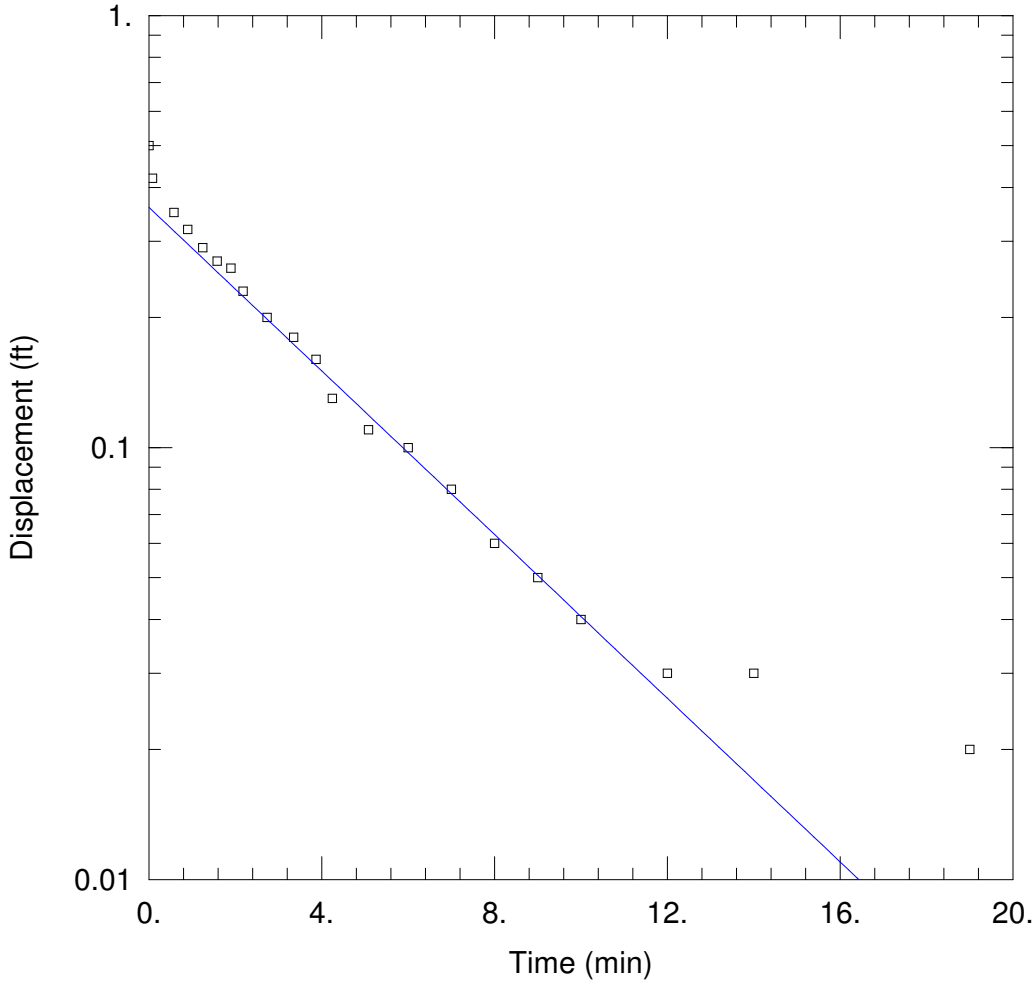
WELL DATA (twn11)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 68. ft
Casing Radius: 0.167 ft
Static Water Column Height: 68. ft
Screen Length: 68. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 9.344E-5 cm/sec
Kz/Kr = 0.1
Ss = 7.177E-5 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn11\twn11hbr.aqt
Date: 11/12/09 Time: 12:09:29

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-11

AQUIFER DATA

Saturated Thickness: 68. ft Anisotropy Ratio (Kz/Kr): 0.1

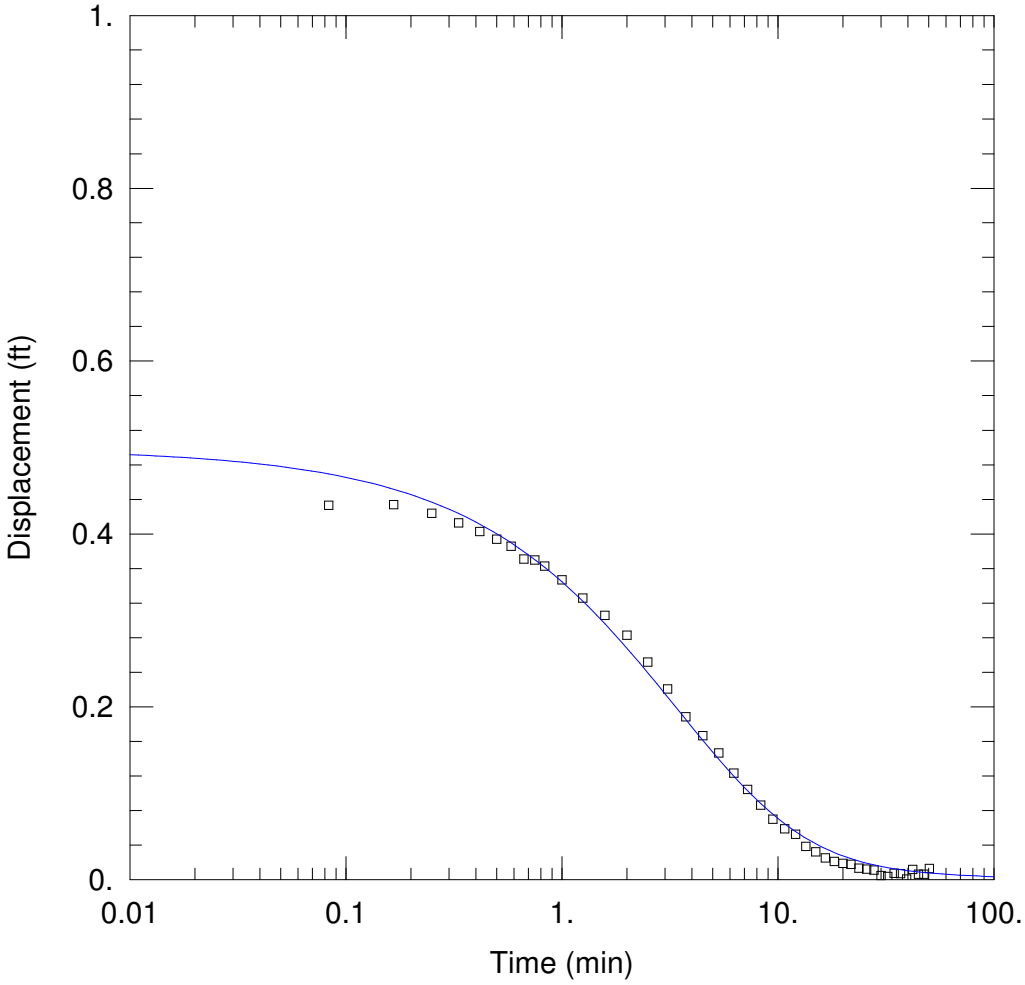
WELL DATA (twn11)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 68. ft
Casing Radius: 0.167 ft
Static Water Column Height: 68. ft
Screen Length: 68. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 9.784E-5 cm/sec
y0 = 0.3597 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn12\twn12c.aqt
Date: 11/12/09 Time: 12:10:10

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-12

AQUIFER DATA

Saturated Thickness: 67. ft

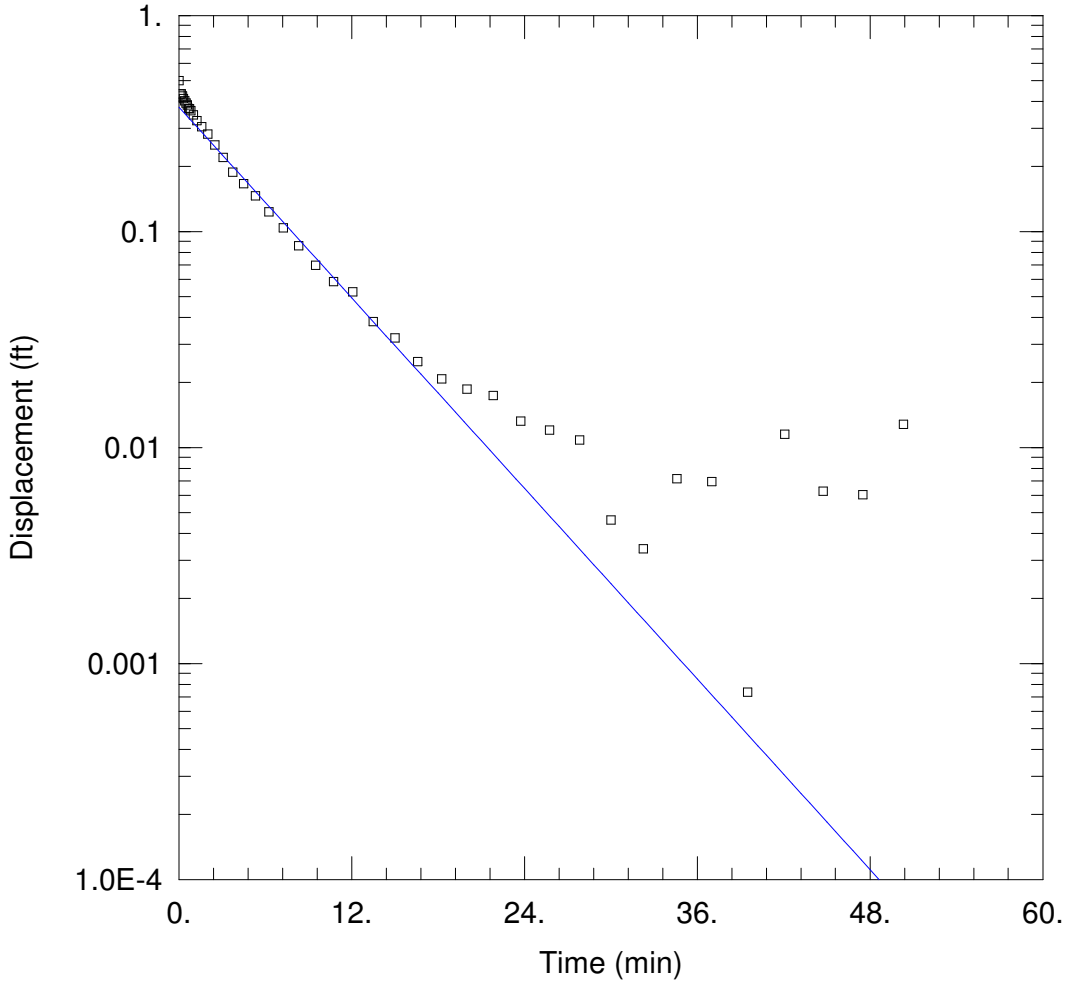
WELL DATA (twn12)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 67. ft
Casing Radius: 0.167 ft
Static Water Column Height: 29. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 8.054E-5 cm/sec
Kz/Kr = 0.1
Ss = 4.65E-5 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn12\twn12cbr.aqt
Date: 11/12/09 Time: 12:10:26

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-12

AQUIFER DATA

Saturated Thickness: 67. ft Anisotropy Ratio (Kz/Kr): 0.1

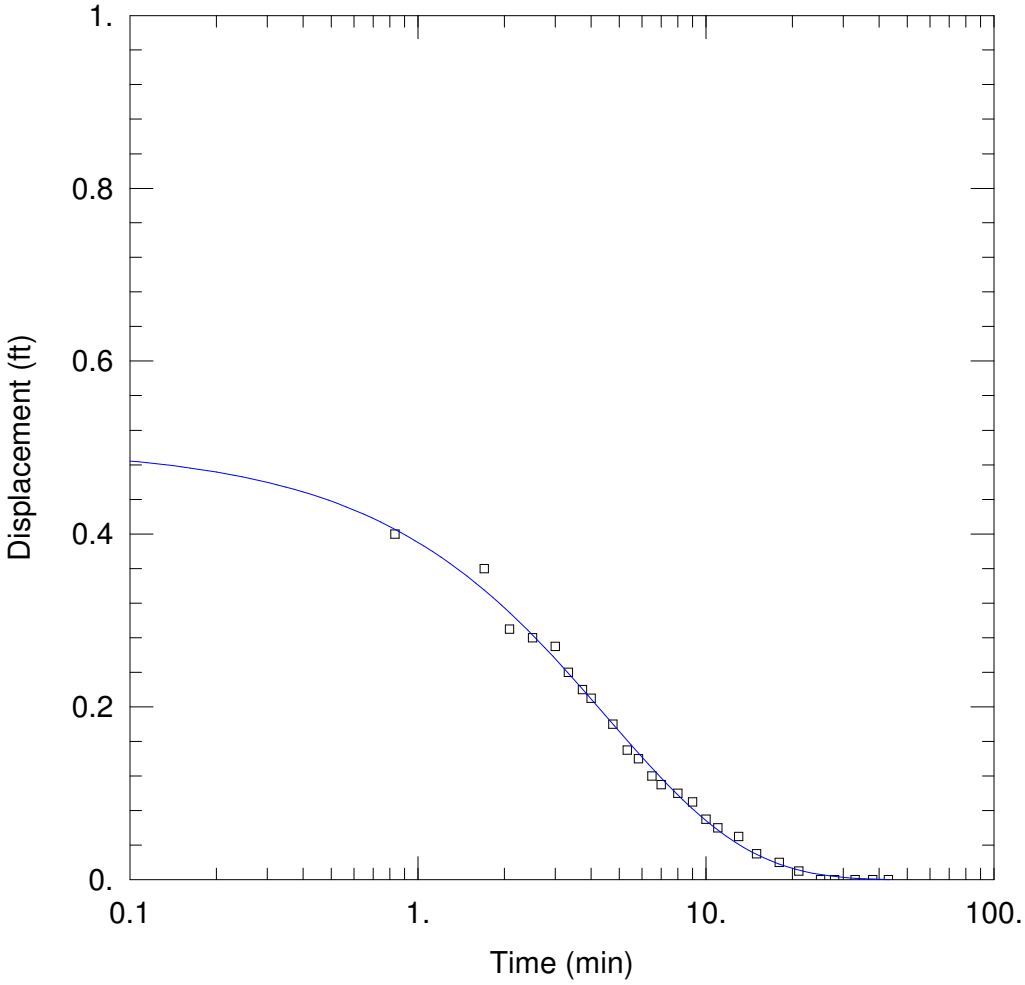
WELL DATA (twn12)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 67. ft
Casing Radius: 0.167 ft
Static Water Column Height: 29. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 7.691E-5 cm/sec
y0 = 0.3766 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn12\twn12h.aqt
Date: 11/12/09 Time: 12:10:38

