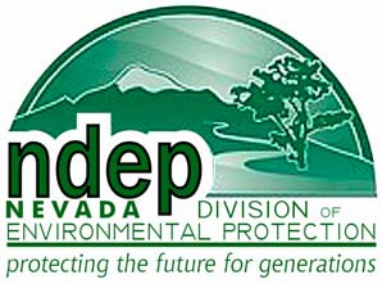
Revised Upgradient Wells Report
BMI Common Areas (Eastside)
Clark County, Nevada

Submitted to:



December 30, 2009

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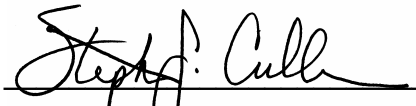

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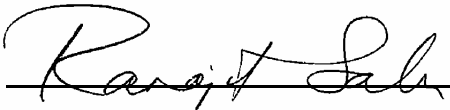

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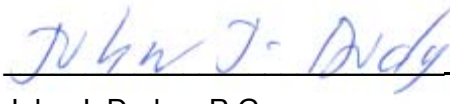

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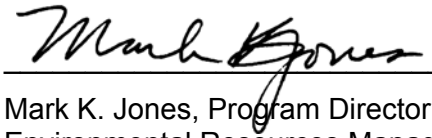

December 30, 2009

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Table of Contents

Section **Page**

1. Introduction 1
   1.1 Location and Setting 1
   1.2 Objective 3

2. Upgradient Well Selection 4
   2.1 Groundwater Occurrence and Flow Direction 4
   2.2 Historical Site Use and Facility Operations 5
   2.3 Modeling Results 7
   2.4 Soil and Groundwater Impacts 7
      2.4.1 Soil Data for Metals 7
      2.4.2 Soil Data for Nonmetals 13
      2.4.3 Groundwater Data 14

3. Summary and Conclusion 18

References 19

List of Figures

Figure **Page**

1 Site Location and Topographic Map

2 Shallow Zone Groundwater Elevations 2009

3 Simulated Recharge to Model Layer 1 for Historical Period Simulation

4 Simulated Heads Model Layer 1 for Historical Period

5 Piper Trilinear Diagrams, Upgradient Wells

6 Piper Trilinear Diagrams, Selected Shallow Zone Wells

7 Piper Trilinear Diagrams, Upgradient Wells and Selected Shallow Zone Wells

8 Stiff Polygonal Diagrams, Upgradient Wells and Selected On-Site (Shallow Zone) Wells

List of Tables

Table		Page
1	Summary of Well Construction Data, Upgradient Wells	
2	Statistical Summary of Soil Analytical Results for Nonmetals Detected in Upgradient Well Borings	
3	Summary of Selected Nonmetals Detected in Soil –from Upgradient Well Borings	
4a	Summary of Groundwater Sampling Data, Upgradient Wells, Detections Exceeding Nevada Basic Comparison Levels, First through Fifth Sampling Rounds	
4b	Summary of Groundwater Sampling Data, Upgradient Wells, Detections Exceeding U.S. EPA Maximum Contaminant Levels, First through Fifth Sampling Rounds	
5a	Summary of Groundwater Sampling Data, Upgradient Wells, Detections Exceeding Nevada Basic Comparison Levels, Eastside 2009 Groundwater Sampling Event	
5b	Summary of Groundwater Sampling Data, Upgradient Wells, Detections Exceeding U.S. EPA Maximum Contaminant Levels, Eastside 2009 Groundwater Sampling Event	

List of Appendices

Appendix	
A	Response to Comments
B	Background Boring Locations and Upgradient Well Boring Logs with Well Construction Data
C	Off-Site Source Information
D	Summary of Soil Sampling Metals Data
E	Summary of Cation-Anion Balance and Related Calculations (2009)

1. Introduction

This report identifies and provides technical justification for the selection of upgradient wells for use in monitoring groundwater quality in the Shallow Zone at the Eastside area of the Basic Management, Incorporated (BMI) Common Areas/Complex (the "Site") in Clark County, Nevada (Figure 1). Proposed existing wells are identified to be used for upgradient monitoring purposes, and the rationale and criteria used to propose the wells are presented and discussed.

The scope of work for this report has previously been discussed between Basic Remediation Company (BRC) and Nevada Division of Environmental Protection (NDEP) representatives, in an NDEP meeting on February 4, 2009 and in written correspondence to BRC dated February 20, 2009. NDEP comments dated June 26, 2009 regarding the draft of this report, dated June 12, 2009, as well as NDEP comments dated August 5 and August 10, 2009, are also addressed in this revised report (Appendix A).

1.1 Location and Setting

The Site is located in Clark County, Nevada, and is situated approximately 2 miles west of the River Mountains and 1 mile north of the McCullough Range. As shown in Figure 1, the area surface topography slopes in a westerly to northwesterly direction from the River Mountains and in a northerly to northeasterly direction from the McCullough Range. Near the Site, the surface topography slopes in a northerly direction toward Las Vegas Wash.

The uppermost water-bearing zone (referred to as the Shallow Zone) is unconfined and occurs primarily in Quaternary alluvium (Qal). At some locations on portions of the Site, Shallow Zone groundwater is first encountered in the uppermost portion of the Tertiary Muddy Creek Formation (TMCf). This unconfined Shallow Zone groundwater generally flows in a northerly direction toward Las Vegas Wash. The Shallow Zone groundwater is generally continuous across the Site, but there are areas where Shallow Zone wells are dry.

Below the Shallow Zone, deeper groundwater occurs in sporadically encountered lenses under pressure in the Middle Zone, designated between approximately 90 and 270 feet below grade.

A coarser-grained facies of the TMCf occurs off-site and in the southwest portion of the study area (at Location 27, for example). The proportion of coarser-grained sediments in the upper portion of the TMCf decreases to the north beneath the Site. This more permeable TMCf facies is interpreted as being caused by an influx of slightly coarser alluvial deposits into the older lacustrine depositional environment. One possible ramification of the presence of these coarser TMCf sediments near the southwestern border of the Site is that they may serve as a potential pathway for chemicals to migrate into the TMCf.

Deep Zone groundwater is generally continuous across the Site and is characterized with wells screened below 270 feet below ground surface (ft bgs) to a maximum nominal depth of 400 ft bgs. Groundwater elevation data from the last several rounds of groundwater monitoring (2006 through 2009) show that Deep Zone groundwater is confined, and the potentiometric surface of Deep Zone groundwater is oriented generally north toward Las Vegas Wash (MWH, 2008).

Vertical gradients at the Eastside area, as measured in the six Eastside monitoring events, have been generally upward. A summary table and figure of vertical gradient data is presented in the BRC report entitled, *Evaluation of Hydrogeologic Zone Connectivity Through Tritium and Stable Isotope Sampling and Analysis*" dated December 29, 2009 (DBS&A, 2009b).

The generally upward gradient condition is consistent with the position of the Site at the relatively distal end of two coalescing alluvial deposits from the McCullough Range and the River Mountains. In general, high-energy alluvial sediments are deposited near their source, resulting in a geologic profile dominated by coarser-textured soils that are conducive to downward recharge of precipitation and mountain runoff. At more distal locations, it is common to encounter lower-energy alluvial sediments that result in a geologic profile dominated by finer-textured soils. The distal portions of alluvial deposits often comprise pressure zones where confining or semiconfining zones exist. Water in these zones is often laterally recharged at depth, resulting in pressure buildup that is sustained by the head of water created in the upslope vertical recharge zones. At more proximal locations, such as the off-site plants area, the gradient would be expected to be more typically downward. For example, downward vertical gradients have been measured in well pairs AA-01/MCF-01B (DBS&A, 2009b).

Separate NDEP-approved project documents provide further information regarding area geology and hydrogeology, soils, history, and investigations completed to date (e.g., BRC et al., 2007; DBS&A, 2009b).

1.2 Objective

The objective of this report is to present and justify the criteria used in the selection of the upgradient wells for monitoring groundwater quality in the Eastside area. Upgradient wells need to be designated at the Site in order to document and evaluate the quality of groundwater flowing onto the Site from off-site areas. Data from the upgradient wells can then be compared to data from on-site wells, along with comparison to state and federal water quality standards, to assist in the evaluation of Site impacts. Upgradient well data will also be used, in part, for remedial decision-making. As discussed in Section 2.1, it is not possible to install background monitoring wells at this Site. As a result, proposed upgradient wells will be used for data evaluation.

2. Upgradient Well Selection

The upgradient wells are located according to the following selection criteria:

- Hydraulically upgradient
- Along the majority of the upgradient site boundary
- Where off-site upgradient groundwater impacts, if present, are well characterized

Proposed upgradient wells must also be properly constructed to represent the hydrogeologic zone of interest. To qualify as Shallow Zone upgradient wells at the Site, the proposed wells must be adequately screened in the Shallow Zone. At the Eastside area, the following wells meet the criteria listed above (Figure 2) (Appendix B):

- AA-01
- AA-27
- AA-UW-1
- AA-UW-2
- AA-UW-3
- AA-UW-4
- AA-UW-5
- AA-UW-6

2.1 Groundwater Occurrence and Flow Direction

Figure 2 presents a map of the Shallow Zone potentiometric surface at the Site based on 2009 data. As discussed in Section 1.1, Shallow Zone groundwater occurs in the Qal and the uppermost TMCf at the Site. Flow direction in the Shallow Zone is directed generally to the north toward Las Vegas Wash.

Flow direction has been roughly consistent over the last several rounds of water level measurement at the Site, completed in 2006, 2007, 2008 (MWH, 2008) and 2009. As shown on Figure 2, the proposed upgradient wells are located at the southern, southwestern, and southeastern boundaries of the Eastside area, and are well distributed along the Site perimeter in this area. This portion of the Site perimeter is the upgradient boundary of the Eastside area.

Appendix C (Figure C-1) contains a regional groundwater flow map prepared by TIMET (2007) that covers the Eastside area as well as adjacent properties upgradient to the south and west. The direction of groundwater flow in the regional flow map is also oriented generally to the north toward Las Vegas Wash.

Several soil borings were completed in the off-site upgradient areas as part of the background metals investigation (BRC and ERM, 2009). Based on these borings, it appears that Shallow Zone groundwater occurs at much deeper depths further upgradient and the Shallow Zone is absent further upgradient to the east. As identified by wet soil logged in the field, groundwater was encountered in only 2 of the 23 borings. Groundwater was encountered at 140 ft bgs in boring DBSA-17 and at 84.7 feet bgs in boring DBSA-20.

The other background metals soil borings (except DBSA-33) were drilled between 80 and 160 ft bgs, but only moist soil was logged (boring DBSA-33 was terminated at 32.5 feet when the TMCf was encountered). Since groundwater occurs at deeper depths further upgradient and off-site, additional wells installed in these areas would likely be screened in a different hydrogeologic unit than the existing on-site wells. The proposed upgradient wells are screened in the same hydrogeologic unit as on-site Shallow Zone wells (Table 1, Appendix B).

2.2 Historical Site Use and Facility Operations

Historical site use and facility operations are detailed for the Eastside area in the 2007 Closure Plan (BRC et al., 2007) and in other related BRC documents. As described in the Closure Plan (BRC et al., 2007) the Eastside area covers approximately 2,321 contiguous acres. The Eastside area lies to the east of Boulder Highway and to the north of Lake Mead Parkway and includes land on which:

- Unlined wastewater effluent evaporation/infiltration ponds (and associated conveyance ditches) were built and into which various plant wastewaters were discharged from 1942 through 1976.

- Effluent from the adjacent TIMET plant was disposed of through the use of a spray irrigation wheel used between 1985 and 1990.

- Lined wastewater effluent ponds were constructed, into which effluent from the TIMET plant was discharged from 1976 to 2005.

- The City of Henderson constructed municipal wastewater infiltration basins (e.g., the Southern rapid infiltration basins [RIBs]).

- Unlined wastewater effluent ponds were constructed, but were never used.

The proposed upgradient wells are generally located within those areas of the Site that were not used for the operations described above. The land in the vicinity of the upgradient wells has remained primarily open desert, with relatively minor adjacent property development for residential or commercial (non-industrial) use. Upgradient wells AA-UW-5 and AA-UW-6 are relatively close to the southern boundary of the upper ponds. Wells AA-01 and AA-UW1 are relatively close to the now-closed TIMET ponds that were built on top of the former upper ponds. Wells AA-01, AA-UW1, and AA-27 are adjacent to the active BMI Complex.

Appendix C provides selected information extracted from various reports and documents that summarize off-site source information for the plants area upgradient to the south and west. Included in Appendix C is a regional map from 2006 that shows flow from the plants area toward proposed upgradient wells AA-01 and AA-27. A regional map of arsenic detections in groundwater (from various dates) is also included that shows arsenic impacts originating at the plants area. Regional plume maps (2006) for nitrate, chloride, sulfate, total dissolved solids (TDS), and selected metals and volatile organic compounds (VOCs) are also included. A map and table summarizing Tronox (formerly Kerr-McGee Chemical LLC) source areas is included for reference. As discussed in Section 2.4.3, the plants area is interpreted to be the likely source for some of the groundwater impacts detected in the proposed upgradient wells.

2.3 Modeling Results

BRC submitted a draft groundwater flow model calibration report to the NDEP in 2009 (DBS&A, 2009a) (subsequently approved by NDEP). An evaluation of the potential historical mounding was completed using the updated flow model. Pond recharge was estimated at 48.18 inches per year (Figure 3). Heads were simulated for this condition to produce a groundwater flow map representing the period of time that the lower ponds were in use (Figure 4). The simulation indicates that groundwater flow was oriented primarily to the north near the locations of upgradient wells AA-01, AA-UW-1, AA-27, AA-UW-2, AA-UW-3, A-UW-4, and AA-UW-5. The simulation also indicates that localized mounding is present at the lower ponds, and flow is radial for a small area around the ponds. The location of well AA-UW-6 appears to be marginally within the area of the localized mounding.

The remaining upgradient wells are located outside the area of modeled localized mounding caused by pond use. Flow direction near the former ponds and at well AA-UW-6 has since returned to its original northwesterly direction (Figure 2, Figure C-1). As discussed in Section 2.4, the soil and groundwater data from well AA-UW-6 do not appear to reflect unique impacts due to former pond use. That is, the analytical data (nonmetals) from AA-UW-6 do not appear to be substantially different from the other well locations.

2.4 Soil and Groundwater Impacts

Selected analytical data for the upgradient well locations are discussed below in Sections 2.4.1 through 2.4.3.

2.4.1 Soil Data for Metals

The background metals dataset for the Eastside area (BRC and ERM, 2009) was compared to the range of metals concentrations data collected from the upgradient well locations (Appendix D) (excluding duplicates). The following metals from the Site-related chemicals (SRC) list were evaluated:

- Radionuclides
  - Radium-226
  - Radium-228
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - Uranium-233/234
  - Uranium-235/236
  - Uranium-238

- Metals
  - Aluminum
  - Antimony
  - Arsenic
  - Barium
  - Beryllium
  - Boron
  - Cadmium
  - Calcium
  - Chromium (VI)
  - Chromium (Total)
  - Cobalt
  - Copper
  - Iron
  - Lead
  - Lithium
  - Magnesium
  - Manganese
  - Mercury
  - Molybdenum
  - Nickel
  - Niobium

In accordance with the BRC Closure Plan (BRC et al., 2007), background metals comparisons were performed using the Quantile test, Slippage test, t-test, and Wilcoxon Rank Sum test with Gehan modification. The Quantile test, Slippage test, and Wilcoxon Rank Sum test are nonparametric; that is, the tests are distribution-free, and an assumption of whether the data are normally or lognormally distributed is therefore not necessary. The computer statistical software program Guided Interactive Statistical Decision Tools (GISdT) (Neptune and Company, 2007) was used to perform all statistical comparisons, with a decision error of alpha equal to 0.025.

The Wilcoxon Rank Sum test analyzes the difference between the sum of the ranks for two populations. This is a nonparametric method of assessing differences in the centers of the distributions that relies on the relative rankings of data values. Knowledge of the precise form of the population distributions is not necessary. When the data are normally distributed, the Wilcoxon Rank Sum test has less power than the two-sample t-test, but the assumptions are not as restrictive. The GISdT version of the Wilcoxon Rank Sum test uses the Mantel approach, which is equivalent to using the Gehan ranking system (Neptune and Company, 2007).

The Quantile test addresses tail effects that are not addressed in the Wilcoxon Rank-Sum test. The Quantile test looks for differences in the right tails (upper end of the dataset) rather than central tendency as the Wilcoxon Rank-Sum test does. The Quantile test was performed using a defined quantile equal to 0.80 (Neptune and Company, 2007).

The Slippage test looks for a shift to the right in the extreme right tail of the background dataset versus the extreme right tail of the site dataset. This is equivalent to asking if a set of the largest values of the site distribution are significantly larger (in a statistical sense) than the maximum value of the background distribution (Neptune and Company, 2007).

Typically, an alpha equal to 0.05 is used to evaluate a statistically significant result (Neptune and Company, 2007). Since several correlated tests were conducted, a lower alpha was selected. As more tests are performed, it is more likely that a statistically significant result will be obtained purely by chance. Given the use of multiple statistical tests, an alpha equal to 0.025 was selected as a reasonable significance level (p).

If an individual test p-value is less than 0.025, the test result is interpreted to indicate that the metal exceeds background levels. Additional factors, such as detection frequency and mean or median values, are also reviewed to determine if a metal exceeds background levels.

Metals data from the upgradient well borings and nearby soil borings SB-01 and SB-27 were sorted into the following groups based on sample depth and the geographic location of the boring:

- Shallow Qal (samples from less than 20 ft bgs): Data were compared to the Shallow McCullough dataset, the Shallow Mixed dataset, or the Shallow River dataset.

- Deep Qal (samples from greater than or equal to 20 ft bgs, but collected above the contact between the Qal and Upper Muddy Creek formation [UMCf]): Data were compared to the Deep McCullough dataset, the Deep Mixed dataset, or the Deep River dataset.

- TMC (samples collected from the UMCf (below the Qal/TMCf contact): Data were compared to TMC dataset.

The River datasets represent background metals characterized from soils collected in the shallow alluvial fan system originating in the River Mountains to the east of the Site. The McCollough datasets represent background metals characterized from soils collected in the shallow alluvial system originating in the McCollough Range to the south/southwest of the Site. The Mixed datasets represent background metals characterized from soils collected in the shallow alluvial system originating from both the River Mountains and the McCollough Range, where the two fan systems coalesce.

Data from upgradient well boring AA-UW-5 were compared to the Mixed datasets because this boring is located where the River Mountains alluvial fan system and the McCollough Range fan system coalesce. Data from upgradient well boring AA-UW-6 were compared to the River datasets because this boring is located within the River Mountains alluvial fan system. All other borings (including soil borings SB-01 and SB-27) fall within the McCollough Range fan system,

so these remaining data were compared to the McCollough datasets (BRC and ERM, 2009). Deep data below the Qal/UMCf contact were compared to the TMC dataset.

2.4.1.1 Shallow Metals (less than 20 feet below grade)

The shallow background metals comparison for upgradient well borings AA-UW-5 (Shallow Mixed dataset) and AA-UW-6 (Shallow River dataset) could not be completed because, with only two samples per boring (not a total of four in a usable set), there is an insufficient number of detections to use for the statistical calculations.

The background metals comparison for the upgradient well borings falling into the McCollough grouping (all borings except AA-UW-5 and AA-UW-6) indicates that the following metals were detected above background:

- Boron
- Chromium (VI)
- Total chromium
- Iron
- Niobium
- Silver
- Sodium
- Strontium
- Titanium
- Tungsten
- Vanadium

2.4.1.2 Deep Metals (greater than 20 feet below grade and above the Qal/UMCf contact)

The deep background metals comparison for upgradient well boring AA-UW-6 (Deep River dataset) could not be completed because, with only two samples in the boring, there is an insufficient number of detections to use for the statistical calculations.

The background metals comparison for the upgradient borings falling into the McCollough grouping (all borings except AA-UW-5 and AA-UW-6) indicates that the following metals were detected above background:

- Aluminum
- Barium
- Boron
- Chromium (VI)
- Total chromium
- Iron
- Lead
- Manganese
- Selenium
- Silicon
- Thallium
- Titanium
- Zinc

The background metals comparison for the upgradient well boring AA-UW-5 falling into the Mixed Deep grouping indicates that the following metals were detected above background:

- Silicon
- Sodium
- Strontium

2.4.1.3 Deep Metals (below the Qal/UMCf contact)

The background metals comparison for the upgradient boring data collected below the Qal/UMCf contact (all borings) indicates that the following metals were detected above background:

- Beryllium
- Boron

- Cadmium
- Chromium (VI)
- Total chromium
- Copper
- Magnesium
- Molybdenum
- Selenium
- Silicon
- Sodium
- Thallium
- Tungsten
- Uranium
- Zinc
- Radium-226
- Thorium-230
- Uranium-233/234
- Uranium-238

2.4.2 Soil Data for Nonmetals

Table 2 presents a statistical summary of nonmetals detected in the upgradient well borings and adjacent borings SB-01 and SB-27. Several compounds were detected in the upgradient borings, including organochlorine pesticides, organophosphate pesticides, and VOCs. None of the detections, however, exceed Nevada Basic Comparison Levels (BCLs). Table 3 summarizes selected analyte detections for each well boring.

Up to 2.5 milligrams per kilogram (mg/kg) perchlorate was detected at 60 ft bgs in soil boring SB-01, drilled near upgradient well AA-01 (Table 2). Perchlorate was also detected at more shallow depths in this boring. Perchlorate was also detected in groundwater samples from well AA-01 and the other upgradient wells. The detected concentrations may not be Site-related and may be due to historical perchlorate use and release at adjacent upgradient and cross-gradient facilities (such as Tronox and AMPAC).

Similarly, relatively low concentrations of VOCs (less than 60 micrograms per kilogram [μg/kg]) have been detected in soil samples from the well borings (Table 2). Tetrachloroethene (PCE) was detected up to 7.7 μg/kg) in soil samples from borings completed near wells AA-01 and AA-UW-5. Trichloroethene (TCE), a degradation daughter compound of PCE, was not detected in soil samples from the upgradient well locations. However, both PCE and TCE have been detected in the upgradient groundwater well samples.

The soil data from well boring AA-UW-6 do not appear to reflect unique historical impacts from former use of the upper evaporation ponds. As shown on Table 3, some VOCs, gross alpha/beta activity, dioxins/furans, and pesticides were detected in other soil borings, but not at AA-UW-6. In addition, nitrate in soil at 50 ft bgs in well boring AA-UW-6 (0.39 mg/kg) is among the lowest nitrate detections. Soil from AA-UW-6 at 40 ft bgs, however, has among the highest detected uranium-233/234 and uranium-238 activity.

2.4.3 Groundwater Data

2.4.3.1 Piper and Stiff Diagrams

Piper trilinear diagrams and Stiff polygonal diagrams of major cation and anion data from the Eastside 2009 groundwater sampling event for BRC wells are provided as Figures 5 through 8. As shown on these figures, the ion data show that the hydrogeochemical signature of groundwater in the upgradient wells is broadly consistent with other Shallow Zone wells screened in the same hydrogeologic unit. A relatively few Site wells, however, have a relatively distinct hydrogeochemical signature, such as off-site well PC-67 (relatively high sodium and chloride content) and well AA-18, where the ion content is relatively low. An updated version of the cation-anion balance (CAB) table (with related check calculations) is provided in Appendix E. The CAB table was prepared in accordance with NDEP guidance and Standard Methods for the Examination of Water and Wastewater (Section E).

2.4.3.2 Basic Comparison Levels

All data from the groundwater samples collected from the Shallow Zone upgradient wells over the six monitoring events were compared to BCLs established by the Nevada Division of Environmental Protection (NDEP) to determine the level of chemical impact to the upgradient

wells. Each of the proposed upgradient wells appear to have been impacted above the BCLs for various individual chemical constituents (Tables 4a, 4b, 5a, and 5b), including:

- 1,4-Dichlorobenzene
- Acetaldehyde
- Alpha BHC
- Arsenic
- Bromodichloromethane
- Chlorine
- Chloroform
- Chromium (VI)
- Dimethyl phosphorodithioic acid
- Fluoride
- Formaldehyde
- Iron
- Lithium
- Magnesium
- Nitrate (as N)
- Octachlorodibenzodioxin
- Perchlorate
- Phosphorus (as P)
- Tetrachloroethylene
- Thallium
- Trichloroethylene
- Uranium

Based on isoconcentration plots of chemicals presented in the monitoring reports for the six monitoring events, the chemical distribution data appear to indicate that chemicals detected in wells AA-01 and AA-27 may be moving from off-site locations onto the Site. The source of these chemicals in groundwater samples from the upgradient wells may be the historical operations in the off-site upgradient BMI Plants area. TCE was detected at less than 1 μg/L (in wells AA-01 and AA-UW-01) in the 5th round event (Table 4a), and PCE was detected at a

maximum of 84 μg/L in well AA-01 in the 5th round event (Table 4a) and at 73 μg/L in the Eastside 2009 groundwater sampling event (Table 5b).

PCE and TCE are also documented to have been released at upgradient sites to the southwest (e.g., TIMET and Tronox) (Appendix C). The information in Appendix C represents a portion of the off-site source information that is fully detailed in the TIMET *Conceptual Site Model Report* (TIMET, 2007) and the Kerr-McGee (now Tronox) *Conceptual Site Model* report (ENSR, 2005). The general spatial trends of the data for other proposed upgradient wells indicate that the concentrations are greater in wells to the south of the Site and decrease with increasing distance to the north-northeast. An exception to this spatial trend is for arsenic, where the concentration in well AA-UW6 (102 μg/L 5th round, 161 μg/L Eastside 2009 groundwater sampling event), located to the northeast, was greater than in well AA-UW1 (69.8 μg/L 5th round, 90.3 μg/L Eastside 2009 groundwater sampling event), located farther to the south toward the plants area. This anomaly in the data spatial trend may be attributable to the spatial variability of the natural arsenic content of geologic materials in the Site vicinity.

As with wells AA-01 and AA-27 discussed above, the chemical distribution data appear to indicate that these chemicals may be moving from off-site locations onto the Site. The source of these chemicals in groundwater may be the historical operations in the BMI plants area. In the case of arsenic, the BMI plants area is an off-site source and the Three Kids Mine may also be a potential source.

2.4.3.3 Maximum Contaminant Levels

Data for groundwater samples collected from the proposed upgradient wells over the six monitoring events were also compared to federal maximum contaminant levels (MCLs) (Tables 4b and 5b). TDS, sulfate, and chloride are the primary analytes detected above secondary MCLs; aluminum, iron, and manganese were also measured over the MCL but at a much lower frequency.

TDS in monitoring wells AA-UW4 and AA-UW6 exceeded ten times the secondary MCL (i.e., greater than 5,000 mg/L) in the 5th round, but the Eastside 2009 groundwater sampling event data showed lower TDS concentrations (3,700 mg/L for each well). The other proposed

upgradient wells also had concentrations of TDS that exceed the TDS MCL during one or more monitoring events (Tables 4b and 5b). However, TDS concentrations are broadly consistent between sampling rounds in the proposed upgradient wells (Tables 4b and 5b).

The groundwater data from well boring AA-UW-6 do not appear to reflect unique historical impacts from former pond use. As shown on Tables 5a and 5b, the detected perchlorate and chlorine concentrations are among the lowest measured. Chloroform was detected at its lowest concentration in well AA-UW-6, and the measured sulfate in well AA-UW-6 is roughly average for the proposed background wells. The TDS detection in this well, however, is among the highest TDS detections in the Shallow Zone. In addition, the arsenic was detected at 102 μg/L (5th round) and 161 μg/L (Eastside 2009 groundwater sampling event), which is the highest among the upgradient wells.

3. Summary and Conclusion

Proposed upgradient wells AA-01, AA-27, and AA-UW-1 through AA-UW-6 meet the criteria listed in Section 2 for designation as Shallow Zone upgradient wells for the Eastside area. Given the locations of the Site boundaries relative to the direction of groundwater flow and the physiographic and hydrogeologic features in the Site vicinity, there appear to be no alternative locations suitable for siting of Site upgradient wells.

Existing BRC data and modeling results that characterize groundwater flow conditions, current and historical site use, soil quality, site location, and groundwater quality support the selection of these wells for use as upgradient wells.

References

Basic Remediation Company (BRC), Environmental Resources Management (ERM), and Daniel B. Stephens & Associates, Inc. (DBS&A). 2007. *Closure plan, BMI Common Areas, Clark County, Nevada.* Prepared for Basic Remediation Company (BRC), Henderson, Nevada. May 2007.

Basic Remediation Company (BRC) and Environmental Resources Management (ERM). 2009. *2008 Deep soil background report, BMI Common Areas (Eastside), Clark County, Nevada.* October 2009.

Daniel B. Stephens & Associates, Inc. (DBS&A). 2009a. *Updated groundwater flow model calibration, BMI Upper and Lower Ponds area.* Prepared for Basic Remediation Company; Submitted to Nevada Division of Environmental Protection. May 14, 2009.

DBS&A. 2009b. *Evaluation of hydrogeologic zone connectivity through tritium and stable isotope sampling and analysis, BMI Common Areas (Eastside), Clark County, Nevada.* Prepared for Basic Remediation Company; Submitted to Nevada Division of Environmental Protection. December 29, 2009.

ENSR International (ENSR). 2005. *Conceptual site model, Kerr-McGee facility, Henderson, Nevada.* Document Number 04020-023-100. Prepared for Kerr-McGee Chemical LLC. February 2005.