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-12

AQUIFER DATA

Saturated Thickness: 67. ft

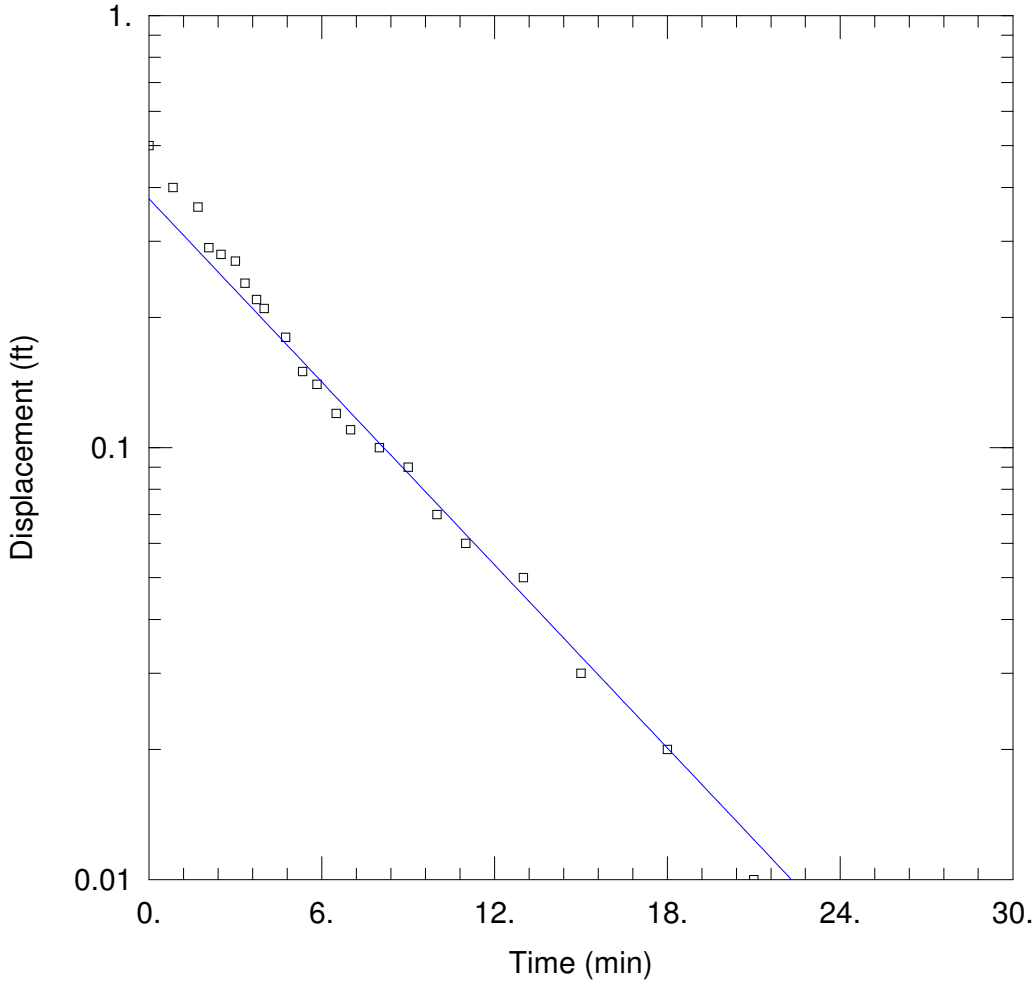
WELL DATA (twn12)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 67. ft
Casing Radius: 0.167 ft
Static Water Column Height: 29. ft
Screen Length: 67. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0001284 cm/sec
Kz/Kr = 0.1
Ss = 1.271E-7 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn12\twn12hbr.aqt
Date: 11/12/09 Time: 12:10:59

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-12

AQUIFER DATA

Saturated Thickness: 67. ft Anisotropy Ratio (Kz/Kr): 0.1

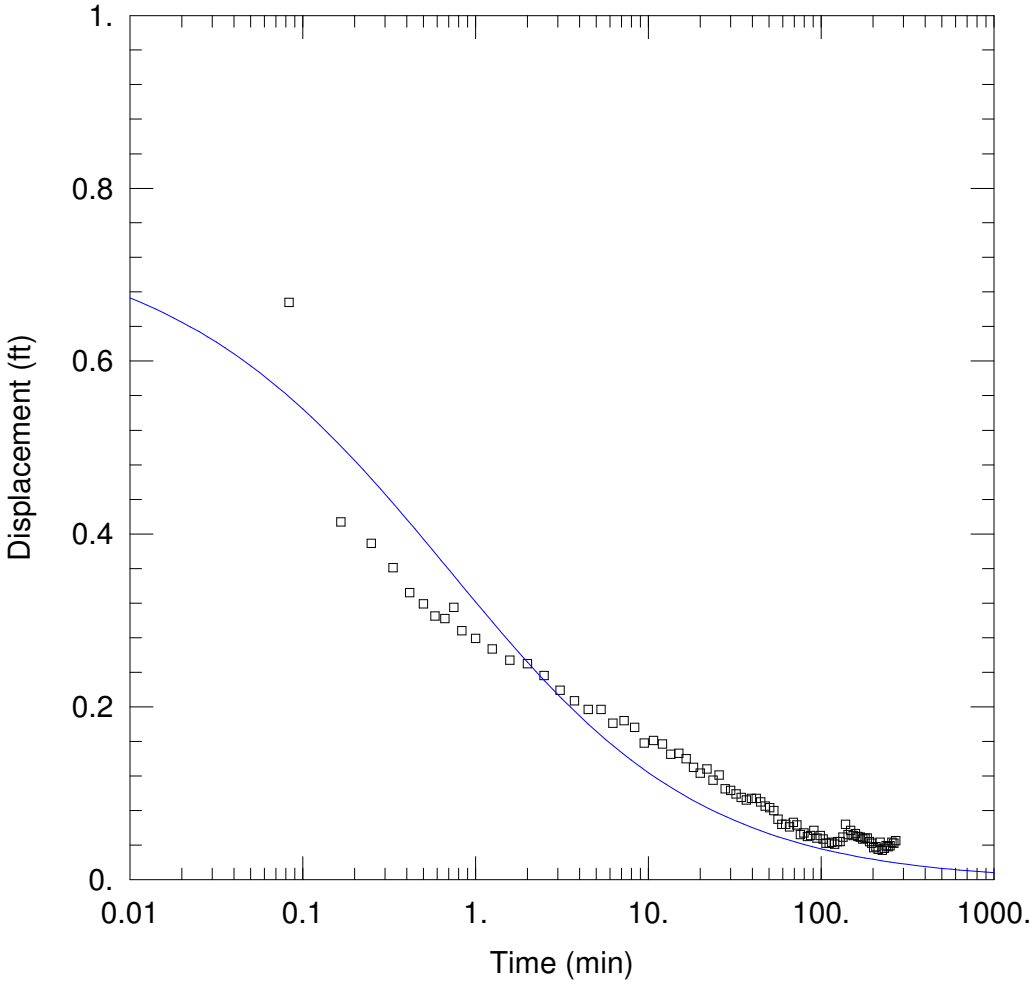
WELL DATA (twn12)

Initial Displacement: 0.5 ft Static Water Column Height: 29. ft
Total Well Penetration Depth: 67. ft Screen Length: 67. ft
Casing Radius: 0.167 ft Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 7.387E-5 cm/sec y0 = 0.3766 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn13\twn13.aqt
Date: 11/12/09 Time: 12:11:20

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-13

AQUIFER DATA

Saturated Thickness: 68. ft

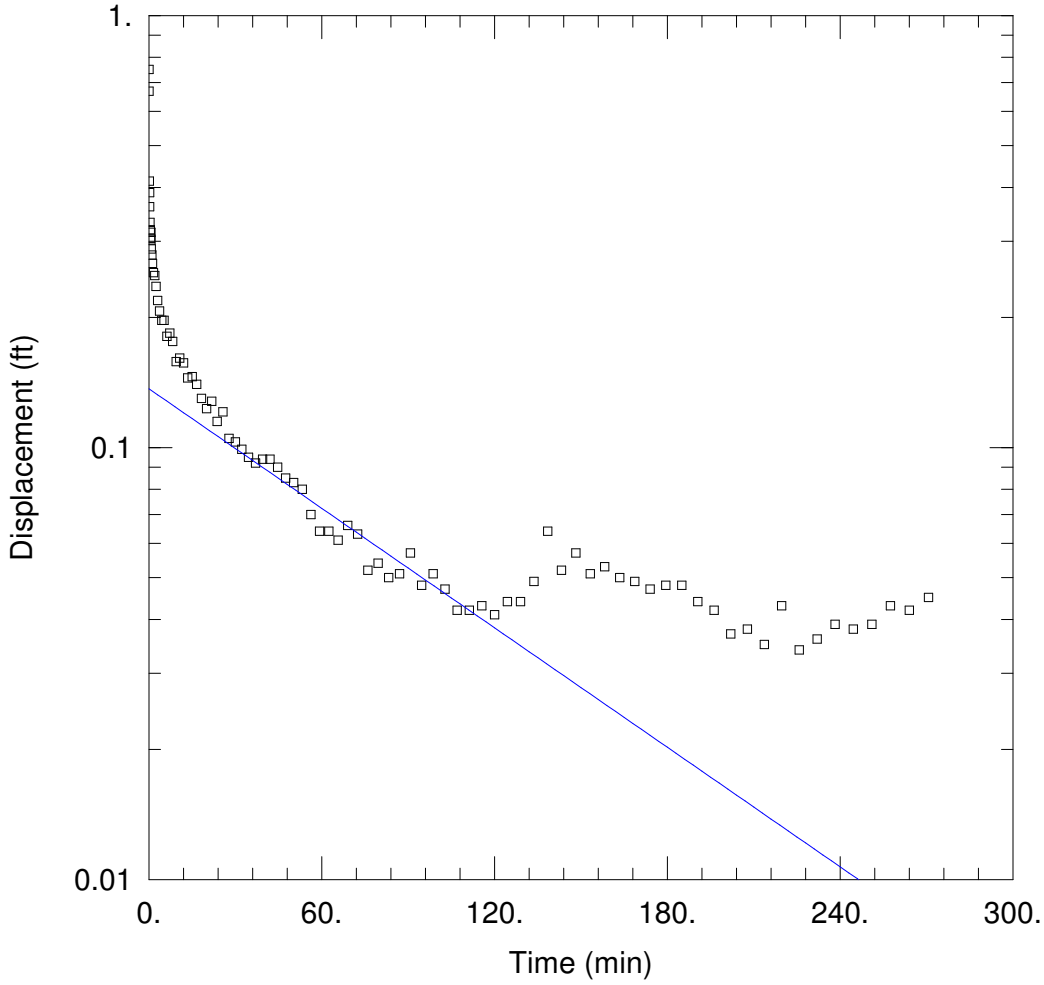
WELL DATA (twn13)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 68. ft
Casing Radius: 0.167 ft
Static Water Column Height: 68. ft
Screen Length: 68. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2.619E-6 cm/sec
Kz/Kr = 0.1
Ss = 0.1 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn13\twn13br.aqt
Date: 11/12/09 Time: 12:11:32

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-13

AQUIFER DATA

Saturated Thickness: 68. ft Anisotropy Ratio (Kz/Kr): 0.1

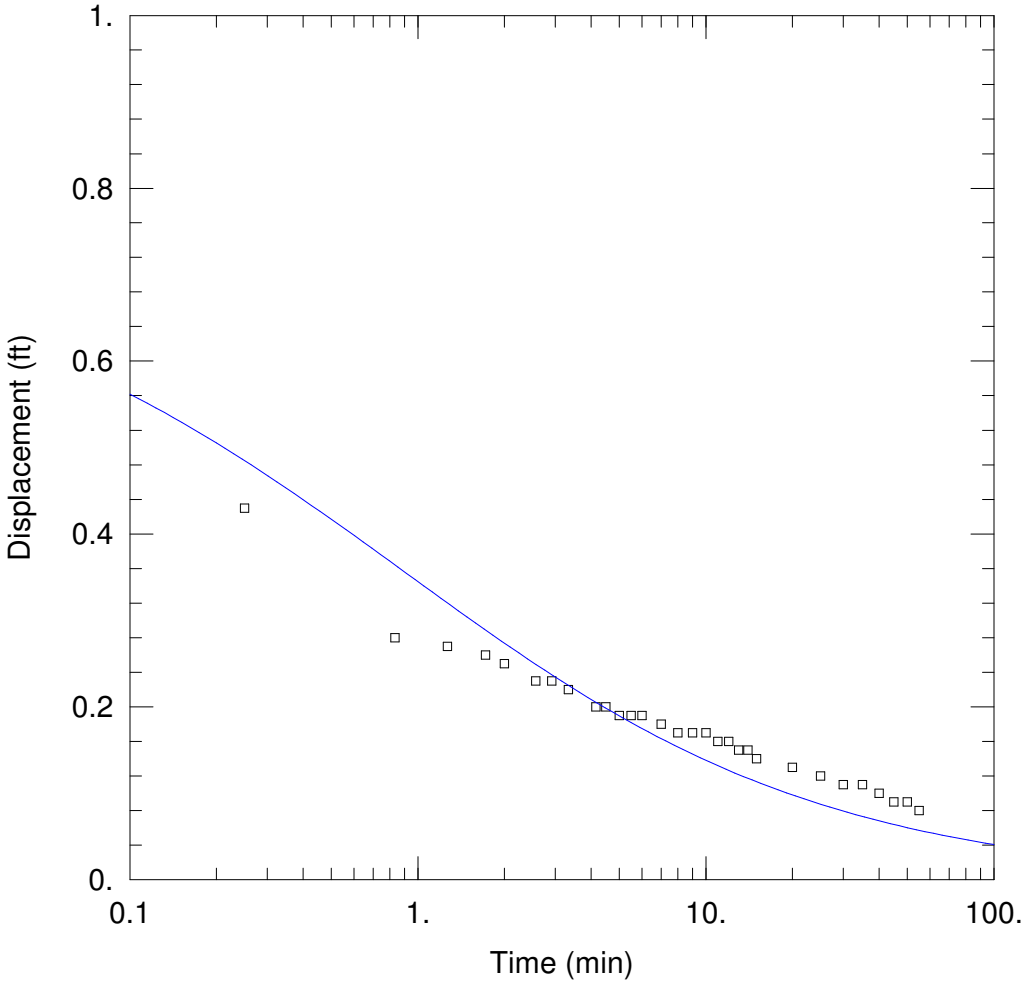
WELL DATA (twn13)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 68. ft
Casing Radius: 0.167 ft
Static Water Column Height: 68. ft
Screen Length: 68. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 4.766E-6 cm/sec
y0 = 0.1367 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn13\twn13h.aqt
Date: 11/12/09 Time: 12:11:46

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-13

AQUIFER DATA

Saturated Thickness: 68. ft

WELL DATA (twn13)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 68. ft
Casing Radius: 0.167 ft

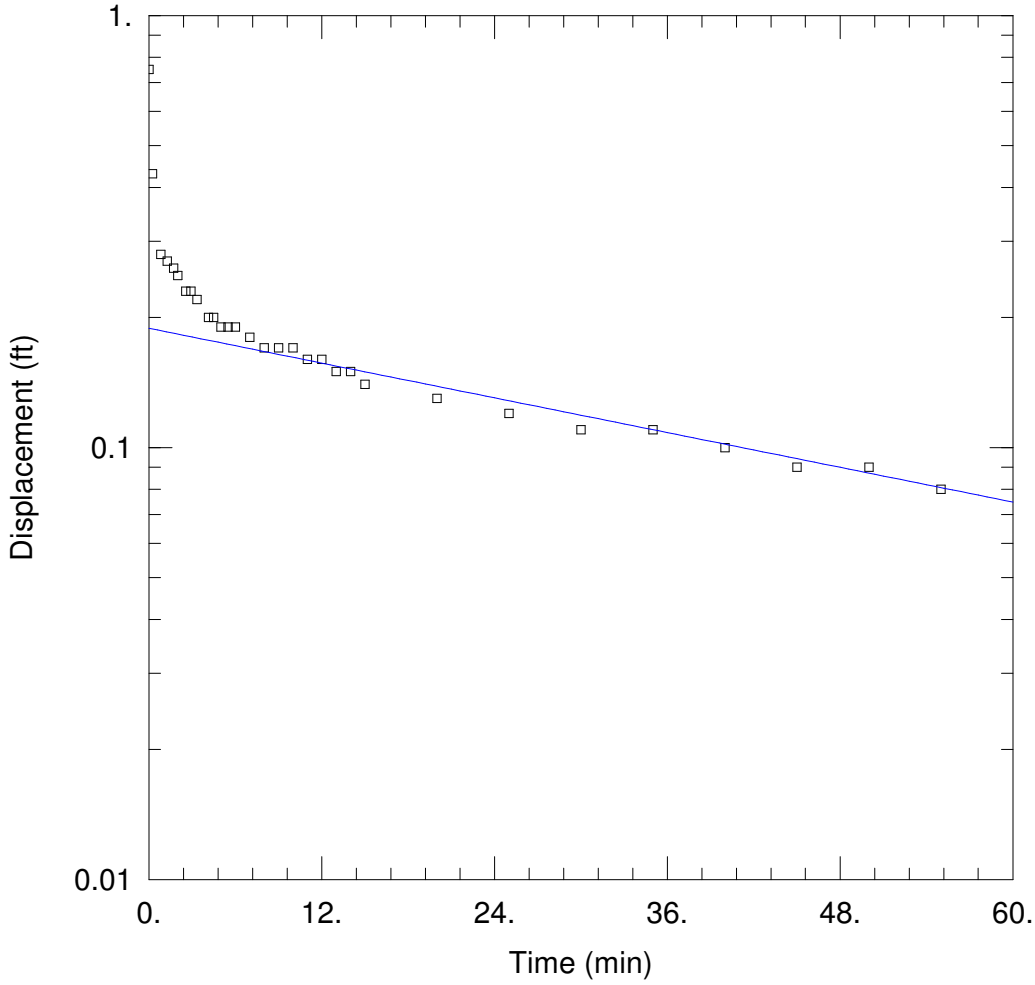
Static Water Column Height: 68. ft
Screen Length: 68. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2.093E-6 cm/sec
Kz/Kr = 0.1

Ss = 0.1 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn13\twn13hbr.aqt
Date: 11/12/09 Time: 12:11:58

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-13

AQUIFER DATA

Saturated Thickness: 68. ft Anisotropy Ratio (Kz/Kr): 0.1

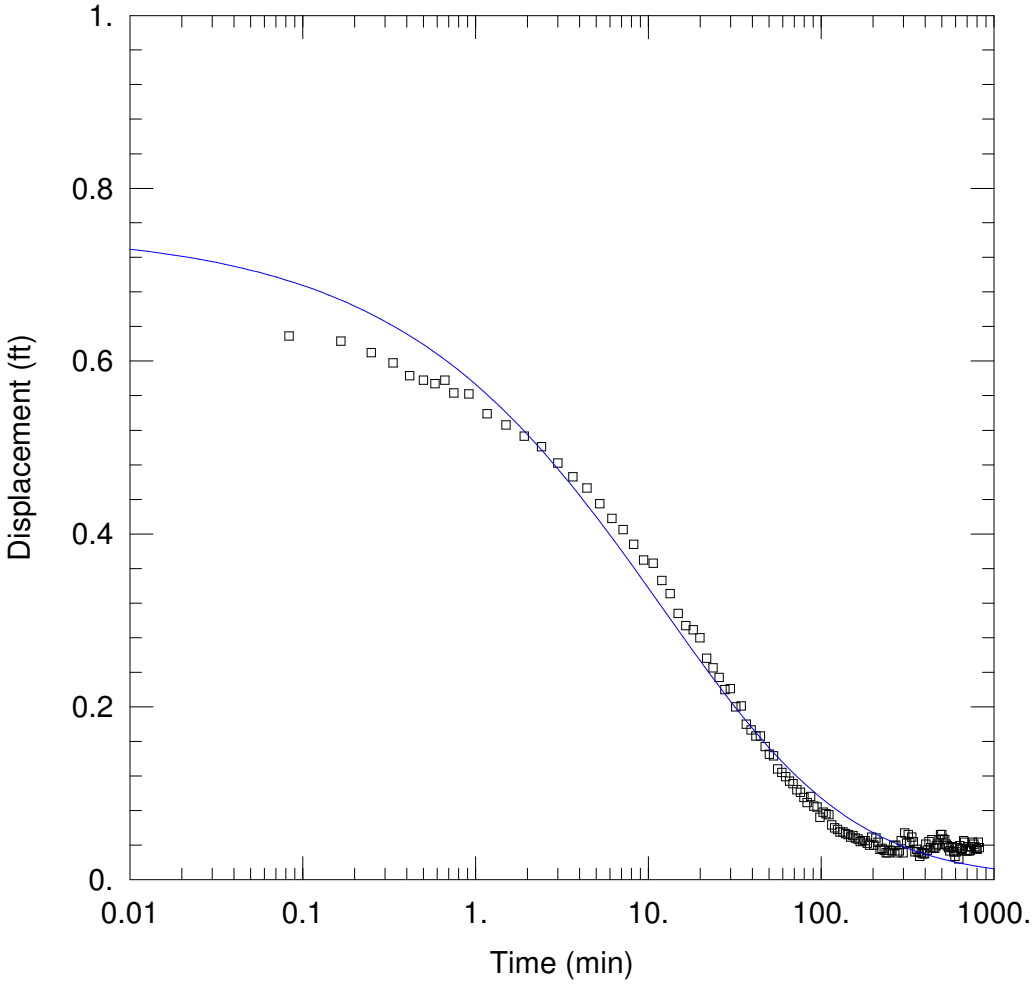
WELL DATA (twn13)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 68. ft
Casing Radius: 0.167 ft
Static Water Column Height: 68. ft
Screen Length: 68. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 6.93E-6 cm/sec
y0 = 0.1888 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn14\twn14.aqt
Date: 11/12/09 Time: 12:12:31

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-14

AQUIFER DATA

Saturated Thickness: 57. ft

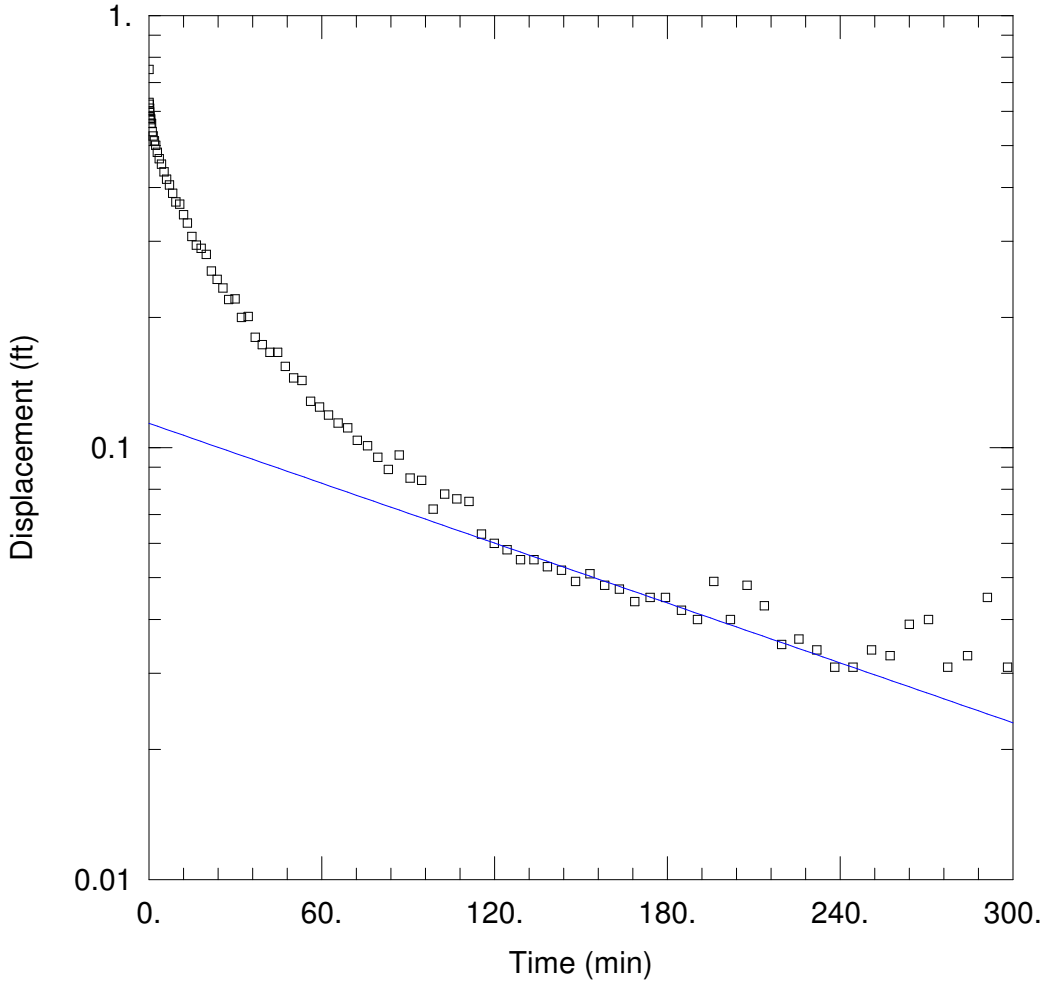
WELL DATA (twn14)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 57. ft
Casing Radius: 0.167 ft
Static Water Column Height: 57. ft
Screen Length: 57. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 3.611E-6 cm/sec
Kz/Kr = 0.1
Ss = 0.006392 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn14\twn14br.aqt
Date: 11/12/09 Time: 12:13:10