Montgomery Watson Harza (MWH). 2008. *Fifth round groundwater monitoring report, April - July 2008, BMI Common Areas (Eastside), Clark County, Henderson, Nevada.* Prepared for Basic Remediation Company (BRC), Henderson, Nevada. December 2008.

Neptune and Company. 2007. Guided interactive statistical decision tools (GISdT). <www.gisdt.org>.

Titanium Metals Corporation (TIMET). 2007. *Conceptual site model, Titanium Metals Corporation Facility, Henderson, Nevada.* April 25, 2007.

Figures

S:\Projects\BRC\ES06.0067.00_Deep_Soil_Background_Investigation\Sept06_Draft\Figures\Fig_1_Site_Loc_Topo_Map.pdf

BMI COMMON AREAS

BMI INDUSTRIAL AREA

2,000 1,000 0 2,000 Feet

Nevada-Clark Co. 7.5 Minute Series (Topographic)
Henderson, Nevada SE, Boulder City NW, and Sloan NE Quadrangles

BMI Site
Henderson, Nevada

N

FIGURE 1

SITE LOCATION AND TOPOGRAPHIC MAP

Basic Remediation COMPANY

Prepared by:	Date	JOB No. 1881262
MKJ MWH	09/28/06	FILE: GIS/BRC/BKGD_FIGURE1.MXD

S:/PROJECTS/BRC/ES09.0281_BRC_WH_AND_PRE-CSM_TASKS/GIS/MXDS/FLUID_LEVELS/FIG02_GROUNDWATER_SHALLOW_ZONE.MXD 900321

PC-83 1551.05
PC-84 --
PC-82 1550.26
PC-90 1543.18
PC-89 --
PC-88 1542.76
WMW5.58SI --
WMW5.58SS --
WMW5.58SD --
PC-80 1553.12
PC-81 1553.15
PC-79 1553.47
COH-1A --
W02 1405.53
DBMW-20 --
MW-1 1453.01
MW-3 1476.87
MW-15 1487.19
MW-13 1493.53
City of Henderson Landfill
AA-21 1561.72
TWI --
AMPAC Re-Injection Area
AA-08 1565.21
PC-76 1549.66
Tronox Seep Pumping Station
PC-95 --
COH-2A --
AA-30 1513.04
HMW-08 1521.85
MW-4 1498.59
AA-26 1518.21
PC-62 1554.79
PC-86 1547.42
PC-92 1539.79
PC-94 1535.84
HMW-09 1525.90
DBMW-22 1505.85
AA-23 --
PC-108 1571.21
PC-56 1544.34
PC-58 1553.42
AA-23-R --
PC-105 --
PC-104 1565.60
DBMW-19 1553.47
AA-22 1550.38
City of Henderson Northern Rib Ponds
Tuscany Village
PC-106 --
PC-103 1572.96
PC-2 1566.40
PC-1 --
PC-4 1564.00
MCF-06B 1576.97
AA-10 1594.82
DBMW-4 1580.08
DBMW-5 1581.98
MCF-06C 1575.81
AA-07 1571.91
PC-107 --
DBMW-2 1592.29
DBMW-1 1591.67
DBMW-7 1573.24
DBMW-13 1619.10
AMPAC Athens Pen Extraction Area
DM-5 --
DBMW-10 1601.89
DBMW-14 1635.55
DBMW-16 1596.19
DBMW-8 1574.05
DBMW-11 1609.98
DBMW-15 1642.40
DBMW-17 1641.27
HMW-16 1612.40
DM-4 --
AA-20 1597.80
DBMW-6 --
DBMW-9 1596.37
PZ-13 --
PC-19 1590.57
PC-12 --
DBMW-3 1594.22
AA-19 --
DM-7B --
DM-8 --
DBMW-18 1649.12
BEC-9 1564.88
BEC-10 1598.31
AA-18 1609.33
MCF-12B 1646.79
PC-50 1621.73
PC-24 1612.49
DBMW-12 1610.27
AA-15 1615.82
POD4 1633.69
MCF-16C 1625.04
AA-UW6 1681.30
AA-11 1629.32
POD4-R --
DM-9 --
PC-31 1646.88
PC-28 1639.04
Spray Wheel
POD8 1620.99
POD2 1624.53
POD2-R2 --
POD2-R 1613.49
BEC-6 1657.88
PC-40 1654.55
BEC-4 1650.52
AA-14 1636.18
AA-09 1657.55
POD7 1639.02
Upper ponds area 1964
PC-64 1665.26
PC-67 1661.28
AA-13 1662.15
AA-UW5 1719.81
HMWWT-6 1732.24
PC-54 1684.85
DM-1 1676.54
POU3 1687.64
HMWWT-4 --
City of Henderson Southern Rib Ponds
PC-21 1691.78
MCF-03B 1740.67
HMWWT-8 --
AA-UW4 1756.78
MCF-01B 1709.23
AA-01 1707.20
AA-UW1 1722.47
AA-27 1721.32
TMPZ-111 1738.13
AA-UW3 1746.06
AA-UW2 1754.20
1420 1440 1460 1480 1500 1520 1540 1560 1580 1600 1620 1640 1660 1680 1700 1720 1740 1760

N

0 1000 2000 Feet

Explanation

- Shallow Zone monitoring well
- Shallow Zone monitoring well (abandoned)
- Proposed upgradient wells
- Site boundary
- Gravel pit circa 1976. Source: Aerial photograph dated 1976
- TIMET site boundary (See Appendix C for off-site source information)
- Tronox site boundary (See Appendix C for off-site source information)
- Las Vegas Wash
- Streets
- Potentiometric surface (dashed where inferred)
- MCF-06B 1576.97 Monitoring well designation Static water elevation (ft msl)

Note:
Water level data from well BEC-9 have not been used for Shallow Zone flow maps in prior monitoring reports.

BMI Common Areas (Eastside)
Henderson, Nevada

FIGURE 2
Shallow Zone
Groundwater Elevations 2009

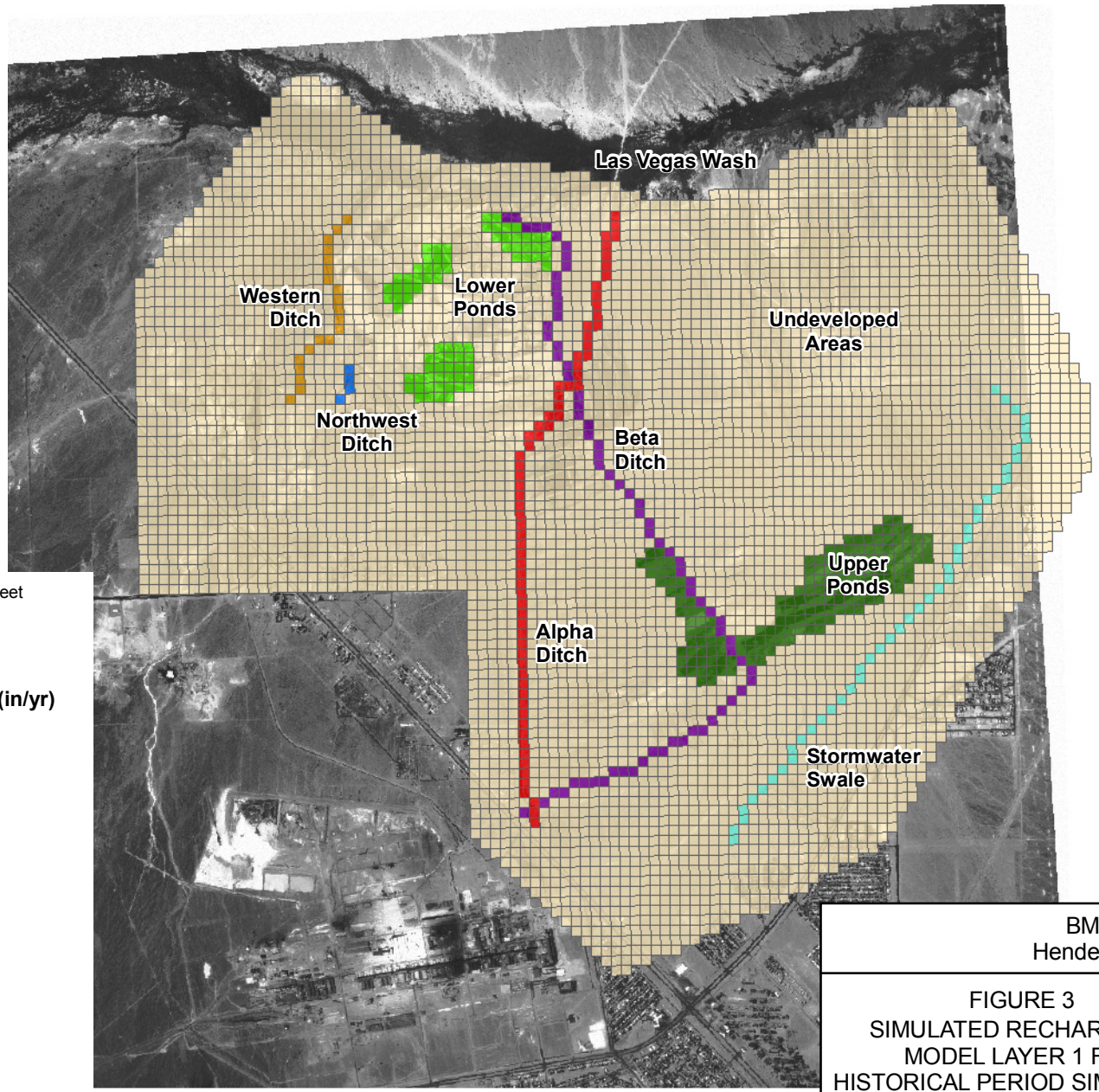
Basic Remediation COMPANY

Prepared by: DBS&A CRS Date 12-29-09

S:/PROJECTS/BRC/ES09.0281_BRC_WH_AND_PRE-CSM_TASKS/GIS/MXDS/BASE_MAPS/MASTER_SITE_MAP_ALL_MONITORING_WELLS_S.MXD 909011

Daniel B. Stephens & Associates, Inc.

S:/PROJECTS/BRC/ES09.0108_MULTIPLE_BRC_TASKS/GIS/MXDS/FIG01_SIM_RECHARGE_MODEL_LAYER_1_HIST_PERIOD_SIM.MXD



N

0 1,750 3,500 Feet

Explanation

Historical recharge (in/yr)

- 0.394
- 13.97
- 14.45
- 21.9
- 41.96
- 48.18
- 87.6
- 105.1
- Model grid

Source: Aerial photograph, 1968

BMI Complex
Henderson, Nevada

FIGURE 3
SIMULATED RECHARGE TO
MODEL LAYER 1 FOR
HISTORICAL PERIOD SIMULATION

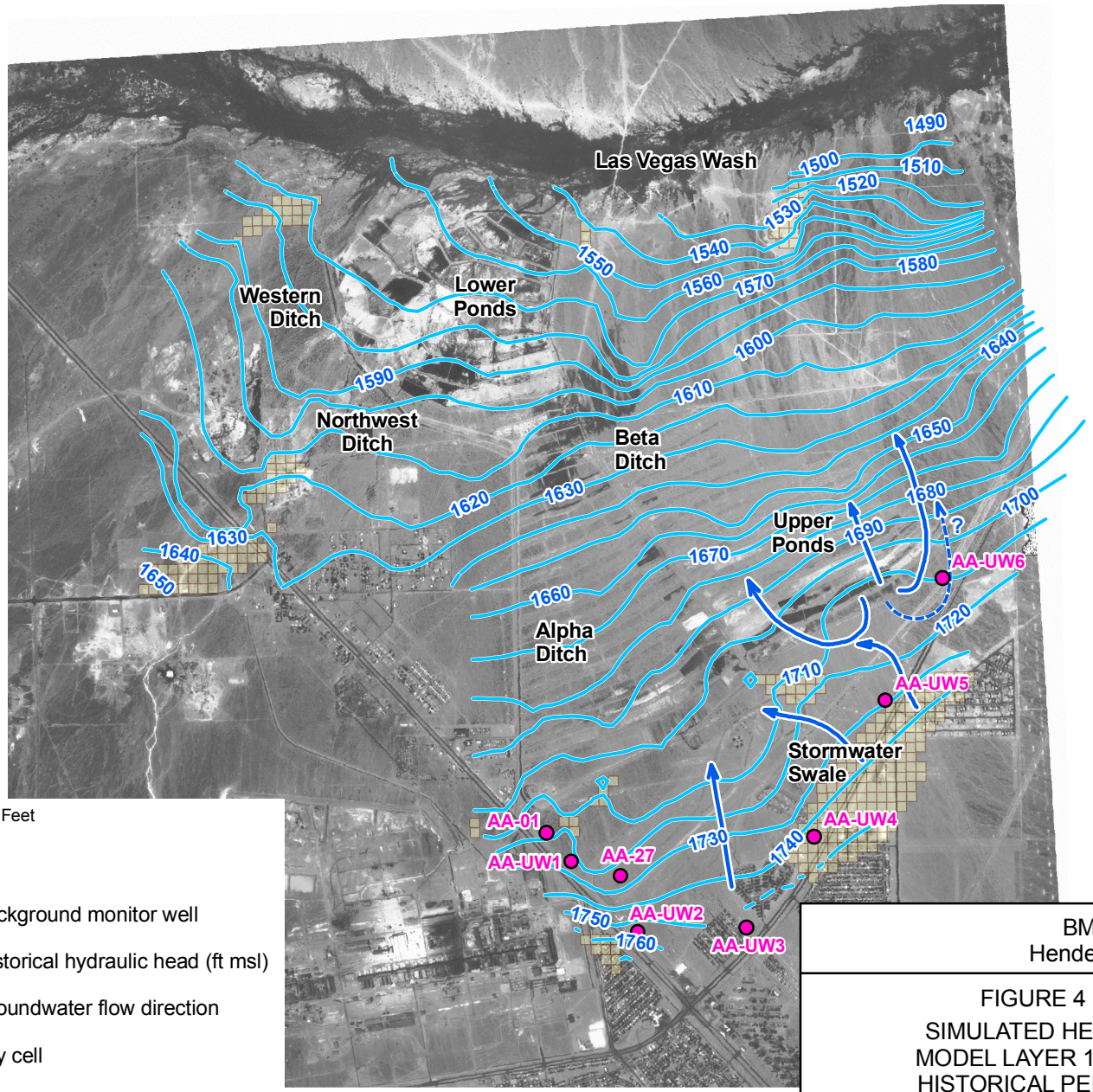
Basic Remediation COMPANY

Prepared by:	Date	
DBS&A GJ	6/2/09	S:/PROJECTS/BRC/ES09.0108_MULTIPLE_BRC_TASKS/GIS/MXDS/FIG01_SIM_RECHARGE_MODEL_LAYER_1_HIST_PERIOD_SIM.MXD