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-14

AQUIFER DATA

Saturated Thickness: 57. ft Anisotropy Ratio (Kz/Kr): 0.1

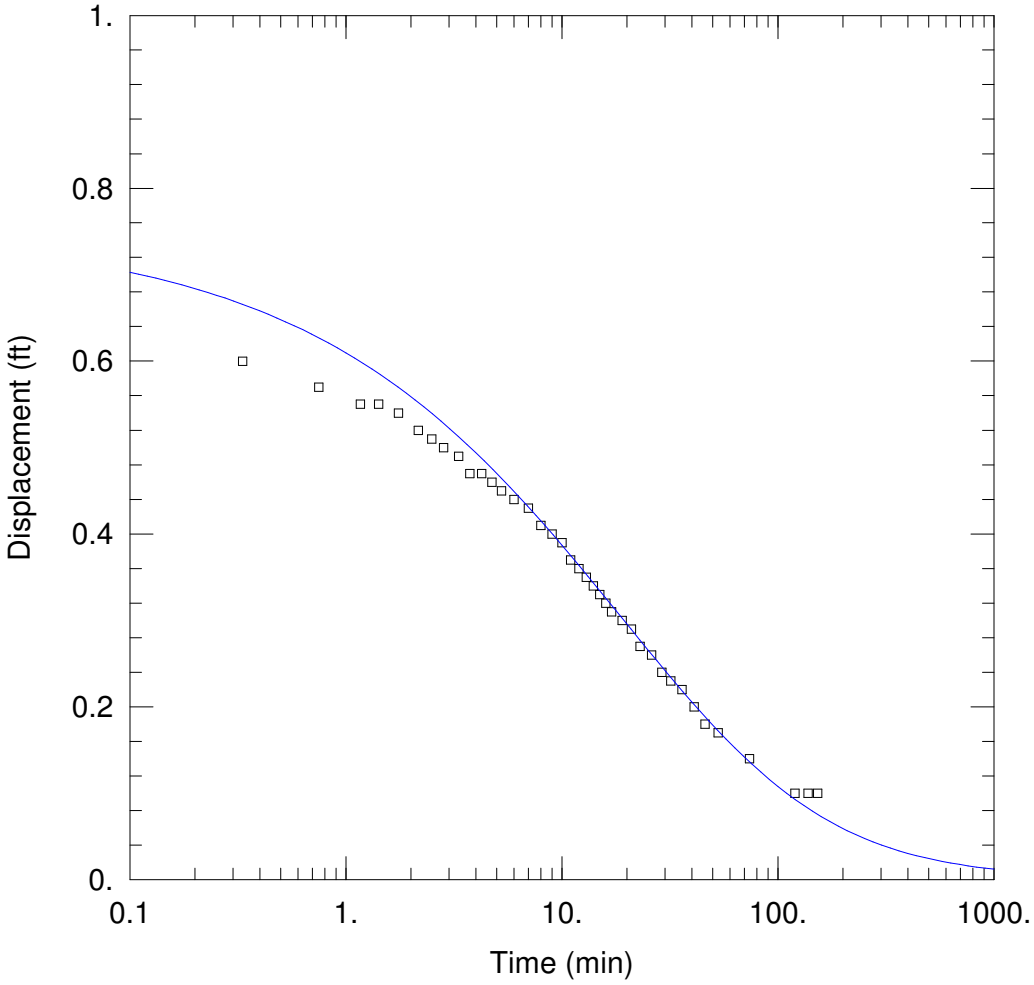
WELL DATA (twn14)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 57. ft
Casing Radius: 0.167 ft
Static Water Column Height: 57. ft
Screen Length: 57. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 2.741E-6 cm/sec
y0 = 0.1137 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn14\twn14h.aqt
Date: 11/12/09 Time: 12:13:23

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-14

AQUIFER DATA

Saturated Thickness: 57. ft

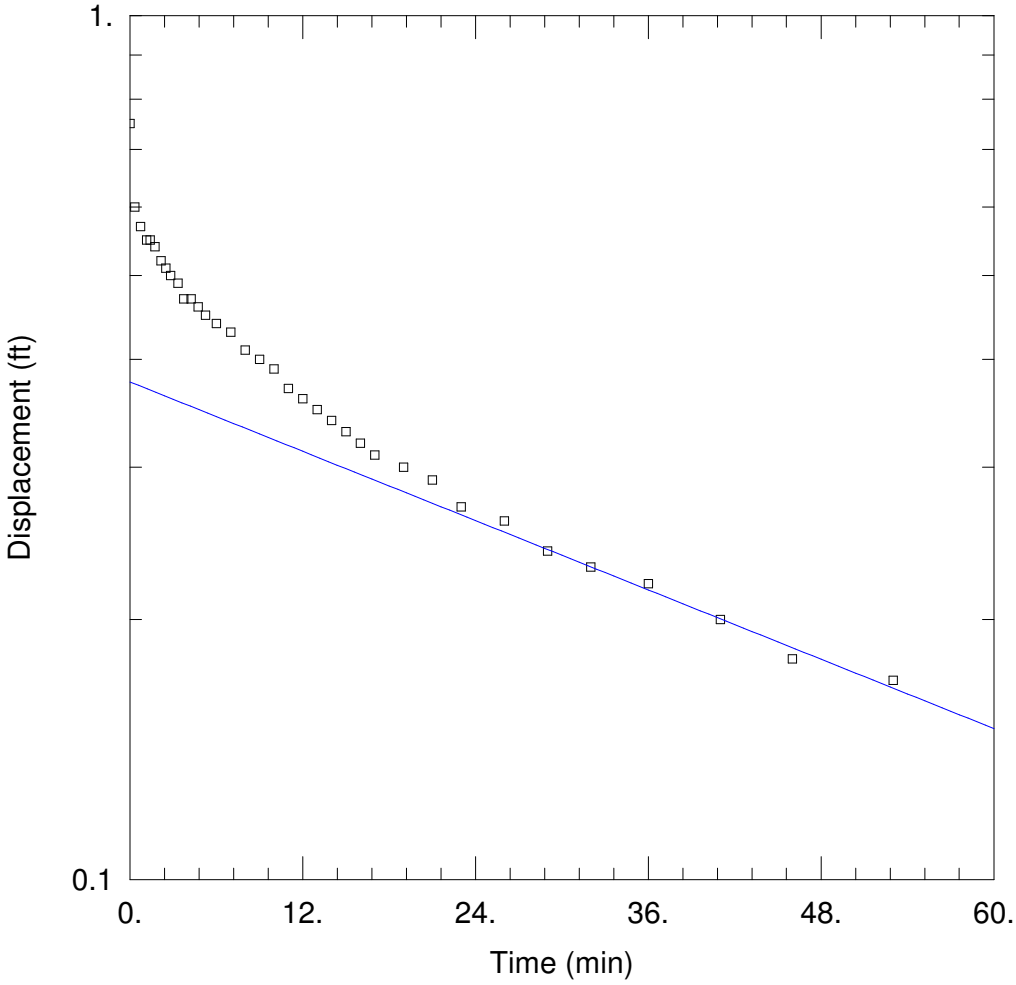
WELL DATA (twn14)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 57. ft
Casing Radius: 0.167 ft
Static Water Column Height: 57. ft
Screen Length: 57. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 3.976E-6 cm/sec
Kz/Kr = 0.1
Ss = 0.003166 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn14\twn14hbr.aqt
Date: 11/12/09 Time: 12:13:39

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-14

AQUIFER DATA

Saturated Thickness: 57. ft Anisotropy Ratio (Kz/Kr): 0.1

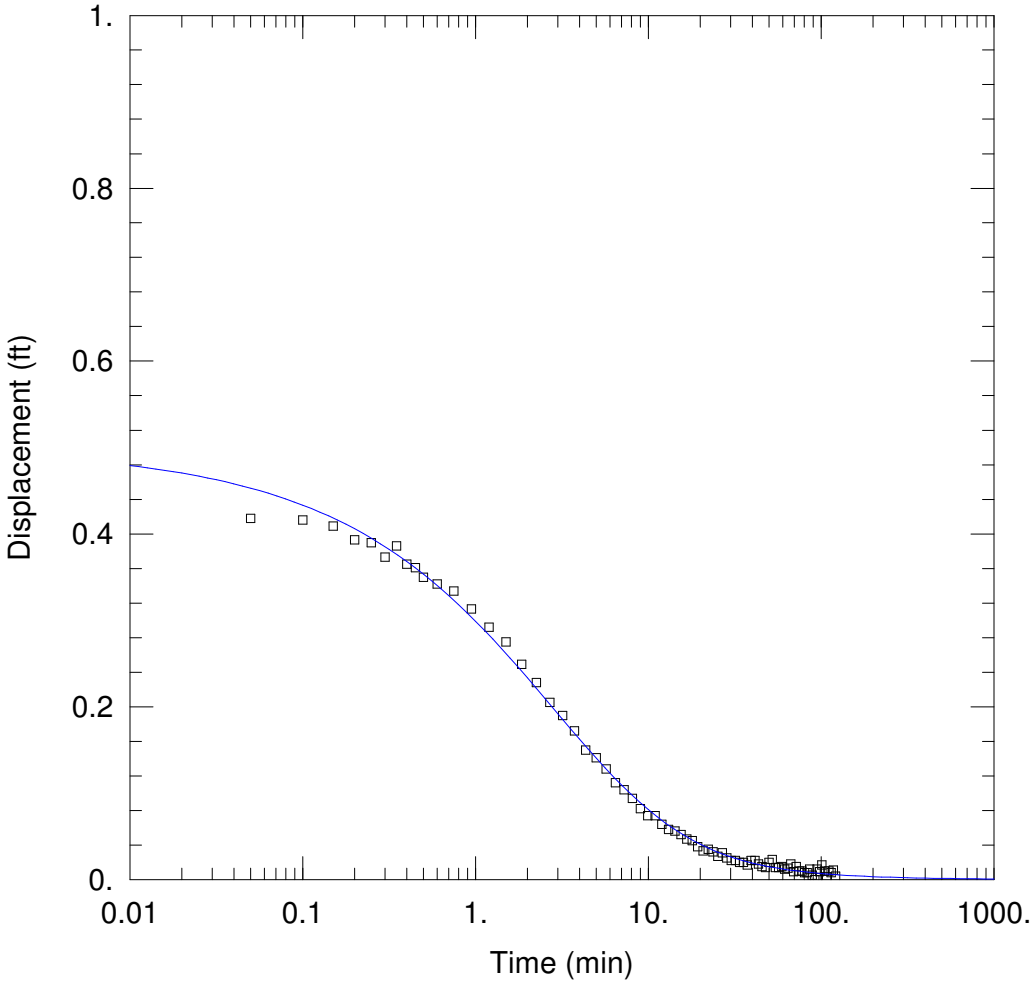
WELL DATA (twn14)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 57. ft
Casing Radius: 0.167 ft
Static Water Column Height: 57. ft
Screen Length: 57. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 7.933E-6 cm/sec
y0 = 0.3766 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn15\twn15.aqt
Date: 11/12/09 Time: 12:13:55

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-15

AQUIFER DATA

Saturated Thickness: 58. ft

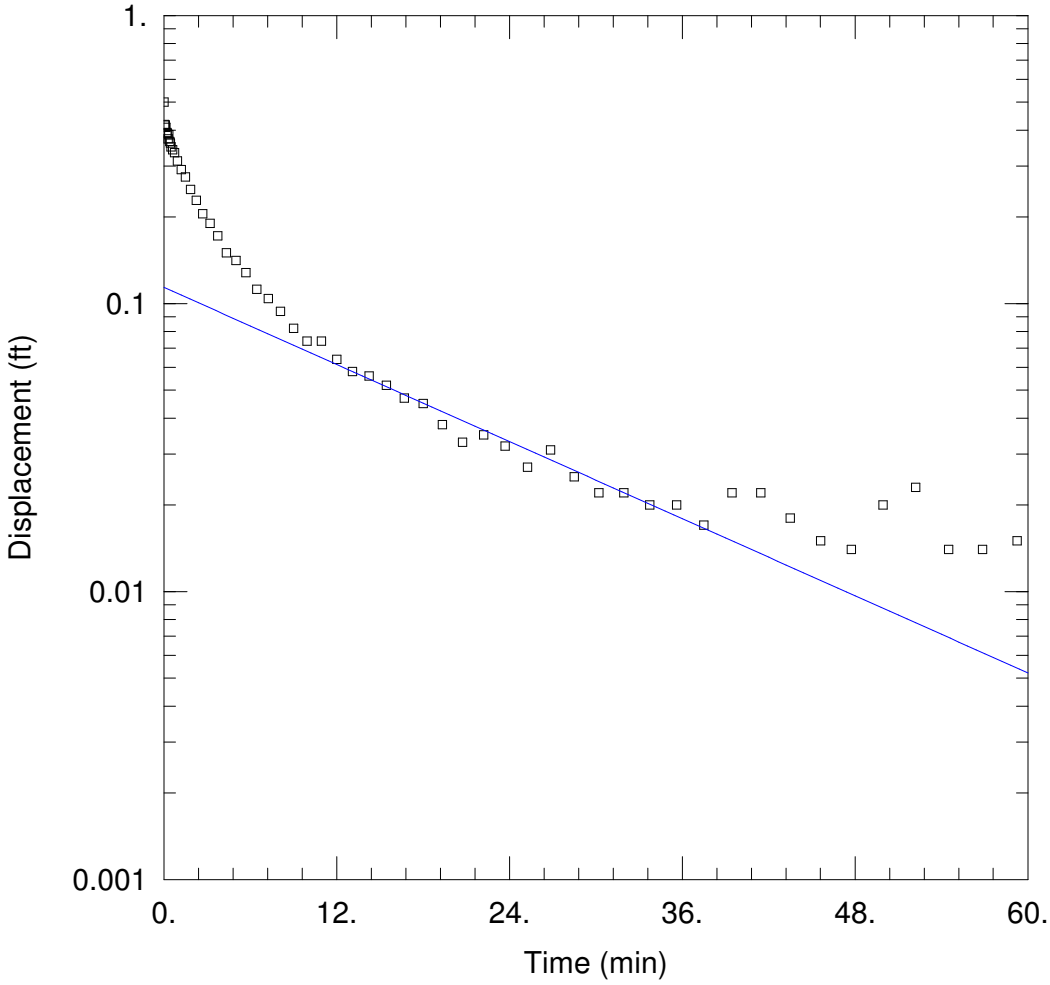
WELL DATA (twn15)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 58. ft
Casing Radius: 0.167 ft
Static Water Column Height: 58. ft
Screen Length: 58. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 4.751E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.001037 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn15\twn15br.aqt
Date: 11/12/09 Time: 12:14:07