Figure 3

Daniel B. Stephens & Associates, Inc.
JN ES09.0108

S:/PROJECTS/BRC/ES09.0108_MULTIPLE_BRC_TASKS/GIS/MXDS/FIG02_HISTORICAL_HEADS_MODEL_LAYER_1.MXD



N

0 1,750 3,500 Feet

Explanation

- Proposed background monitor well
- Simulated historical hydraulic head (ft msl)
- Simulated groundwater flow direction
- Simulated dry cell

Source: Aerial photograph, 1968

BMI Complex
Henderson, Nevada

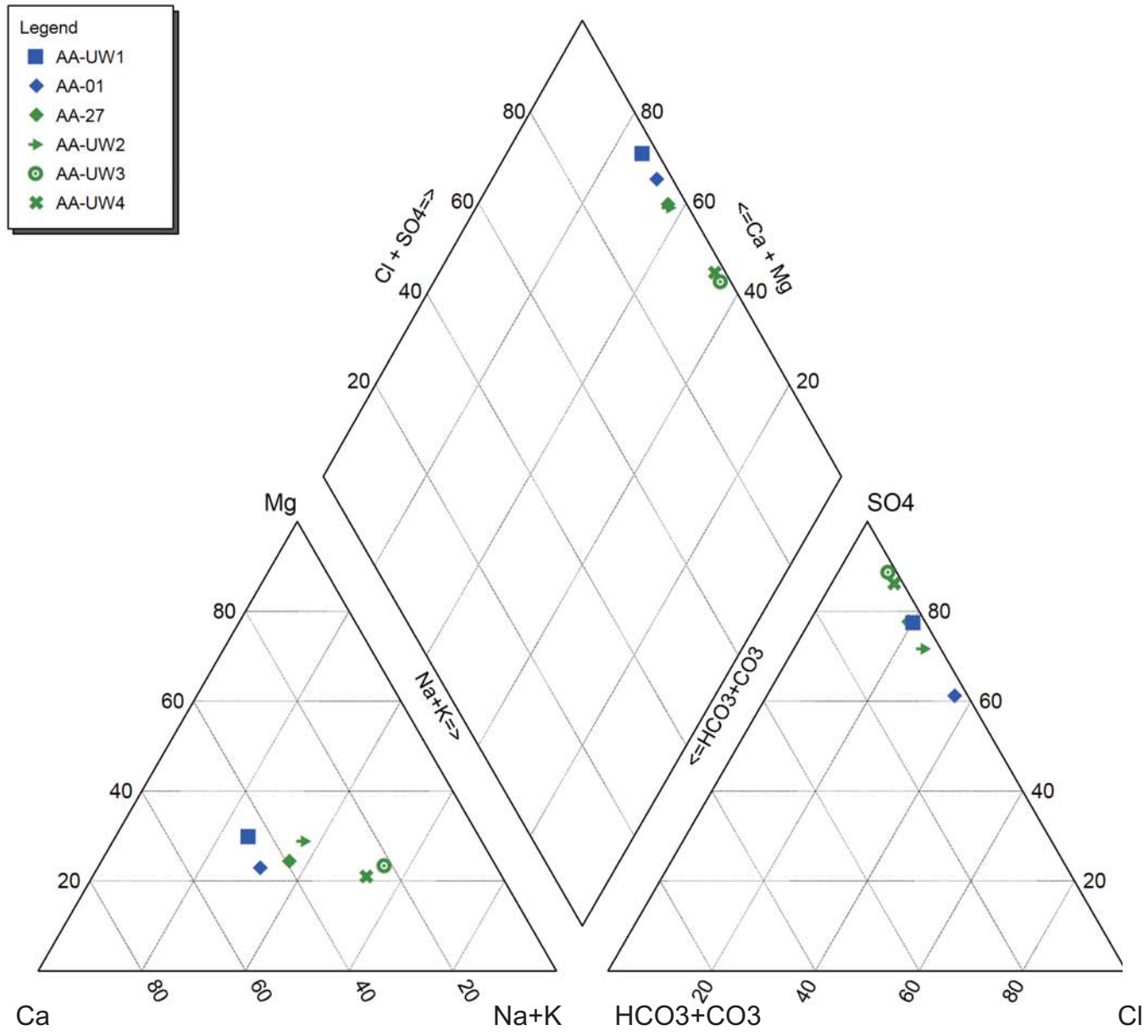
FIGURE 4
SIMULATED HEADS
MODEL LAYER 1 FOR
HISTORICAL PERIOD

Basic Remediation COMPANY

Prepared by:	Date	
DBS&A MK	06/02/09	S:/PROJECTS/BRC/ES09.0108_MULTIPLE_BRC_TASKS/GIS/MXDS/FIG02_HISTORICAL_HEADS_MODEL_LAYER_1.MXD

Figure 4

Daniel B. Stephens & Associates, Inc.
JN ES09.0108



Note: Data from 2009 sampling event.

BMI Common Areas (Eastside)
Henderson, Nevada

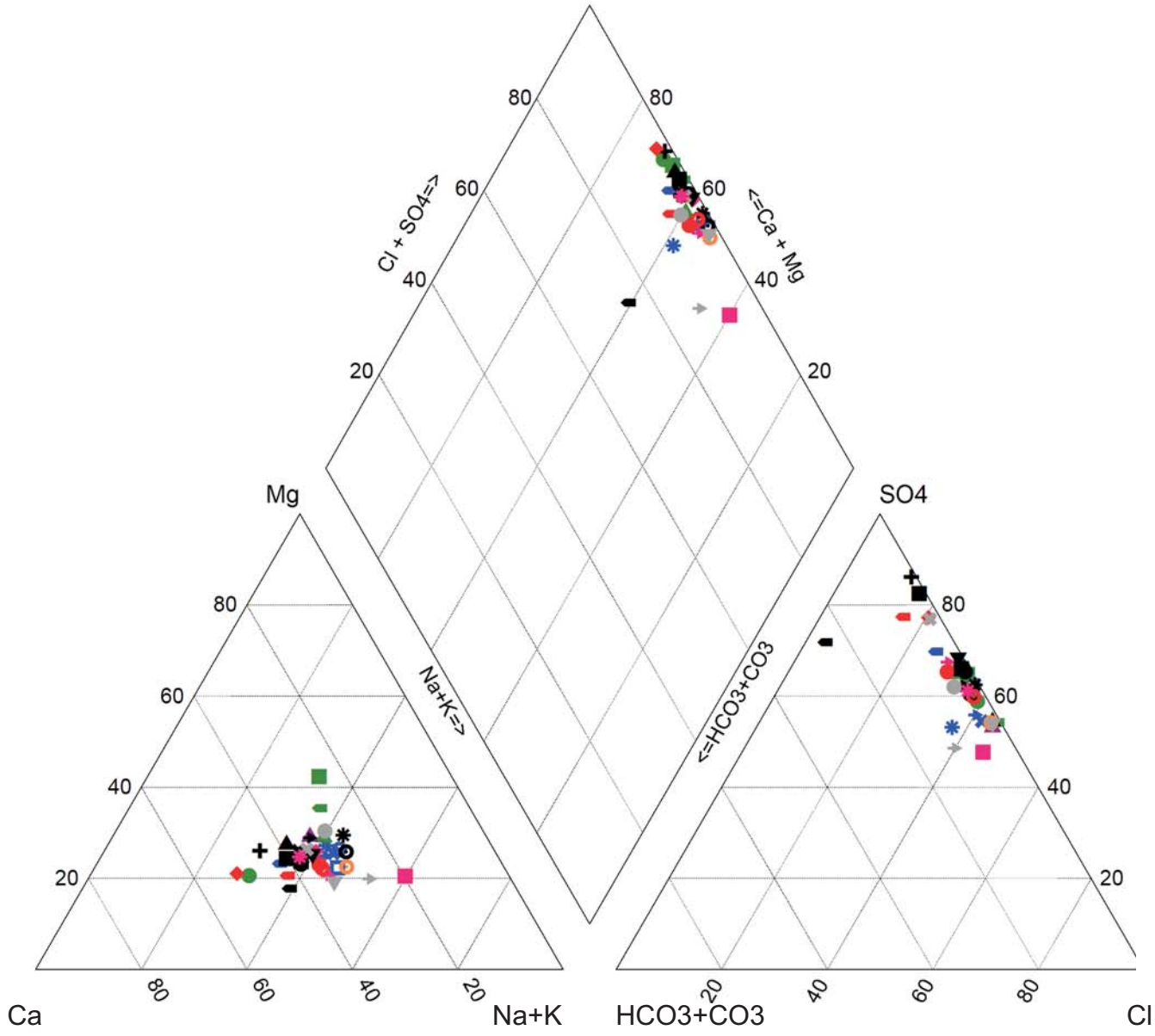
FIGURE 5
Piper Trilinear Diagrams
Upgradient Wells

Basic Remediation COMPANY

Prepared by:
DBS&A CRS 12-17-09

S:/PROJECTS/BRC/ES09.0281_BRC_WH_AND_PRE-CSM_TASKS/VDR_DRAWINGS\piper.cdr

Daniel B. Stephens & Associates, Inc.



Note: Data from 2009 sampling event.

BMI Common Areas (Eastside)
Henderson, Nevada

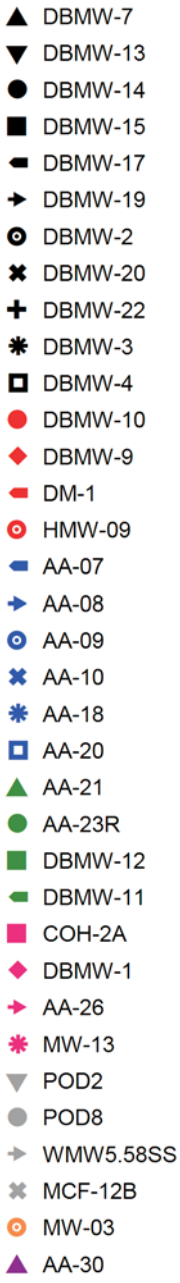
FIGURE 6
Piper Trilinear Diagrams
Selected Shallow Zone Wells
Page 1 of 2

Basic Remediation COMPANY

Prepared by:
DBS&A CRS 12-17-09

S:/PROJECTS/BRC/ES09.0281_BRC_WH_AND_PRE-CSM_TASKS/VDR_DRAWINGS\piper.cdr

Daniel B. Stephens & Associates, Inc.



Note: Data from 2009 sampling event.

BMI Common Areas (Eastside)
Henderson, Nevada

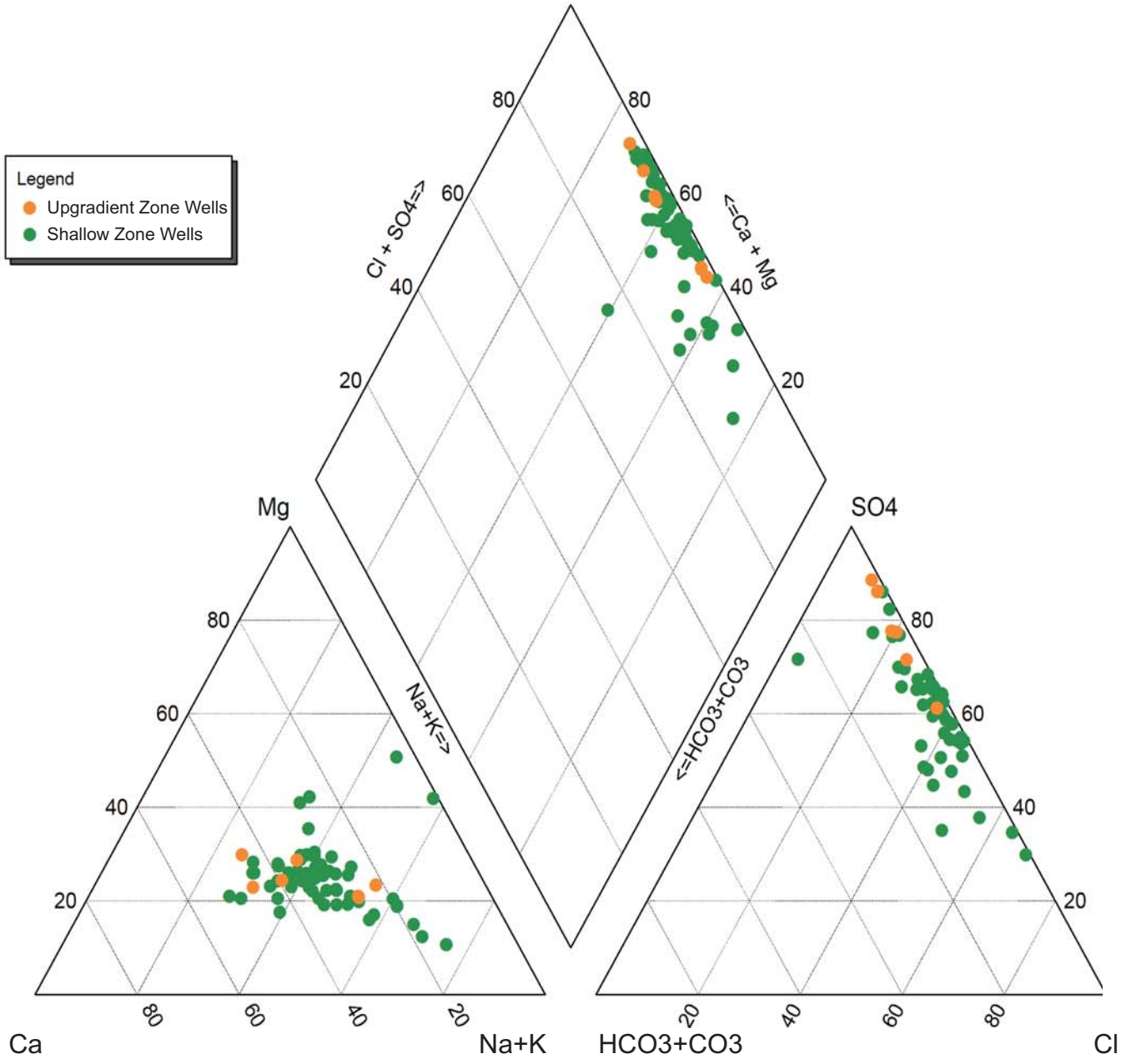
FIGURE 6
Piper Trilinear Diagrams
Selected Shallow Zone Wells
Page 2 of 2 (Legend)

Basic Remediation COMPANY

Prepared by:
DBS&A CRS 12-17-09

S:/PROJECTS/BRC/ES09.0281_BRC_WH_AND_PRE-CSM_TASKS/VDR_DRAWINGS\piper.cdr

Daniel B. Stephens & Associates, Inc.



Note: Data from 2009 sampling event.

BMI Common Areas (Eastside)
Henderson, Nevada

FIGURE 7
Piper Trilinear Diagrams
Upgradient Wells and
Selected Shallow Zone Wells

Basic Remediation COMPANY

Prepared by: DBS&A CRS Date 12-17-09

S:/PROJECTS/BRC/ES09.0281_BRC_WH_AND_PRE-CSM_TASKS/VDR_DRAWINGS\piper.cdr

Daniel B. Stephens & Associates, Inc.