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-15

AQUIFER DATA

Saturated Thickness: 58. ft Anisotropy Ratio (Kz/Kr): 0.1

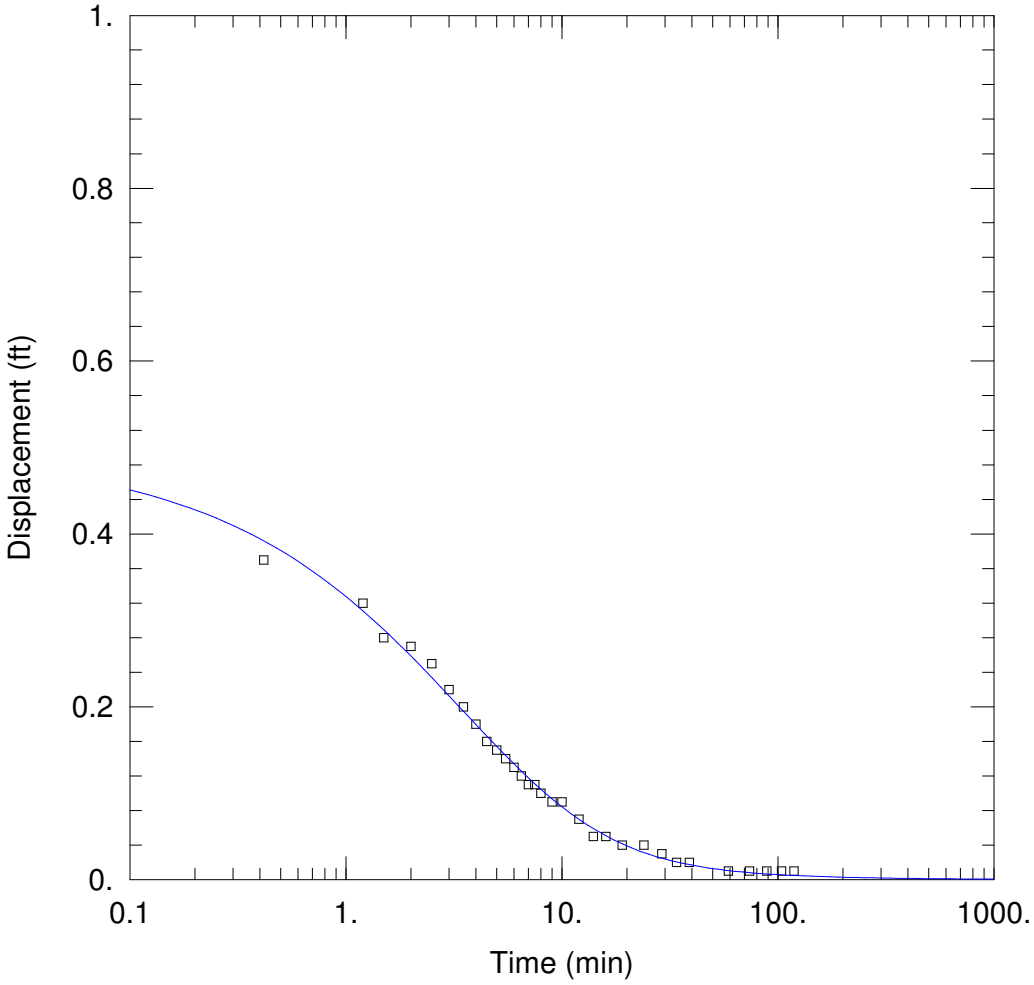
WELL DATA (twn15)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 58. ft
Casing Radius: 0.167 ft
Static Water Column Height: 58. ft
Screen Length: 58. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 2.611E-5 cm/sec
y0 = 0.1137 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn15\twn15h.aqt
Date: 11/12/09 Time: 12:14:19

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-15

AQUIFER DATA

Saturated Thickness: 58. ft

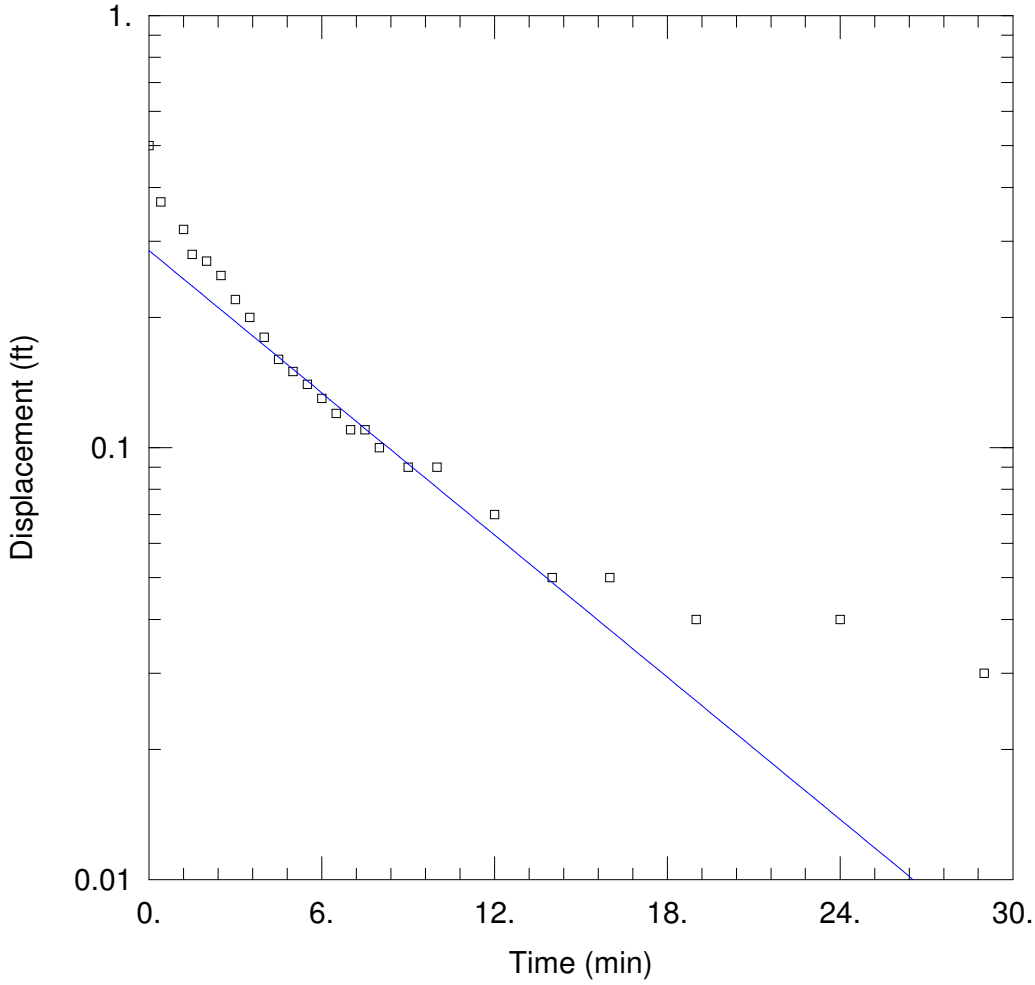
WELL DATA (twn15)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 58. ft
Casing Radius: 0.167 ft
Static Water Column Height: 58. ft
Screen Length: 58. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 5.857E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.0003488 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn15\twn15hbr.aqt
Date: 11/12/09 Time: 12:14:30

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-15

AQUIFER DATA

Saturated Thickness: 58. ft Anisotropy Ratio (Kz/Kr): 0.1

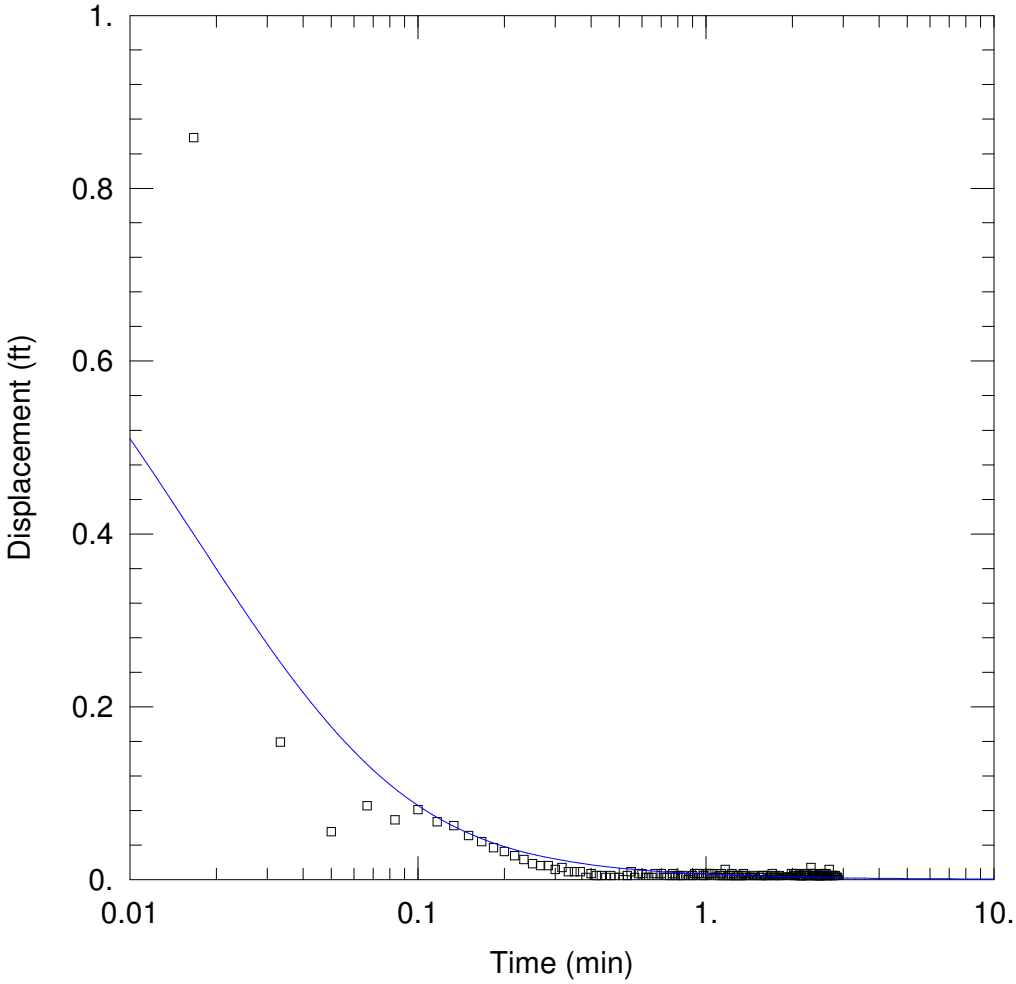
WELL DATA (twn15)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 58. ft
Casing Radius: 0.167 ft
Static Water Column Height: 58. ft
Screen Length: 58. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 6.422E-5 cm/sec
y0 = 0.2857 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn16\twn16.aqt
Date: 11/12/09 Time: 12:15:01