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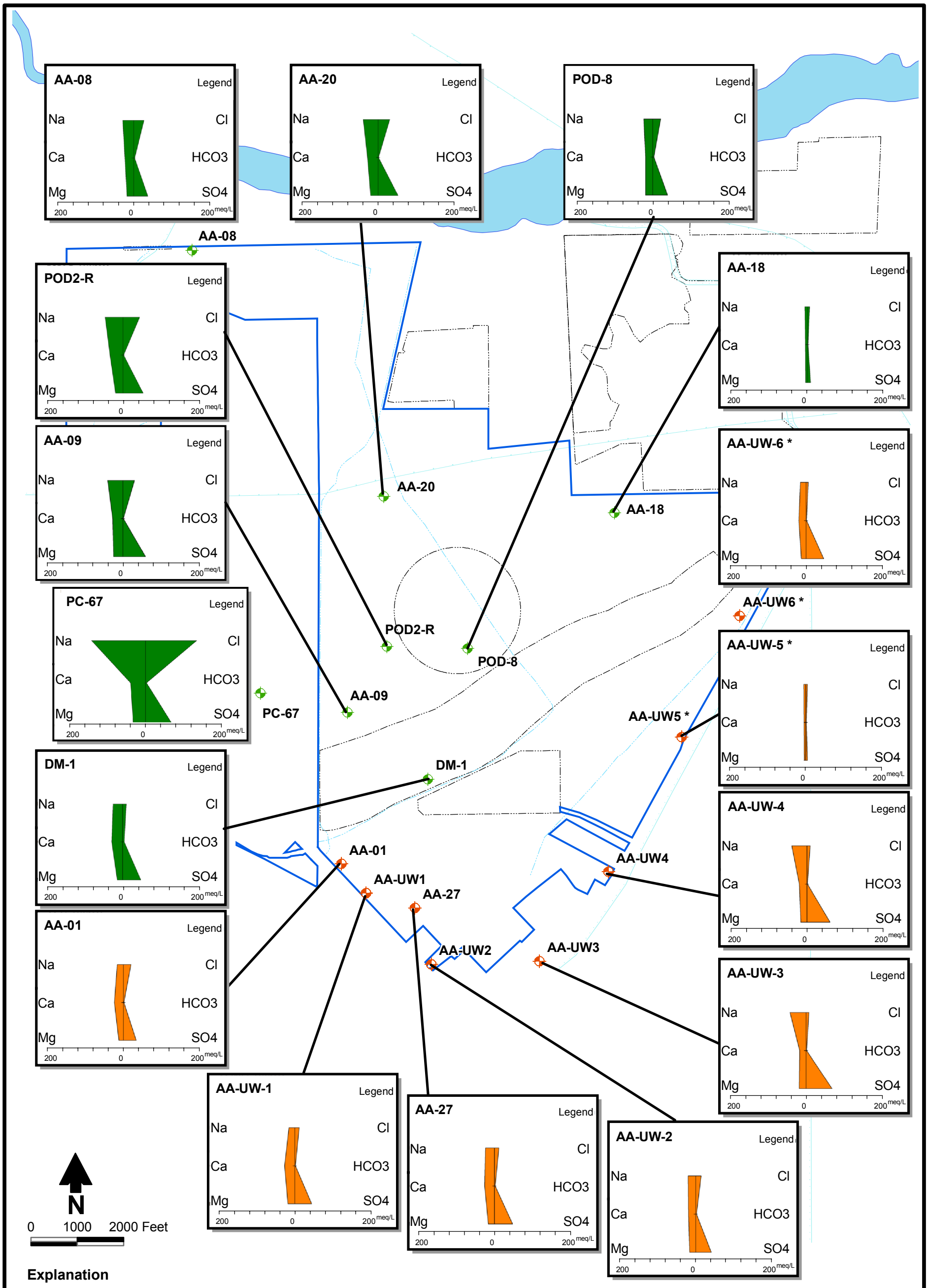


Explanation

- Upgradient wells
- On-site wells
- Site AOC3 boundary
- meq/L Milliequivalents per liter

Note: 1. Data from 2009 sampling event.
2. * = Cation-anion balance check does not pass; TDS measured/sum and/or TDS:EC ratio check do not pass

BMI Common Areas (Eastside)
Henderson, Nevada

FIGURE 8
Stiff Polygonal Diagrams
Upgradient Wells and Selected
On-Site (Shallow Zone) Wells

Basic Remediation COMPANY

Prepared by: DBS&A CRS Date 12-17-09

S:/PROJECTS/BRC/ES09.0281_BRC_WH_AND_PRE-CSM_TASKS/GIS/MXDS/REPORTS/STIFF.MXD 907121

Daniel B. Stephens & Associates, Inc.

Tables

Table 1. Summary of Well Construction Data
Upgradient Wells

Well ID	Top of Casing Elevation (ft msl)	Surface Elevation (ft msl)	Total Boring Depth (ft bgs)	Casing Material	Diameter of Casing (inches)	Depth to Top of Screen (ft bgs)	Depth to Bottom of Screen (ft bgs)	Screen Interval (feet)	Screen Slot Size (inches)	Well Installation Date	Water-Bearing Zone	Date Measured	Measured Depth to Water (ft btoc)	Groundwater Elevation (ft msl)
AA-01	1757.13	1754.93	401	Sch 80 PVC	4	29	49	20	0.01	02/25/04	Shallow	04/08/04	45.10	1712.03
												04/18/06	44.78	1712.35
												07/27/06	45.44	1711.69
												10/16/06	45.63	1711.50
												01/22/07	45.68	1711.45
												06/03/08	47.07	1710.06
AA-27	1789.43	1787.03	143	Sch 80 PVC	4	61.5	81.5	20	0.01	07/07/04	Shallow	07/13/04	59.45	1729.98
												04/19/06	65.85	1723.58
												07/26/06	66.77	1722.66
												10/16/06	66.82	1722.61
												01/22/07	66.97	1722.46
												06/03/08	67.69	1721.74
AA-UW1	1774.45	1771.22	69.4	Sch 40 PVC	4	54.5	64.5	10	0.02	07/30/07	Shallow	06/03/08	52.35	1722.10
AA-UW2	1821.36	1817.63	82.72	Sch 40 PVC	4	55	75	20	0.02	08/03/07	Shallow	06/03/08	66.83	1754.53
AA-UW3	1812.72	1809.07	88.53	Sch 40 PVC	4	60	80	20	0.02	08/06/07	Shallow	06/03/08	66.66	1746.06
AA-UW4	1800.28	1796.79	60.7	Sch 40 PVC	4	35	55	20	0.02	08/07/07	Shallow	06/05/08	42.86	1757.42
AA-UW5	1768.68	1765.05	63.62	Sch 40 PVC	4	37	57	20	0.02	08/08/07	Shallow	06/05/08	48.80	1719.88
AA-UW6	1740.81	1737.01	68.66	Sch 40 PVC	4	37	57	20	0.02	08/08/07	Shallow	06/05/08	58.94	1681.87

ft msl= Feet above mean sea level
ft bgs- Feet below ground surface
ft btoc= Feet below top of casing

Table 2. Statistical Summary of Soil Analytical Results for Nonmetals Detected in Upgradient Well Borings

Parameter of Interest	Compound List	Total No. of Samples	No. of Detections	Detection Frequency (%)	Detected Concentration (mg/kg)		Residential Soil BCL	No. of Detections > BCL
					Minimum	Maximum		
Aldehydes	Formaldehyde	14	6	43	0.081	0.15	10.6	0
Dioxins/Furans	TCDD TEQ	11	11	100	0.14	8	50[a]	0
General Chemistry	Cyanide (total)	26	1	4	1.9	1.9	1,220	0
	Sulfide	26	1	4	12.9	12.9	—	—
	Chlorate	29	2	7	1.5	1.8	—	—
	Bromide	29	4	14	0.91	1.3	—	—
	Orthophosphate as P	29	4	14	0.89	3.2	—	—
	Bromine	14	2	14	2	2.6	—	—
	Nitrite (as N)	29	6	21	0.25	3.6	—	—
	Total Kjeldahl nitrogen (TKN)	26	11	42	23.5	104	—	—
	Perchlorate	69	43	62	0.0052	2.5	54.8	0
	Fluoride	29	21	72	0.44	7.1	3,670	0
	Nitrate (as N)	29	26	90	0.27	6	—	—
	Chloride	29	29	100	2.4	367	—	—
	Chlorine	14	14	100	12.2	734	7,820	0
	Sulfate	29	29	100	15.2	2330	—	—
OCPs	4,4-DDD	55	4	7	0.0019	0.0032	2.44	0
	4,4-DDE	55	4	7	0.0021	0.0033	1.72	0
	4,4-DDT	55	5	9	0.0065	0.012	1.72	0
	alpha-BHC	55	6	11	0.0054	0.022	0.0902	0

[a] ATSDR screening value of 50 parts per trillion (ppt)

mg/kg = Milligrams per kilogram
BCL = Basic comparison level (From NDEP 2008; values used are residential soil BCLs).
— = Not applicable or no value has been established
OCPs = Organochlorine pesticides

Table 2. Statistical Summary of Soil Analytical Results for Nonmetals Detected in Upgradient Well Borings
Page 2 of 3

Parameter of Interest	Compound List	Total No. of Samples	No. of Detections	Detection Frequency (%)	Detected Concentration (mg/kg)		Residential Soil BCL	No. of Detections > BCL
					Minimum	Maximum		
OCPs (continued)	beta-BHC	55	6	11	0.0022	0.034	0.316	0
	Lindane	55	6	11	0.004	0.0096	0.437	0
	Methoxychlor	55	6	11	0.036	0.11	306	0
OPPs	Disulfoton	14	1	7	0.004	0.004	2.44	0
	Chlorpyrifos	13	1	8	0.0042	0.0042	183	0
	Malathion	13	1	8	0.0053	0.0053	1,220	0
	Dichlorvos	13	2	15	0.0074	0.0074	1.68	0
	Ethoprophos	13	2	15	0.005	0.0057	—	—
	Phorate	13	2	15	0.0046	0.0049	—	—
	Ronnel	13	2	15	0.0033	0.0037	3,060	0
	Sulfotep	13	2	15	0.0041	0.0051	—	—
SVOCs	bis(2-Ethylhexyl) phthalate	50	1	2	1.7	1.7	34.7	0
VOCs	Chloroform	16	1	6	0.0013	0.0013	0.245	0
	m,p-Xylene	18	2	11	0.0011	0.0025	195	0
	o-Xylene	18	2	11	0.00058	0.0011	282	0
	Xylenes (total)	18	2	11	0.0017	0.0036	193	0
	Toluene	29	4	14	0.00043	0.0011	521	0
	1,2,4-Trimethylbenzene	27	4	15	0.00046	0.00073	8.94	0
	Ethylbenzene	19	3	16	0.00025	0.0008	234	0
	Methyl ethyl ketone	16	4	25	0.0071	0.013	22,600	0

mg/kg = Milligrams per kilogram
BCL = Basic comparison level (From NDEP 2008; values used are residential soil BCLs.
— = Not applicable or no value has been established

OCPs = Organochlorine pesticides
OPPs = Organophosphorous pesticides
SVOCs = Semivolatile organic compounds
VOCs = Volatile organic compounds

Table 2. Statistical Summary of Soil Analytical Results for Nonmetals Detected in Upgradient Well Borings
Page 3 of 3

Parameter of Interest	Compound List	Total No. of Samples	No. of Detections	Detection Frequency (%)	Detected Concentration (mg/kg)		Residential Soil BCL	No. of Detections > BCL
					Minimum	Maximum		
VOCs (continued)	Acetonitrile	21	6	29	0.0067	0.013	623	0
	Tetrachloroethylene	18	8	44	0.00023	0.0077	0.554	0
	Acetone	26	12	46	0.0052	0.058	14,200	0
	Benzene	16	8	50	0.00049	0.0011	0.656	0
	Dichloromethane	34	25	74	0.0027	0.045	8.9	0

mg/kg = Milligrams per kilogram
BCL = Basic comparison level (From NDEP 2008; values used are residential soil BCLs.
— = Not applicable or no value has been established
VOCs = Volatile organic compounds

Table 3. Summary of Selected Nonmetals Detected in Soil from Upgradient Well Borings
Page 1 of 5

Analyte	Boring	Date	Depth (feet)	Concentration (mg/kg)
1,2,4-Trimethylbenzene	AA-UW-4	08/06/2007	10	0.00046
	AA-UW-4	08/06/2007	20	0.0005
	AA-UW-4	08/06/2007	40	0.00073
	SB-01-B	05/10/2004	7	0.00072
4,4-DDD	SB-01-B	05/10/2004	0	0.0032
	SB-01-B	05/10/2004	7	0.0023
	SB-27-A	06/24/2004	0	0.0031
	SB-27-A	06/24/2004	7	0.0019
4,4-DDE	AA-UW-1	07/30/2007	0	0.0026
	SB-01-B	05/10/2004	0	0.0021
	SB-01-B	05/10/2004	7	0.0024
	SB-27-A	06/24/2004	0	0.0033
4,4-DDT	SB-01-B	05/10/2004	0	0.009
	SB-01-B	05/10/2004	7	0.0092
	SB-27-A	06/24/2004	0	0.012
	SB-27-A	06/24/2004	7	0.0094
	SB-27-A	06/29/2004	107	0.0065
Acetone	AA-UW-1	07/30/2007	5	0.0068
	AA-UW-1	07/30/2007	10	0.0066
	AA-UW-1	07/30/2007	50	0.014
	AA-UW-1	07/30/2007	60	0.028
	AA-UW-4	08/06/2007	20	0.0052
	AA-UW-4	08/06/2007	30	0.0059
	AA-UW-4	08/06/2007	40	0.0053
	AA-UW-6	08/07/2007	10	0.014
	AA-UW-6	08/07/2007	40	0.0055
	SB-01-B	05/10/2004	0	0.033
	SB-01-B	05/10/2004	7	0.058
	SB-27-A	06/24/2004	0	0.054
alpha-BHC	SB-01-B	05/10/2004	0	0.022
	SB-01-B	05/10/2004	0	0.021
	SB-01-B	05/10/2004	7	0.013
	SB-01-B	05/11/2004	93	0.0054
	SB-27-A	06/24/2004	0	0.02
	SB-27-A	06/24/2004	0	0.02

mg/kg = Milligrams per kilogram

Table 3. Summary of Selected Nonmetals Detected in Soil from Upgradient Well Borings
Page 2 of 5

Analyte	Boring	Date	Depth (feet)	Concentration (mg/kg)
alpha-BHC (continued)	SB-27-A	06/24/2004	7	0.011
	SB-27-A	06/29/2004	107	0.0066
beta-BHC	AA-UW-1	07/30/2007	0	0.0065
	SB-01-B	05/10/2004	0	0.034
	SB-01-B	05/10/2004	0	0.03
	SB-01-B	05/10/2004	7	0.012
	SB-01-B	05/10/2004	17	0.0025
	SB-27-A	06/24/2004	0	0.0052
	SB-27-A	06/24/2004	7	0.0022
Lindane	SB-01-B	05/10/2004	0	0.0091
	SB-01-B	05/10/2004	7	0.0057
	SB-01-B	05/11/2004	93	0.004
	SB-27-A	06/24/2004	0	0.0096
	SB-27-A	06/24/2004	7	0.0052
	SB-27-A	06/29/2004	107	0.0048
Ethylbenzene	AA-UW-2	07/31/2007	10	0.00025
	AA-UW-3	08/05/2007	30	0.00028
	AA-UW-4	08/06/2007	5	0.00054
	AA-UW-4	08/06/2007	40	0.0008
Nitrate (as N)	AA-UW-1	07/30/2007	10	6
	AA-UW-1	07/30/2007	10	4.8
	AA-UW-1	07/30/2007	30	1.6
	AA-UW-1	07/30/2007	40	1.4
	AA-UW-1	07/30/2007	50	0.83
	AA-UW-1	07/30/2007	60	0.27
	AA-UW-2	07/31/2007	10	1.6
	AA-UW-2	07/31/2007	70	2.2
	AA-UW-3	08/05/2007	10	8.5
	AA-UW-3	08/05/2007	80	1.4
	AA-UW-4	08/06/2007	10	0.6
	AA-UW-4	08/06/2007	50	2.7
	AA-UW-5	08/07/2007	10	2
	AA-UW-5	08/07/2007	60	2.6
	AA-UW-6	08/07/2007	10	2
	AA-UW-6	08/07/2007	50	0.39

mg/kg = Milligrams per kilogram

Table 3. Summary of Selected Nonmetals Detected in Soil from Upgradient Well Borings
Page 3 of 5

Analyte	Boring	Date	Depth (feet)	Concentration (mg/kg)
Nitrate (as N) (continued)	SB-01-B	05/10/2004	0	3.2
	SB-01-B	05/10/2004	7	3.6
	SB-01-B	05/10/2004	17	1.9
	SB-01-B	05/10/2004	27	0.54
	SB-01-B	05/10/2004	47	0.52
	SB-01-B	05/11/2004	77	0.64
	SB-01-B	05/11/2004	93	1.5
	SB-27-A	06/24/2004	7	0.88
	SB-27-A	06/24/2004	27	0.82
	SB-27-A	06/24/2004	57	0.87
	SB-27-A	06/29/2004	97	3.3
	SB-27-A	06/29/2004	107	2.4
Perchlorate	AA-UW-1	07/30/2007	5	0.272
	AA-UW-1	07/30/2007	10	1.55
	AA-UW-1	07/30/2007	10	1.41
	AA-UW-1	07/30/2007	30	0.0449
	AA-UW-1	07/30/2007	40	0.0447
	AA-UW-1	07/30/2007	50	0.0716
	AA-UW-1	07/30/2007	60	0.1
	AA-UW-2	07/31/2007	5	0.0742
	AA-UW-2	07/31/2007	10	0.142
	AA-UW-3	08/05/2007	5	1.2
	AA-UW-3	08/05/2007	30	0.0072
	AA-UW-3	08/05/2007	60	0.0038
	AA-UW-3	08/05/2007	70	0.0105
	AA-UW-4	08/06/2007	5	0.0349
	AA-UW-4	08/06/2007	10	0.0078
	AA-UW-4	08/06/2007	30	0.0077
	AA-UW-4	08/06/2007	40	0.0162
	AA-UW-5	08/07/2007	5	0.222
	AA-UW-6	08/07/2007	5	0.284
	AA-UW-6	08/07/2007	10	0.0117
	AA-UW-6	08/07/2007	20	0.138
	AA-UW-6	08/07/2007	40	0.162
	AA-UW-6	08/07/2007	40	0.107

mg/kg = Milligrams per kilogram

Table 3. Summary of Selected Nonmetals Detected in Soil from Upgradient Well Borings
Page 4 of 5

Analyte	Boring	Date	Depth (feet)	Concentration (mg/kg)
Perchlorate (continued)	SB-01-B	05/10/2004	0	1.99
	SB-01-B	05/10/2004	7	0.19
	SB-01-B	05/10/2004	27	0.0052
	SB-01-B	05/10/2004	47	0.0088
	SB-01-B	05/12/2004	60	2.5
	SB-01-B	05/11/2004	77	0.0482
	SB-01-B	05/11/2004	80	0.17
	SB-01-B	05/11/2004	93	0.0249
	SB-01-B	05/11/2004	120	0.1
	SB-01-B	05/12/2004	180	0.095
	SB-01-B	05/12/2004	214	0.017
	SB-27-A	06/24/2004	0	0.295
	SB-27-A	06/24/2004	7	0.117
	SB-27-A	06/24/2004	17	0.132
	SB-27-A	06/24/2004	27	0.0892
	SB-27-A	06/24/2004	47	0.0487
	SB-27-A	06/24/2004	57	0.046
	SB-27-A	06/29/2004	77	0.0505
	SB-27-A	06/29/2004	97	0.106
	SB-27-A	06/29/2004	102	0.0611
	SB-27-A	06/29/2004	107	0.103
	SB-27-B	07/07/2004	120	0.0308
	SB-27-B	07/07/2004	125	0.0294
	SB-27-B	07/07/2004	131	0.0064
Sulfate	AA-UW-1	07/30/2007	10	725
	AA-UW-1	07/30/2007	10	511
	AA-UW-1	07/30/2007	30	62
	AA-UW-1	07/30/2007	40	69.6
	AA-UW-1	07/30/2007	50	754
	AA-UW-1	07/30/2007	60	271
	AA-UW-2	07/31/2007	10	197
	AA-UW-2	07/31/2007	70	424
	AA-UW-3	08/05/2007	10	216
	AA-UW-3	08/05/2007	80	589
	AA-UW-4	08/06/2007	10	24.4

mg/kg = Milligrams per kilogram

Table 3. Summary of Selected Nonmetals Detected in Soil from Upgradient Well Borings
Page 5 of 5

Analyte	Boring	Date	Depth (feet)	Concentration (mg/kg)
Sulfate (continued)	AA-UW-4	08/06/2007	50	746
	AA-UW-5	08/07/2007	10	15.2
	AA-UW-5	08/07/2007	60	89.3
	AA-UW-6	08/07/2007	10	23.7
	AA-UW-6	08/07/2007	50	567
	SB-01-B	05/10/2004	0	19.6
	SB-01-B	05/10/2004	7	54.9
	SB-01-B	05/10/2004	17	191
	SB-01-B	05/10/2004	27	59
	SB-01-B	05/10/2004	47	142
	SB-01-B	05/11/2004	77	408
	SB-01-B	05/11/2004	93	133
	SB-27-A	06/24/2004	0	69.4
	SB-27-A	06/24/2004	7	2330
	SB-27-A	06/24/2004	17	311
	SB-27-A	06/24/2004	27	308
	SB-27-A	06/24/2004	47	137
	SB-27-A	06/24/2004	57	241
	SB-27-A	06/29/2004	97	898
	SB-27-A	06/29/2004	107	856
Tetrachloroethylene	AA-UW-1	07/30/2007	50	0.0018
	AA-UW-1	07/30/2007	60	0.00068
	SB-01-B	05/10/2004	0	0.00029
	SB-01-B	05/10/2004	7	0.00027
	SB-01-B	05/10/2004	27	0.00023
	SB-01-B	05/10/2004	47	0.00068
	SB-01-B	05/11/2004	77	0.0077
	SB-01-B	05/11/2004	93	0.00043

mg/kg = Milligrams per kilogram

Table 4a. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding Nevada Basic Comparison Levels
First through Fifth Sampling Rounds

Well	Chemical	Method	Unit	Event	Result	Nevada BCL
AA-01	Arsenic	SW6020	µg/L	1st	67.3	0.0448
				2nd	66.3	0.0448
				3rd	68.8	0.0448
				4th	78.3	0.0448
	Tetrachloroethylene	SW8260	µg/L	1st	81	0.105
				2nd	45	0.105
				3rd	42	0.105
				4th	84	0.105
				5th	54	0.105
	Octachlorodibenzodioxin	SW8290	pg/L	1st	49	0.448
	Phosphorus (as P)	SW6020	µg/L	2nd	100	0.73
	Chlorine	EPA 300.0	mg/L	1st	1780	3.65
				2nd	1700	3.65
				3rd	1510	3.65
				4th	1940	3.65
				5th	1420	3.65
	Trichloroethylene	SW8260	µg/L	1st	0.34	0.028
				2nd	0.29	0.028
				3rd	0.46	0.028
				4th	0.44	0.028
				5th	0.41	0.028
	Chloroform	SW8260	µg/L	1st	4	0.167
				2nd	3.2	0.167
				3rd	7.9	0.167
				4th	5.5	0.167
				5th	5	0.167
	Acetaldehyde	EPA 8315A	µg/L	2nd	30	1.75
	Perchlorate	EPA314.0	µg/L	1st	1170	18
				2nd	1530	18
				3rd	1550	18
				4th	1290	18
	Bromodichloromethane	SW8260	µg/L	3rd	0.21	0.181
	Fluoride	EPA 300	mg/L	2nd	3.5	2.19
				3rd	3.1	2.19

BCL = Basic Comparison Level
µg/L = Micrograms per liter
pg/L = Pictograms per liter
mg/L= Milligrams per liter

Table 4a. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding Nevada Basic Comparison Levels
First through Fifth Sampling Rounds
Page 2 of 3

Well	Chemical	Method	Unit	Event	Result	Nevada BCL
AA-01 (continued)	Thallium	SW6020	µg/L	2nd	10	2.56
	Dimethyl phosphorodithioic acid	Alpha Acids	mg/L	2nd	13	3.65
	Nitrate (as N)	EPA 300	mg/L	1st	11.8	10
				2nd	12.4	10
				4th	20.7	11
AA-27	Arsenic	SW6020	µg/L	1st	38.7	0.0448
				2nd	35	0.0448
	Chlorine	EPA 300.0	mg/L	1st	886	3.65
				2nd	2500	3.65
				3rd	868	3.65
				4th	1210	3.65
				5th	900	3.65
	Chloroform	SW8260	µg/L	2nd	1.8	0.167
				3rd	2	0.167
				4th	1.7	0.167
	Formaldehyde	EPA 8315A	µg/L	2nd	60	1.46
	Acetaldehyde	EPA 8315A	µg/L	2nd	30	1.75
	Perchlorate	EPA 314.0	µg/L	1st	247	18
				2nd	246	18
				3rd	261	18
				4th	249	18
				5th	266	18
	Chloroform	SW8260	µg/L	1st	1.6	0.167
				5th	1.4	0.167
	Acetaldehyde	EPA 8315A	µg/L	1st	3.8	1.75
	Fluoride	EPA 300	mg/L	2nd	3.3	2.19
				3rd	3	2.19
	Dimethyl phosphorodithioic acid	Alpha Acids	mg/L	2nd	6.7	3.65
	Nitrate (as N)	EPA 300	mg/L	1st	14.1	10
				2nd	39.3	10
				3rd	12	10
				4th	12.6	12
	Chromium (VI)	SM3500-CR D	µg/L	2nd	260	110

BCL = Basic Comparison Level
µg/L = Micrograms per liter
pg/L = Pictograms per liter
mg/L= Milligrams per liter

Table 4a. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding Nevada Basic Comparison Levels
First through Fifth Sampling Rounds
Page 3 of 3

Well	Chemical	Method	Unit	Event	Result	Nevada BCL
AA-UW1	Arsenic	SW6020	µg/L	5th	69.8	0.0448
	Tetrachloroethylene	SW8260	µg/L	5th	24	0.105
	Chlorine	EPA 300.0	mg/L	5th	877	3.65
	Perchlorate	EPA 314.0	µg/L	5th	697	18
	Trichloroethylene	SW8260	µg/L	5th	0.26	0.028
	Chloroform	SW8260	µg/L	5th	1.1	0.167
	1,4-Dichlorobenzene	SW8260	µg/L	5th	0.58	0.467
AA-UW2	Chlorine	EPA 300.0	mg/L	5th	1040	3.65
	Chloroform	SW8260	µg/L	5th	1.2	0.167
	1,4-Dichlorobenzene	SW8260	µg/L	5th	1.1	0.467
	Perchlorate	EPA 314.0	µg/L	5th	108	18
	Iron	SW6020	µg/L	5th	793	110
AA-UW3	Chlorine	EPA 300.0	mg/L	5th	528	3.65
	Chloroform	SW8260	µg/L	5th	3.6	0.167
	Perchlorate	EPA 314.0	µg/L	5th	80.2	18
AA-UW4	Chlorine	EPA 300.0	mg/L	5th	663	3.65
	Chloroform	SW8260	µg/L	5th	2.6	0.167
	Perchlorate	EPA 314.0	µg/L	5th	90	18
AA-UW5	Chloroform	SW8260	µg/L	5th	1.9	0.167
	Chlorine	EPA 300.0	mg/L	5th	353	3.65
	Tetrachloroethylene	SW8260	µg/L	5th	0.45	0.105
	Perchlorate	EPA 314.0	µg/L	5th	57.2	18
AA-UW6	Arsenic	SW6020	µg/L	5th	102	0.0448
	Chlorine	EPA 300.0	mg/L	5th	452	3.65
	Chloroform	SW8260	µg/L	5th	0.44	0.167
	Perchlorate	EPA 314.0	µg/L	5th	65.1	18

BCL = Basic Comparison Level
µg/L = Micrograms per liter
pg/L = Pictograms per liter
mg/L= Milligrams per liter

Table 4b. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding U.S. EPA Maximum Contaminant Levels
First through Fifth Sampling Rounds
Page 1 of 2

Well	Chemical	Method	Unit	Event	Result	Nevada BCL
AA-01	Chloride	EPA 300	mg/L	1st	892	250
				2nd	884	250
				3rd	757	250
				4th	970	250
				5th	711	250
	Sulfate	EPA 300	mg/L	1st	1,500	250
				2nd	1,700	250
				3rd	1,600	250
				4th	2,140	250
				5th	1,460	250
	Total Dissolved Solids	EPA 160.1	mg/L	1st	3,430	500
				2nd	3,930	500
				3rd	3,310	500
				4th	3,730	500
				5th	3,850	500
AA-27	Chloride	EPA 300	mg/L	1st	443	250
				2nd	1,250	250
				3rd	434	250
				4th	605	250
				5th	450	250
	Sulfate	EPA 300	mg/L	1st	2,410	250
				2nd	6,870	250
				3rd	2,700	250
				4th	2,800	250
				5th	2,380	250
	Total Dissolved Solids	EPA 160.1	mg/L	1st	4,080	500
				2nd	4,240	500
				3rd	4,220	500
				4th	4,340	500
				5th	4,570	500
AA-UW1	Aluminum	SW6020	µg/L	5th	323	200
	Chloride	EPA 300	mg/L	5th	439	250
	Manganese	SW6020	µg/L	5th	99	50
	Sulfate	EPA 300	mg/L	5th	2,120	250
	Total Dissolved Solids	EPA 160.1	mg/L	5th	4,310	500