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-16

AQUIFER DATA

Saturated Thickness: 41. ft

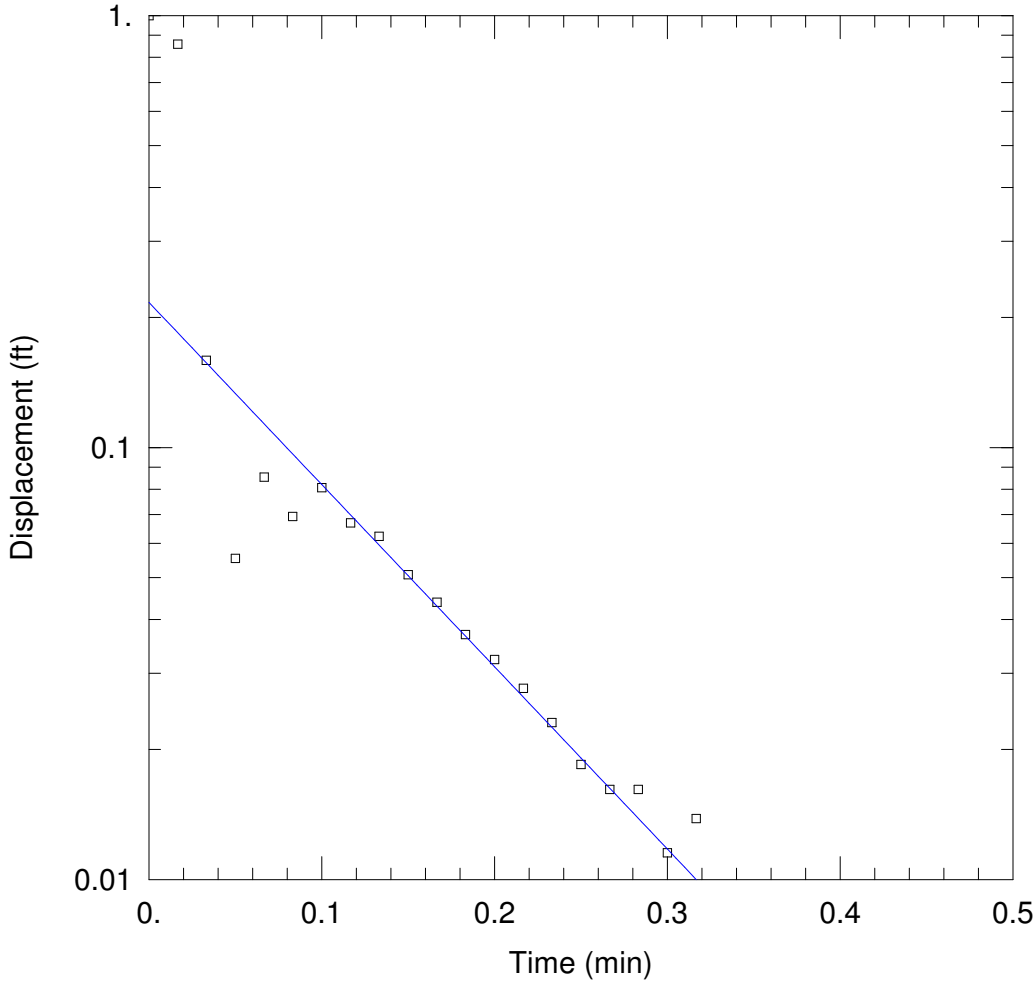
WELL DATA (twn16)

Initial Displacement: 1. ft
Total Well Penetration Depth: 41. ft
Casing Radius: 0.167 ft
Static Water Column Height: 41. ft
Screen Length: 41. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.01416 cm/sec
Kz/Kr = 0.1
Ss = 0.0008019 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn16\twn16br.aqt
Date: 11/12/09 Time: 12:15:12

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-16

AQUIFER DATA

Saturated Thickness: 41. ft Anisotropy Ratio (Kz/Kr): 0.1

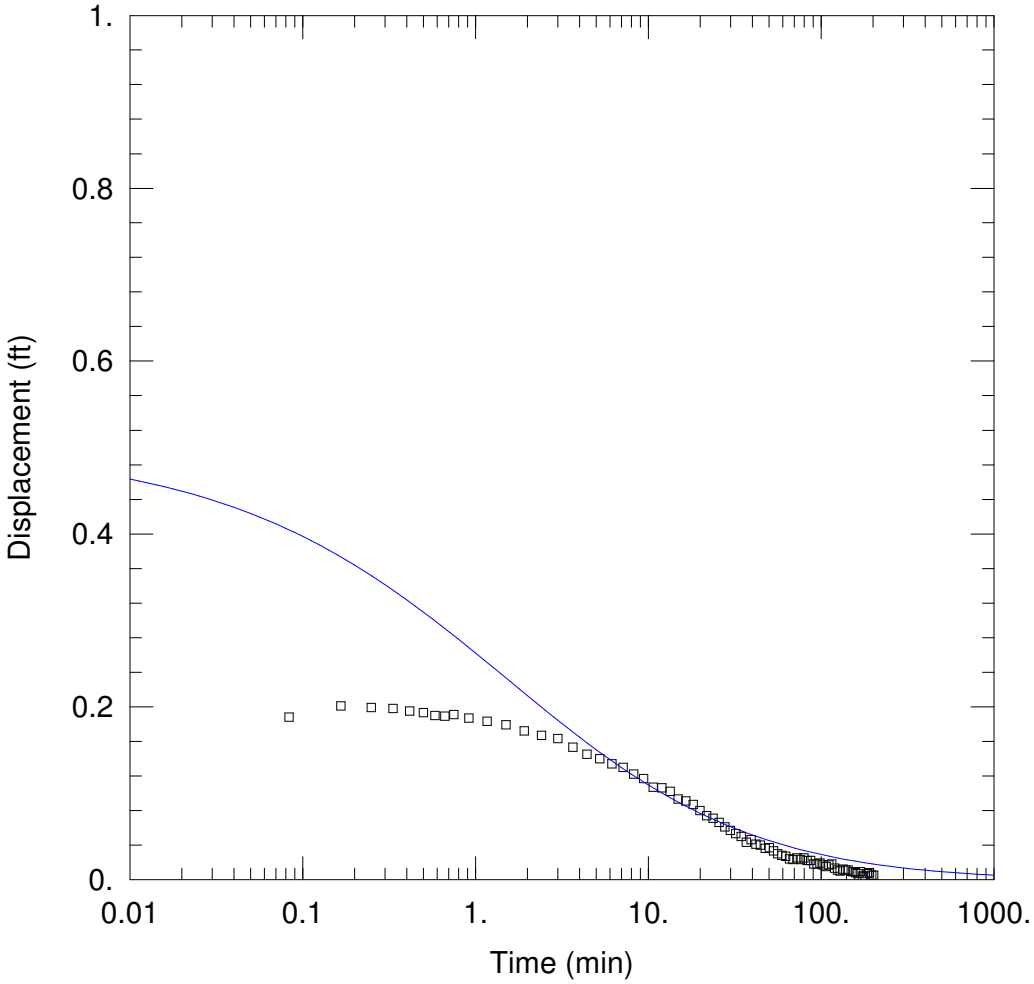
WELL DATA (twn16)

Initial Displacement: 1. ft
Total Well Penetration Depth: 41. ft
Casing Radius: 0.167 ft
Static Water Column Height: 41. ft
Screen Length: 41. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.006472 cm/sec
y0 = 0.2167 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn17\twn17.aqt
Date: 11/12/09 Time: 12:15:34

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-17

AQUIFER DATA

Saturated Thickness: 69. ft

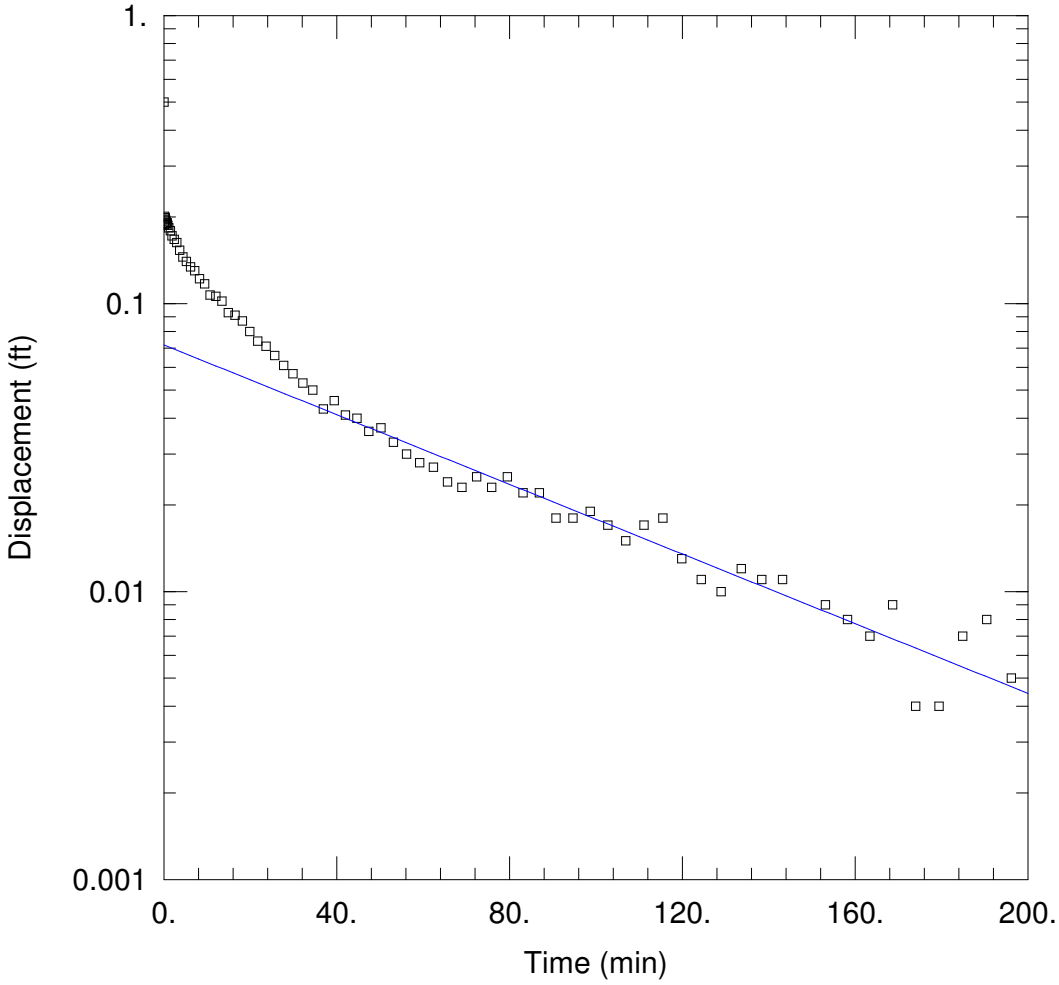
WELL DATA (twn17)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 69. ft
Casing Radius: 0.167 ft
Static Water Column Height: 69. ft
Screen Length: 69. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 3.725E-6 cm/sec
Kz/Kr = 0.1
Ss = 0.03315 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn17\twn17br.aqt
Date: 11/12/09 Time: 12:16:05

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-17

AQUIFER DATA

Saturated Thickness: 69. ft Anisotropy Ratio (Kz/Kr): 0.1

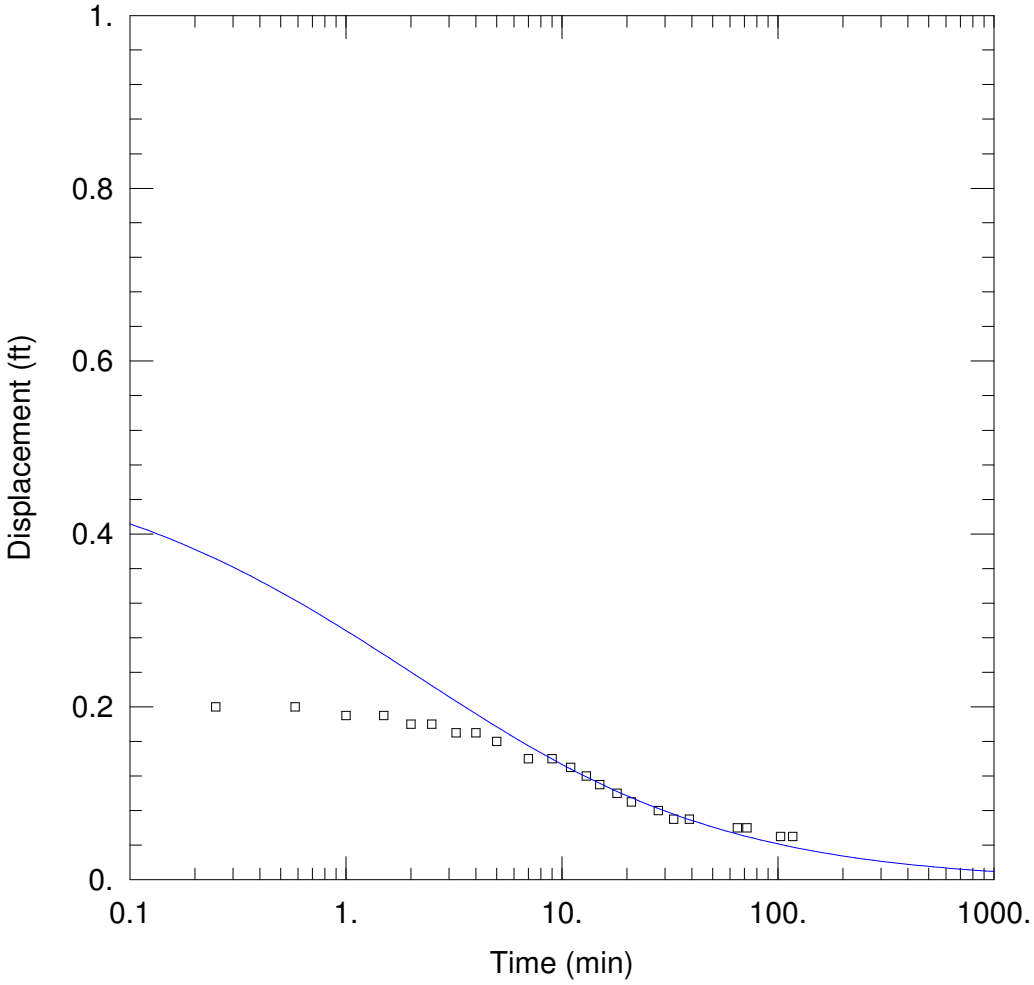
WELL DATA (twn17)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 69. ft
Casing Radius: 0.167 ft
Static Water Column Height: 69. ft
Screen Length: 69. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 6.181E-6 cm/sec
y0 = 0.07176 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn17\twn17h.aqt
Date: 11/12/09 Time: 12:16:32