MCL = Maximum contaminant level mg/L= Milligrams per liter µg/L = Micrograms per liter

Table 4b. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding U.S. EPA Maximum Contaminant Levels
First through Fifth Sampling Rounds
Page 2 of 2

Well	Chemical	Method	Unit	Event	Result	Nevada BCL
AA-UW2	Chloride	EPA 300	mg/L	5th	522	250
	Iron	SW6020	µg/L	5th	793	300
	Manganese	SW6020	µg/L	5th	164	50
	Sulfate	EPA 300	mg/L	5th	1,930	250
	Total Dissolved Solids	EPA 160.1	mg/L	5th	4,460	500
AA-UW3	Chloride	EPA 300	mg/L	5th	264	250
	Sulfate	EPA 300	mg/L	5th	3,070	250
	Total Dissolved Solids	EPA 160.1	mg/L	5th	4,880	500
AA-UW4	Chloride	EPA 300	mg/L	5th	331	250
	Sulfate	EPA 300	mg/L	5th	2,970	250
	Total Dissolved Solids	EPA 160.1	mg/L	5th	5,990	500
AA-UW5	Sulfate	EPA 300	mg/L	5th	271	250
	Total Dissolved Solids	EPA 160.1	mg/L	5th	1,400	500
AA-UW6	Sulfate	EPA 300	mg/L	5th	2,480	250
	Total Dissolved Solids	EPA 160.1	mg/L	5th	5,850	500

MCL = Maximum contaminant level mg/L= Milligrams per liter µg/L = Micrograms per liter

Table 5a. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding Nevada Basic Comparison Levels
Eastside 2009 Groundwater Sampling Event

Well	Filtered?	Chemical	Unit	Result	SQL	Nevada BCL
AA-01	Yes	Chlorine	mg/L	1,520	—	4
		Perchlorate	µg/L	1,900	2	18
	No	Arsenic	µg/L	91	0.21	10
		Chlorine	mg/L	1,440	—	4
		Chloroform	µg/L	5.7	0.067	1.6
		Nitrate	mg/L	10.9	2.5	10
		Perchlorate	µg/L	1,900	2	18
		Tetrachloroethene	µg/L	73	0.065	5
		Uranium	µg/L	48.1	0.02	30
AA-27	Yes	Chlorine	mg/L	834	—	4
		Nitrate	mg/L	12.2	0.1	10
		Perchlorate	µg/L	230	2	18
	No	Arsenic	µg/L	44.3	2.1	10
		Chlorine	mg/L	845	—	4
		Nitrate	mg/L	12.5	0.1	10
		Perchlorate	µg/L	230	0.4	18
		Uranium	µg/L	68.7	0.2	30
AA-UW1	Yes	Chlorine	mg/L	824	—	4
		Magnesium	µg/L	227,000	53.5	207,000
		Perchlorate	µg/L	740	10	18
	No	alpha-BHC	µg/L	0.16	0.01	0.011
		Arsenic	µg/L	90.3	2.1	10
		Chlorine	mg/L	831	—	4
		Lithium	µg/L	180	13	73
		Magnesium	µg/L	219,000	53.5	207,000
		Perchlorate	µg/L	630	10	18
		Tetrachloroethene	µg/L	53	0.065	5
		Uranium	µg/L	48.2	0.2	30
AA-UW2	Yes	Chlorine	mg/L	999	—	4
		Nitrate	mg/L	10.2	0.1	10
		Perchlorate	µg/L	99	1	18
	No	Arsenic	µg/L	37.1	0.21	10
		Chlorine	mg/L	1,020	—	4

SQL = Sample quantitation limit
BCL = Basic Comparison Level
mg/L= Milligrams per liter
— = Not applicable or not reported
µg/L = Micrograms per liter

Table 5a. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding Nevada Basic Comparison Levels
Eastside 2009 Groundwater Sampling Event

Well	Filtered?	Chemical	Unit	Result	SQL	Nevada BCL
AA-UW2 (continued)	No	Nitrate	mg/L	10.2	0.1	10
	No	Perchlorate	µg/L	99	1	18
	No	Uranium	µg/L	98.8	0.02	30
AA-UW3	Yes	Chlorine	mg/L	506	—	4
		Magnesium	µg/L	228,000	53.5	207,000
		Perchlorate	µg/L	68	0.4	18
	No	Arsenic	µg/L	13.3	2.1	10
		Chlorine	mg/L	533	—	4
		Chloroform	µg/L	2.4	0.067	1.6
		Lithium	µg/L	132	13	73
		Magnesium	µg/L	221,000	53.5	207,000
		Perchlorate	µg/L	65	0.4	18
AA-UW4	Yes	Chlorine	mg/L	610	—	4
		Nitrate	mg/L	12.7	0.1	10
		Perchlorate	µg/L	76	0.2	18
	No	Arsenic	µg/L	94.6	2.1	10
		Chlorine	mg/L	613	—	4
		Chloroform	µg/L	2.7	0.067	1.6
		Nitrate	mg/L	12.7	0.1	10
		Perchlorate	µg/L	75	0.2	18
	Yes	Chlorine	mg/L	614	—	4
		Nitrate	mg/L	12.6	0.1	10
		Perchlorate	µg/L	81	0.2	18
	No	Arsenic	µg/L	90.4	2.1	10
		Chlorine	mg/L	608	—	4
		Chloroform	µg/L	2.5	0.067	1.6
		Nitrate	mg/L	12.6	0.1	10
		Perchlorate	µg/L	77	0.4	18
AA-UW5	Yes	Chlorine	mg/L	318	—	4
		Nitrate	mg/L	13.7	0.5	10
		Perchlorate	µg/L	54	0.4	18
	No	Arsenic	µg/L	13.4	2.1	10
		Chlorine	mg/L	333	—	4

SQL = Sample quantitation limit
BCL = Basic Comparison Level
mg/L= Milligrams per liter
— = Not applicable or not reported
µg/L = Micrograms per liter

Table 5a. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding Nevada Basic Comparison Levels
Eastside 2009 Groundwater Sampling Event
Page 3 of 3

Well	Filtered?	Chemical	Unit	Result	SQL	Nevada BCL
AA-UW5 (continued)	No	Lithium	µg/L	108	13	73
		Nitrate	mg/L	12.9	0.5	10
		Perchlorate	µg/L	56	0.4	18
	Yes	Chlorine	mg/L	324	—	4
		Nitrate	mg/L	13.3	0.5	10
		Perchlorate	µg/L	54	0.4	18
	No	Arsenic	µg/L	13.7	2.1	10
		Chlorine	mg/L	320	—	4
		Lithium	µg/L	102	13	73
		Nitrate	mg/L	13.3	0.5	10
		Perchlorate	µg/L	51	0.1	18
AA-UW6	Yes	Chlorine	mg/L	400	—	4
		Perchlorate	µg/L	52	0.4	18
	No	Arsenic	µg/L	161	2.1	10
		Chlorine	mg/L	403	—	4
		Lithium	µg/L	266	13	73
		Perchlorate	µg/L	50	0.4	18

SQL = Sample quantitation limit
BCL = Basic Comparison Level
mg/L= Milligrams per liter
— = Not applicable or not reported
µg/L = Micrograms per liter

Table 5b. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding U.S. EPA Maximum Contaminant Levels
Eastside 2009 Groundwater Sampling Event

Well	Filtered?	Chemical	Unit	Result	SQL	Nevada BCL
AA-01	Yes	Chloride	mg/L	759	10	250
		Sulfate	mg/L	1,720	25	250
	No	Chloride	mg/L	719	10	250
		Iron	µg/L	1,700	4.8	300
		Sulfate	mg/L	1,640	25	250
		Total Dissolved Solids	mg/L	3,800	350	500
AA-27	Yes	Chloride	mg/L	417	10	250
		Sulfate	mg/L	2,290	25	250
	No	Aluminum	µg/L	155	36.2	50
		Chloride	mg/L	422	10	250
		Iron	µg/L	5,850	47.7	300
		Sulfate	mg/L	2,320	25	250
		Total Dissolved Solids	mg/L	3,300	350	500
AA-UW1	Yes	Chloride	mg/L	412	10	250
		Sulfate	mg/L	2,160	25	250
	No	Aluminum	µg/L	162	36.2	50
		Chloride	mg/L	415	10	250
		Iron	µg/L	2,080	47.7	300
		Manganese	µg/L	58.6	3.1	50
		Sulfate	mg/L	2,150	25	250
		Total Dissolved Solids	mg/L	3,100	350	500
AA-UW2	Yes	Chloride	mg/L	500	10	250
		Sulfate	mg/L	1,920	25	250
	No	Chloride	mg/L	512	10	250
		Iron	µg/L	1,290	4.8	300
		Sulfate	mg/L	1,970	25	250
		Total Dissolved Solids	mg/L	4,200	350	500
AA-UW3	Yes	Chloride	mg/L	253	10	250
		Sulfate	mg/L	3,130	25	250
	No	Aluminum	µg/L	74.7	36.2	50
		Chloride	mg/L	267	10	250
		Iron	µg/L	1,370	47.7	300
		Sulfate	mg/L	3,280	25	250
		Total Dissolved Solids	mg/L	3,500	350	500

SQL = Sample quantitation limit
BCL = Basic Comparison Level

mg/L= Milligrams per liter
µg/L = Micrograms per liter

Table 5b. Summary of Groundwater Sampling Data, Upgradient Wells
Detections Exceeding U.S. EPA Maximum Contaminant Levels
Eastside 2009 Groundwater Sampling Event
Page 2 of 2

Well	Filtered?	Chemical	Unit	Result	SQL	Nevada BCL
AA-UW4	Yes	Chloride	mg/L	305	10	250
		Sulfate	mg/L	2,900	25	250
	No	Chloride	mg/L	306	10	250
		Iron	µg/L	4,580	47.7	300
		Sulfate	mg/L	2,930	25	250
		Total Dissolved Solids	mg/L	3,700	350	500
	Yes	Chloride	mg/L	307	10	250
		Sulfate	mg/L	2,970	25	250
	No	Aluminum	µg/L	64.1	36.2	50
		Chloride	mg/L	304	10	250
		Iron	µg/L	4,480	47.7	300
		Sulfate	mg/L	2,920	25	250
		Total Dissolved Solids	mg/L	4,300	350	500
AA-UW5	No	Aluminum	µg/L	615	36.2	50
		Iron	µg/L	910	47.7	300
		Total Dissolved Solids	mg/L	600	350	500
		Iron	µg/L	586	47.7	300
		Total Dissolved Solids	mg/L	700	350	500
AA-UW6	Yes	Sulfate	mg/L	2,260	25	250
	No	Iron	µg/L	4,550	47.7	300
		Sulfate	mg/L	2,240	25	250
		Total Dissolved Solids	mg/L	3,700	350	500

SQL = Sample quantitation limit
BCL = Basic Comparison Level
mg/L= Milligrams per liter
µg/L = Micrograms per liter

Appendix A

Response to Comments

Response to Nevada Division of Environmental Protection (NDEP) Comments, dated August 5, 2009, to *Upgradient Wells Report, BMI Common Areas, Eastside Area,* dated July 24, 2009
NDEP Facility ID# H-000688

1. General comment, due to the remaining deficiencies of the cation-anion balance the NDEP has not completed a comprehensive review of this report. It is not clear that this report will be able to be corrected until new, valid data is collected (the 2009 data set). It is suggested that BRC discuss these matters with the NDEP in order to arrive at a mutually agreeable path forward.

   Response: Comment noted and agreed. The CAB will be re-submitted with the new upcoming 2009 data.

2. Figure 2, this Figure needs to be updated with adjacent data to support BRC's discussion about the source of some of the upgradient contaminants. In addition, if BRC believes that some of the contaminants may be sourcing from the Middle Zone it would be helpful to develop plume maps and potentiometric surface maps for the Middle Zone. In addition, a discussion of vertical gradients would be needed.

   Response: The revised upgradient wells report will include an updated figure that depicts upgradient source areas. In addition, the report will include a discussion of Middle Zone hydrogeology, and vertical gradients, to further characterize upgradient impacts near well AA-01. Plume maps for the Middle Zone, and, if applicable, potentiometric surface maps, will also be included.

3. Appendix A, Response-to-Comments (RTCs), the NDEP has the following comments:
   a. RTC 3.c.iv and 3.c.v, there are a number of apparent errors that remain. Please see detailed comments below.

      Response: Comment noted.

   b. RTC 4, it is the belief that if BRC is proposing to use well AA-01 as an "upgradient" well it is important to determine the source of the PCE impact at this time. Alternately, well AA-01 can be removed as an upgradient well.

      Response: As noted above in response to Comment No.2, additional information will be included in the revised report to further characterize upgradient impacts near well AA-01.

   c. RTC 5, BRC's response does not meet the intent of the NDEP's comment. If wells do not pass the cation-anion balance it is not appropriate to generate Piper and Stiff diagrams with invalid data.

      Response: As noted above in the response to Comment No.1, the CAB will be resubmitted using the new upcoming 2009 dataset. Revised Piper and Stiff diagrams will also be resubmitted as applicable.

4. Appendix A, Cation-Anion Balance Attachment, the NDEP has the following comments:
   a. The Cation-Anion Balance (CAB) check algorithm (within the executable spreadsheet) for three tabulated samples is in error. For samples MCF-02A, MCF-02B and MCF-03A, the acceptable percent difference is $\pm$2%, since their anion sums are between 3 and 10 meq/L. The spreadsheet algorithm uses an acceptable difference of $\pm$2-5% (which applies to anion sums greater than 10 meq/L). This error does not change the test determination for these samples; they pass the CAB

check. However, BRC is advised to build in the correct algorithm to the spreadsheet for future submittals.

Response: Comment noted and agreed.

b. Column "AM" of the executable spreadsheet contains an error for the algorithm that determines whether samples measured versus calculated TDS falls within the range for acceptable ratio. The range should be defined as greater than 1.0 and less than 1.2; the submitted algorithm defines the range as greater than or equal to 0.99 and less than or equal to 1.2. NDEP notes that three additional samples fail this test, when properly administered. BRC is advised to build in the correct algorithm to the spreadsheet.

Response: Comment noted and agreed.

c. Column "AY" of the executable spreadsheet contains an error for the algorithm that lists "Data Flags from Quality Checks". Specifically, the Data Flag A (Outside acceptable limits for Cation-Anion Balance for 10.0-800 meq/L Anion Sum.), is being applied to all samples that failed the CAB check, rather than those samples whose anion sums are outside the acceptable limits for the check. NDEP notes that sixteen samples qualify for Data Flag A, versus the reported 42 samples. BRC is advised to build in the correct algorithm to the spreadsheet.