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-17

AQUIFER DATA

Saturated Thickness: 69. ft

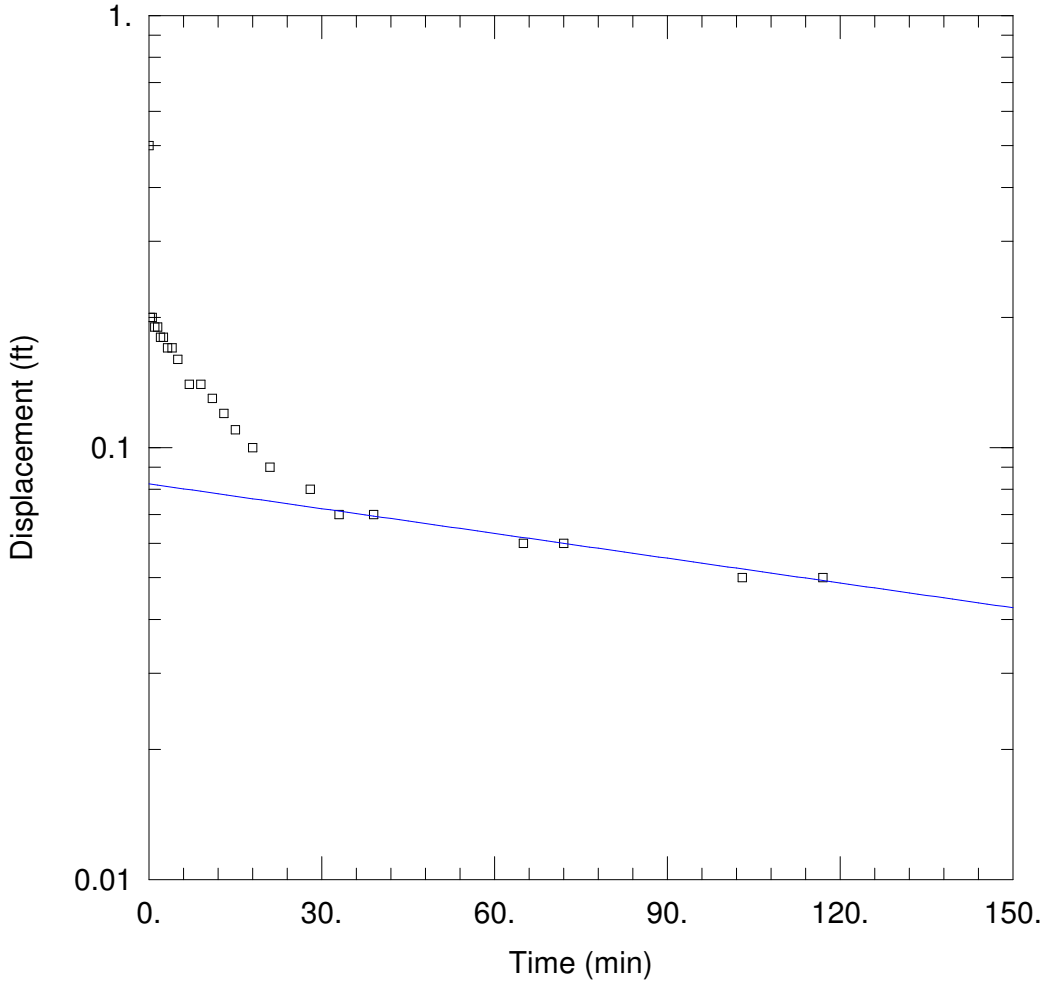
WELL DATA (twn17)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 69. ft
Casing Radius: 0.167 ft
Static Water Column Height: 69. ft
Screen Length: 69. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 1.416E-6 cm/sec
Kz/Kr = 0.1
Ss = 0.06122 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn17\twn17hbr.aqt
Date: 11/12/09 Time: 12:17:19

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-17

AQUIFER DATA

Saturated Thickness: 69. ft Anisotropy Ratio (Kz/Kr): 0.1

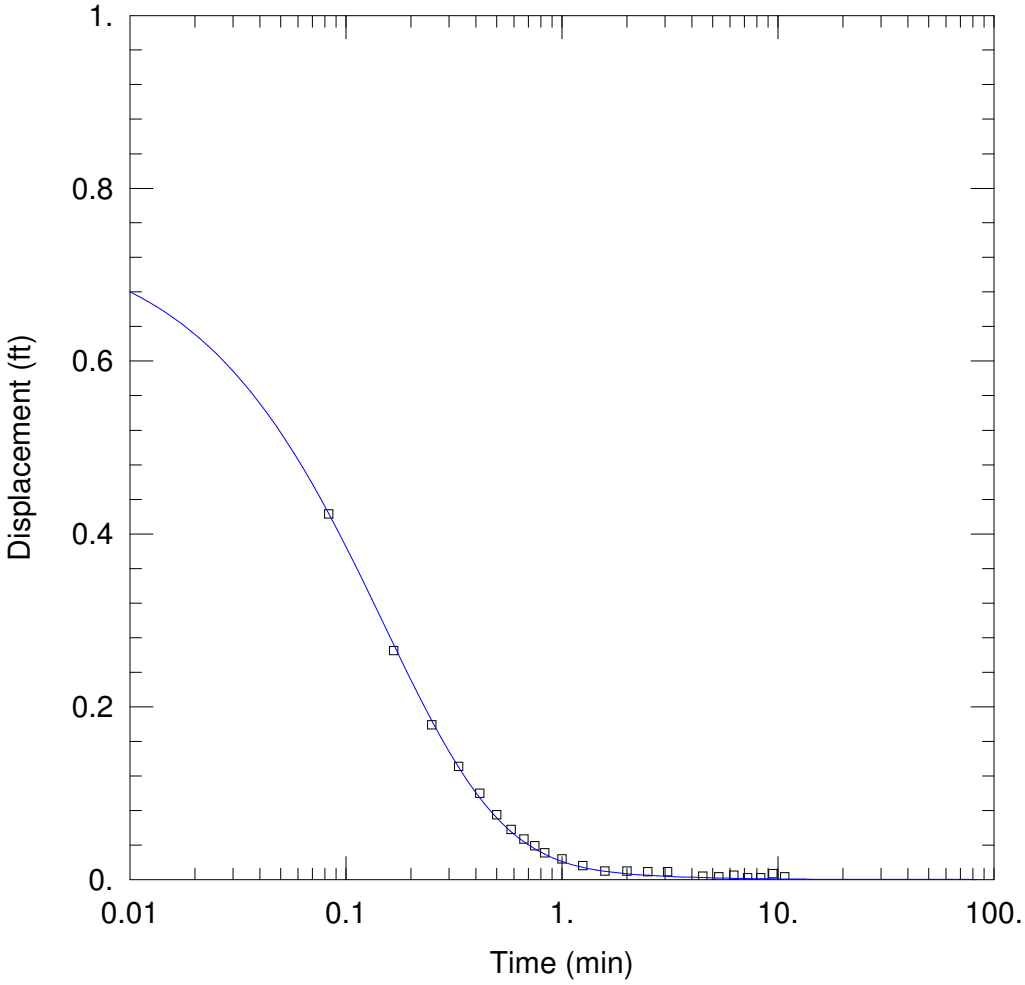
WELL DATA (twn17)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 69. ft
Casing Radius: 0.167 ft
Static Water Column Height: 69. ft
Screen Length: 69. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.955E-6 cm/sec
y0 = 0.08239 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn18\twn18.aqt
Date: 11/12/09 Time: 12:18:02

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-18

AQUIFER DATA

Saturated Thickness: 83. ft

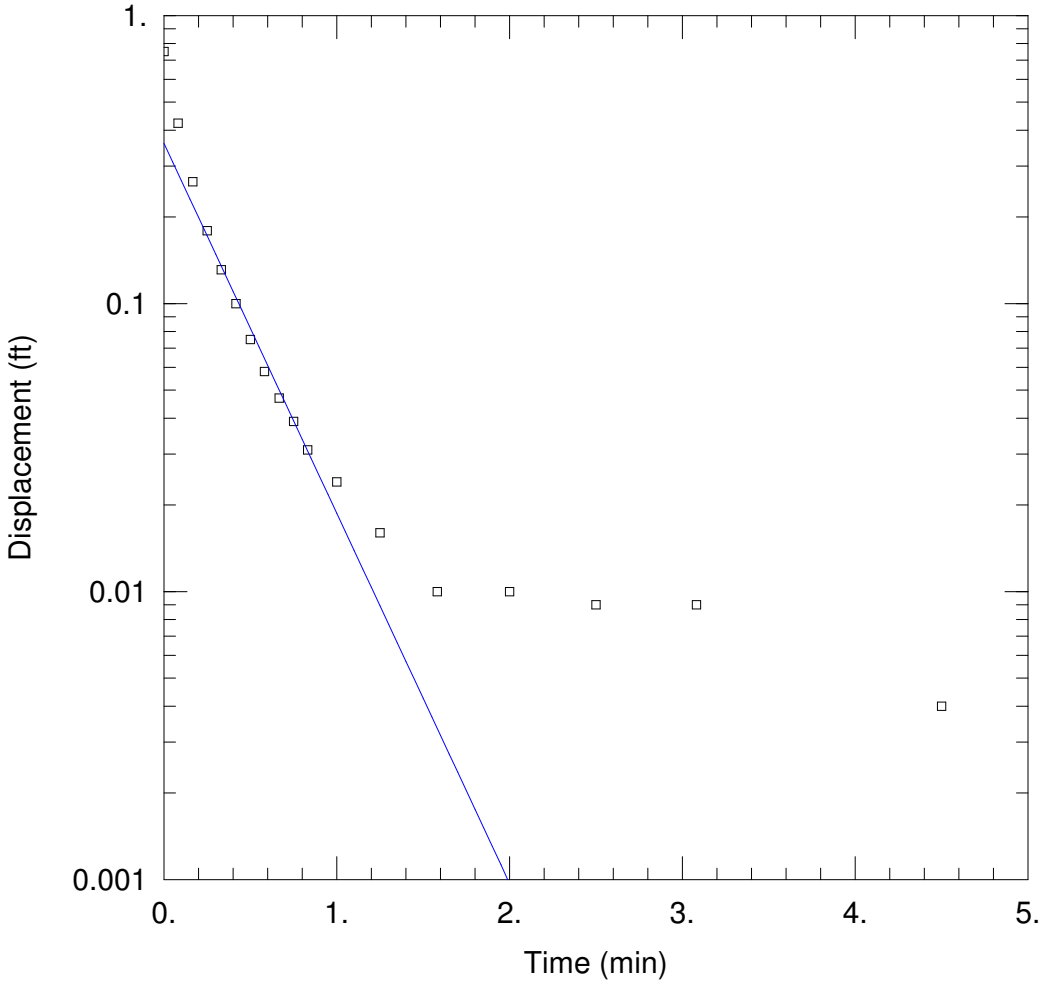
WELL DATA (twn18)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 83. ft
Casing Radius: 0.167 ft
Static Water Column Height: 83. ft
Screen Length: 83. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.002267 cm/sec
Kz/Kr = 0.1
Ss = 2.442E-6 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn18\twn18br.aqt
Date: 11/12/09 Time: 12:18:21

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-18

AQUIFER DATA

Saturated Thickness: 83. ft Anisotropy Ratio (Kz/Kr): 0.1

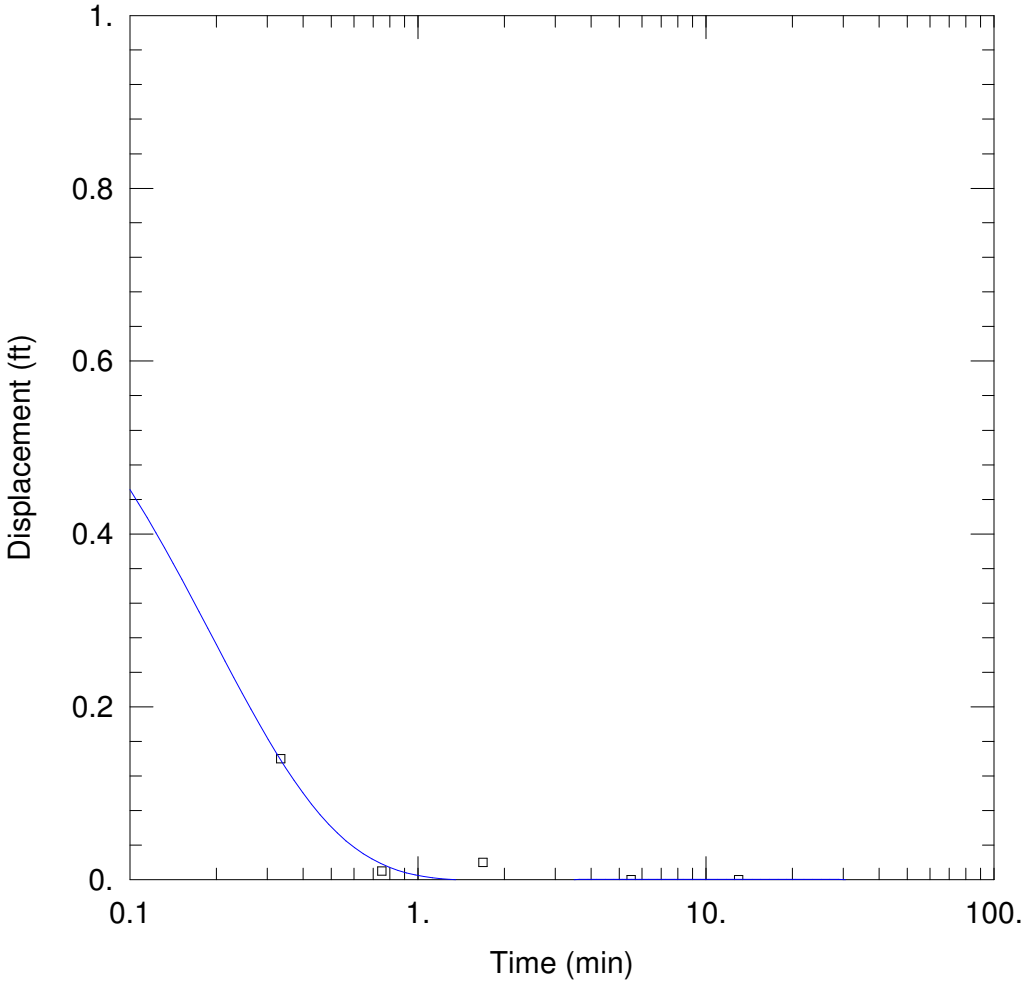
WELL DATA (twn18)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 83. ft
Casing Radius: 0.167 ft
Static Water Column Height: 83. ft
Screen Length: 83. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.001136 cm/sec
y0 = 0.3597 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn18\twn18h.aqt
Date: 11/12/09 Time: 12:18:34

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-18

AQUIFER DATA

Saturated Thickness: 83. ft

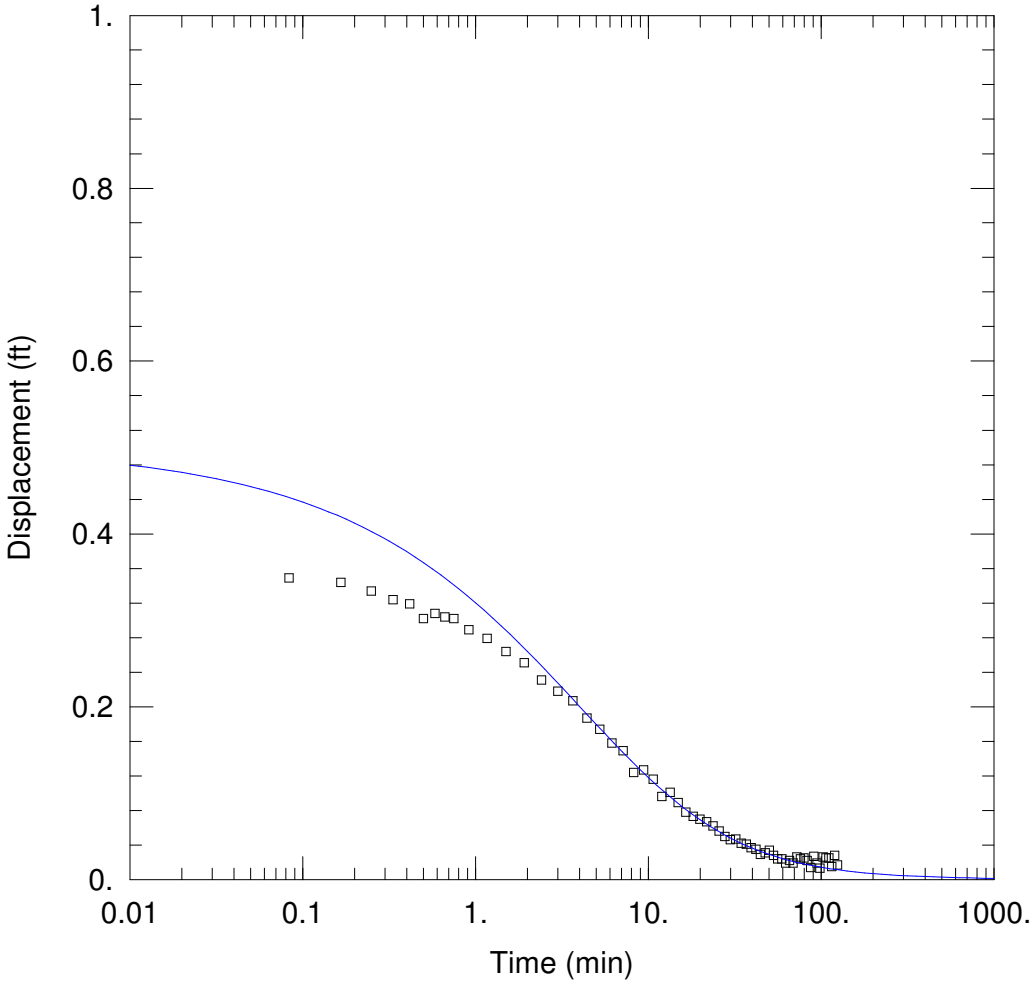
WELL DATA (twn18)

Initial Displacement: 0.75 ft
Total Well Penetration Depth: 83. ft
Casing Radius: 0.167 ft
Static Water Column Height: 83. ft
Screen Length: 83. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.00267 cm/sec
Kz/Kr = 0.1
Ss = 2.215E-12 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn19\twn19.aqt
Date: 11/12/09 Time: 12:18:57

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-19

AQUIFER DATA

Saturated Thickness: 50. ft

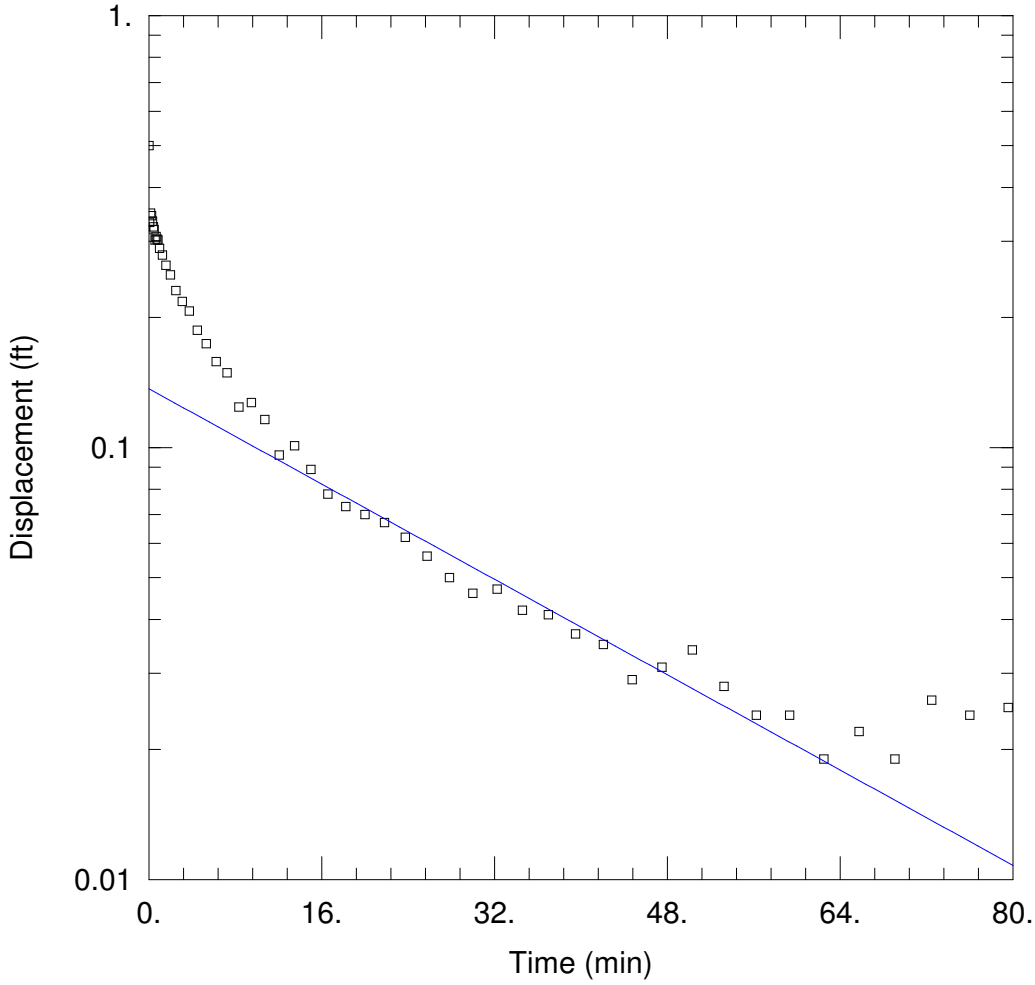
WELL DATA (twn19)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 50. ft
Casing Radius: 0.167 ft
Static Water Column Height: 50. ft
Screen Length: 50. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2.685E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.002493 ft^{-1}



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn19\twn19br.aqt
Date: 11/12/09 Time: 12:19:27

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-19

AQUIFER DATA

Saturated Thickness: 50. ft Anisotropy Ratio (Kz/Kr): 0.1

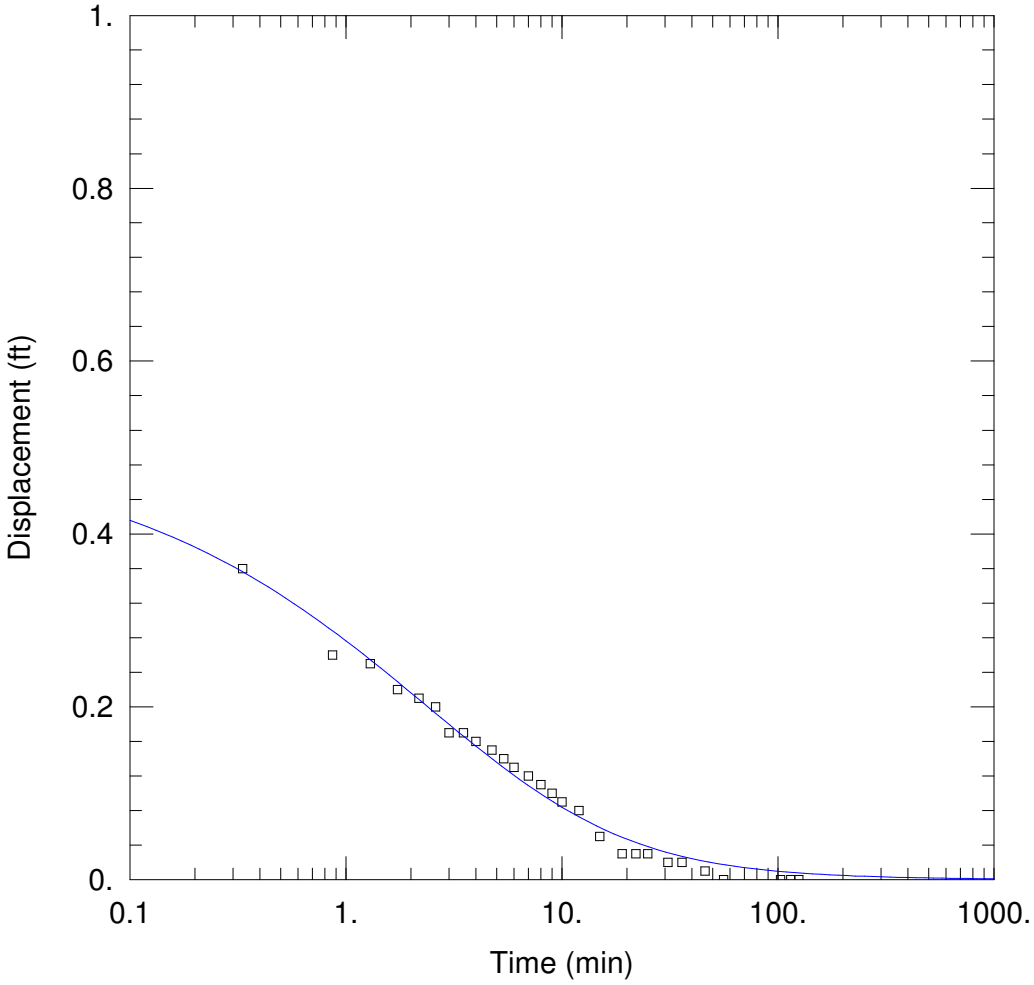
WELL DATA (twn19)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 50. ft
Casing Radius: 0.167 ft
Static Water Column Height: 50. ft
Screen Length: 50. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.811E-5 cm/sec
y0 = 0.1367 ft



WELL TEST ANALYSIS

Data Set: H:\718000\hydtst09\twn19\twn19h.aqt
Date: 11/12/09 Time: 12:19:40

PROJECT INFORMATION

Company: HGC
Client: Denison
Test Well: TWN-19

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (twn19)

Initial Displacement: 0.5 ft
Total Well Penetration Depth: 50. ft
Casing Radius: 0.167 ft
Static Water Column Height: 50. ft
Screen Length: 50. ft
Well Radius: 0.28 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 3.832E-5 cm/sec
Kz/Kr = 0.1
Ss = 0.00335 ft^{-1}

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

Mixing Equation: $C_t*V_t + C_g*V_g = C_m*V_m$ (eq 1)

Where: C_t = Concentration of nitrate in tailings solutions

V_t = Volume of tailings solutions

Cg = Concentration of nitrate in unimpacted groundwater

V_g = Volume of unimpacted groundwater

C_m = Concentration of nitrate in mixture

V_m = Volume of mixture

Another Equation: $V_t + V_g = V_m$ (eq 2)

Substituting eq2 in eq1: $C_t*V_t + C_g*V_g = C_m*(V_t + V_g)$ (eq 3)

Substitute Nitrate Concentrations in eq3

290*Vt + 1*Vg = 30*(Vt + Vg)

290*Vt + 1*Vg = 30*Vt + 30*Vg

260*Vt = 29*Vg

Vt = 29/260*Vg = 0.11* Vg

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