Response: Comment noted and agreed.

d. The upper limit of acceptable Lab-TDS to EC ratio (1.47, estimated using graphed data) is in error. Please inspect the axes on the graph used to generate this estimate; NDEP notes that the correct ratio is the reciprocal of 1.47 (approximately 0.68), which is close to the value of 0.7 specified in Standard Methods. NDEP notes that, using the range indicated in Standard Methods, 96 samples fail this test, versus the reported 20 samples.

Response: Comment noted and understood. BRC will review and revise the ratio estimate with the incoming 2009 dataset. Per the suggestion of NDEP, BRC will refer to the following document for guidance: Hem, John D., 1985. Study and Interpretation of the Chemical Characteristics of Natural Water, Third Edition, U.S. Geological Survey Water-supply Paper 2254 (reprinted 1989).

e. For samples where cation concentrations were estimated (wells MCF-05 and MCF-07), it is not proper to perform Correctness Checks. The estimated values are useful for Piper and Stiff charts (such data requires notes of estimation on each product), however it is misleading to perform correctness checks which indicate "Pass" or otherwise.

Response: Comment noted and agreed.

Nevada Division of Environmental Protection Response to: ***Response to Nevada Division of Environmental Protection (NDEP) Comments, dated August 5, 2009, to Upgradient Wells report, BMI Common Areas, Eastside Area, dated July 24,2009*** **dated August 7, 2009**
NDEP Facility ID# H-000688

The NDEP has received and reviewed BRC's document identified above and finds that the document is acceptable with the following clarifications noted.

1. Response-to-comment (RTC) 2, please note that the evaluation of the Middle Zone hydrogeology and vertical gradients should not be constrained to location AA-01. BRC needs to expand this evaluation to any area where the discussion is applicable.

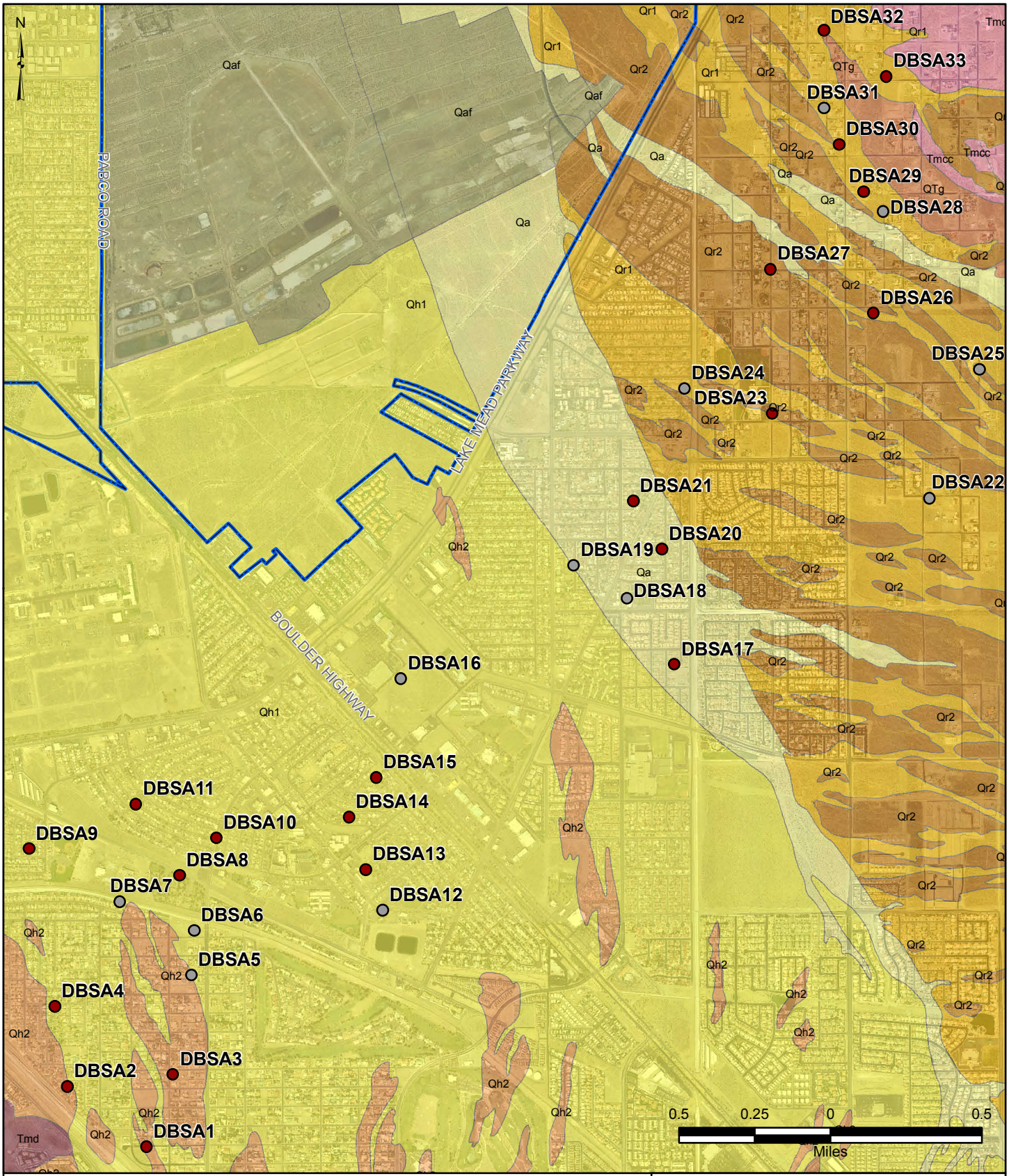
   Response: Comment noted and agreed.

2. General comment, NDEP expects that a revised submittal date for the Upgradient Wells Report will be determined once the 2009 data has been collected.

   Response: Comment noted and agreed.

Appendix B

Background Boring Locations and Upgradient Well Boring Logs with Well Construction Data



Site AOC3 Boundary

Deep Background Sample Location

- Boring Location
- Boring Location not Used

Lithology

Qa	Qr2
Qaf	QTg
Qh1	Tmcc
Qh2	Tmd
Qr1	

Fall 2006 Aerial Photo.

BMI Common Areas (Eastside)
Clark County, Nevada

FIGURE 1

2008 DEEP BACKGROUND SAMPLE LOCATIONS

Basic Remediation Company

Prepared by MKJ (ERM) | Date 06/18/09 | JOB No. 0064276 | FILE: GIS/BRC/DEEP-BACKGROUND_FIGURE1.MXD

Log of Boring No. BRC-SB-01-A

BMI Site - Hydrogeologic Characterization

Henderson, Nevada

Drilling Method: Mud Rotary
Drilling Equipment: Gefco 15K
Drilling Contractor: Water Development Corporation
Driller: Juan Aguilar

Borehole Total Depth: 400 ft bgs
Borehole Diameter: 10 in
Boring Location: Location 1 (Well ID: AA-01)
Depth to Water (ft. bgs): NA ▽

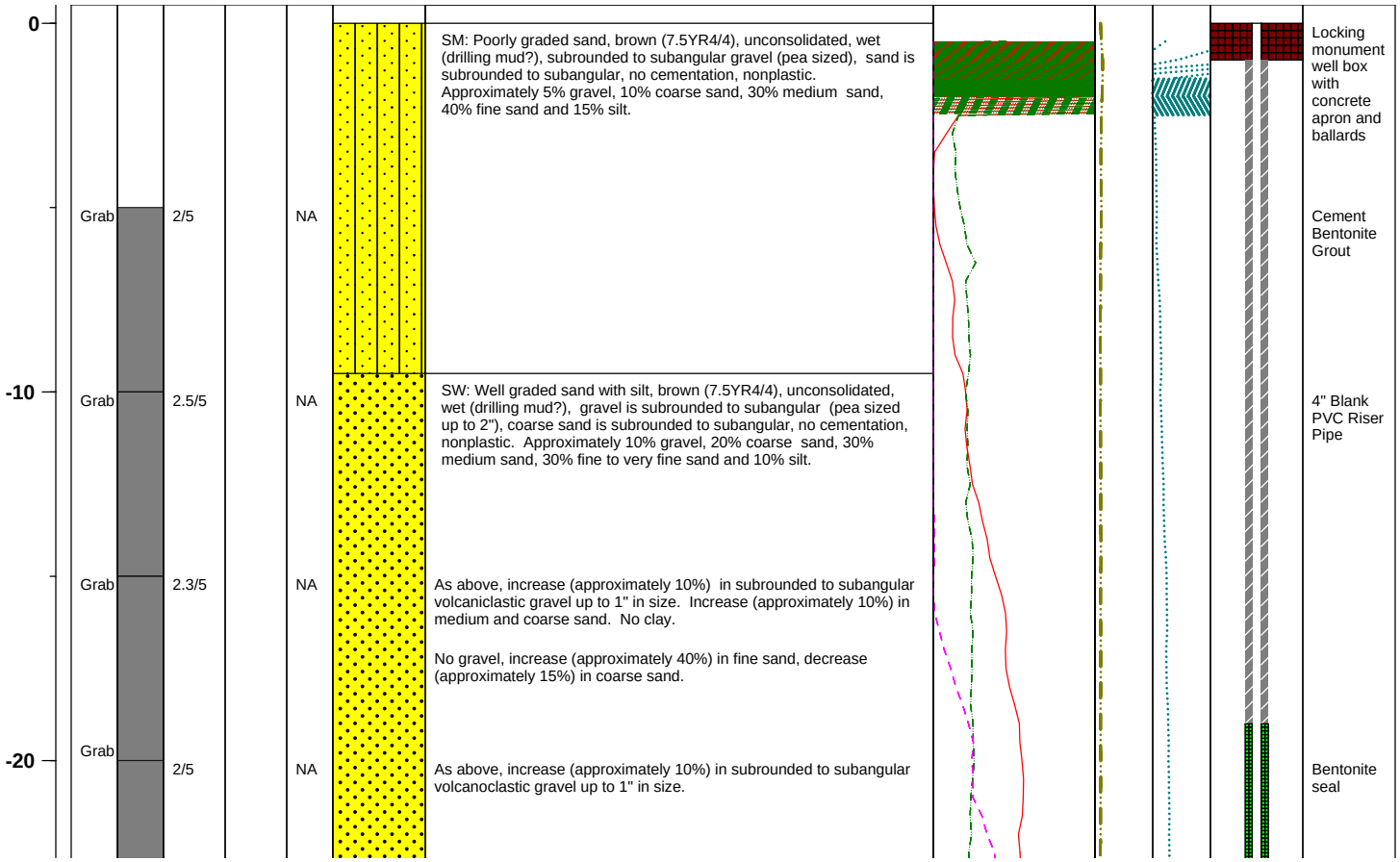
Sample Type: Continuous Core
Sample Interval Continuous

Logged By: Dave Kremer
Date Started: 2/21/04
Date Completed: 2/23/04

Monitoring Well Construction

Type of Surface Seal:	Bentonite-Grout	**Screen Slot Size:**	0.010 in
Blank Casing Type/Size:	4" Sch 80 PVC	**Top of Screen (ft. bgs):**	29 ft bgs
Screen Type/Size:	4" Sch 80 PVC	**Bottom of Screen (ft. bgs):**	49 ft bgs
Transition Sand Type:	#1C	**Type of Sand Pack:**	#10 x 20

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log: 16" (OHM)	E-Log: 64" (OHM)	E-Log: S. PT. (OHM)	Caliper Log (inch)	Guard Log (OHM.M)	Well Construction
0	Grab	2/5			NA		SM: Poorly graded sand, brown (7.5YR4/4), unconsolidated, wet (drilling mud?), subrounded to subangular gravel (pea sized), sand is subrounded to subangular, no cementation, nonplastic. Approximately 5% gravel, 10% coarse sand, 30% medium sand, 40% fine sand and 15% silt.						Locking monument well box with concrete apron and ballards
-10	Grab	2.5/5			NA		SW: Well graded sand with silt, brown (7.5YR4/4), unconsolidated, wet (drilling mud?), gravel is subrounded to subangular (pea sized up to 2"), coarse sand is subrounded to subangular, no cementation, nonplastic. Approximately 10% gravel, 20% coarse sand, 30% medium sand, 30% fine to very fine sand and 10% silt.						Cement Bentonite Grout
	Grab	2.3/5			NA		As above, increase (approximately 10%) in subrounded to subangular volcaniclastic gravel up to 1" in size. Increase (approximately 10%) in medium and coarse sand. No clay. No gravel, increase (approximately 40%) in fine sand, decrease (approximately 15%) in coarse sand.						4" Blank PVC Riser Pipe
-20	Grab	2/5			NA		As above, increase (approximately 10%) in subrounded to subangular volcanoclastic gravel up to 1" in size.						Bentonite seal



Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log 16" (OHM)	E-Log 64" (OHM)	E-Log S. PT. (OHM)	Caliper Log (inch)	Guard Log (OHM.M)	Well Construction
	Grab		3/5				SM: Poorly graded silty sand, brown (7.5YR4/4), wet (drilling mud?), subrounded to subangular volcanoclastic gravel (pea sized up to 1 1/2-in in size), sand is subrounded, no clay, no cementation, nonplastic, unconsolidated. Approximately 10% gravel, 25% coarse sand, 25% medium sand, 30% fine sand and 15% silt.						#1C Transition Sand
-30	Grab		3/5		NA		SP-SM: Sand with silt, brown (7.5YR4/4), wet (drilling mud?), subrounded volcanoclastic gravel (pea sized up to 1" in size), subrounded sand, no clay, no cementation, nonplastic, unconsolidated. Approximately 10% gravel, 15% coarse sand, 35% medium sand, 30% fine sand and 10% silt.						#10 x 20 Sand Pack
							As above, slightly moist, increase in sand. Approxmately 10% gravel, 15% coarse sand, 30% medium sand, 40% fine sand and 5% silt.						
	Grab		3/5		NA								4" 0.010 Slot PVC screen
							As above.						
-40	Grab		1/5		NA		As above, increase in gravel and sand. Approximately 20% gravel, 30% coarse sand, 40% medium sand and 10% fine sand.						
	Grab		1/5		NA		As above, increase in sand, decrease in gravel (up to 2" in size). Approximately 15% gravel, 25% coarse sand, 30% medium sand, 25% fine sand and 5% silt.						
-50	Grab		5/5		NA		ML: Silt, brown (7.5YR5/4), soft, moist, sand is very fine grained, trace clay, weak to no cementation, nonplastic. Approximately 5% fine sand, 90% silt and 5% clay.						Threaded PVC Well Base Cap #10 x 20 Sand Pack Basal Bentonite Seal

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log: 16" (OHM)	Geophysical Data: E-Log: 64" (OHM)	Geophysical Data: E-Log: S. P. (OHM)	Geophysical Data: Caliper Log (inch)	Geophysical Data: Guard Log (OHM.M)	Well Construction
	Grab		5/5		NA		As above.						
							As above, slight (approximately 5%) increase in fine sand, non-plastic to low plasticity.						
-60	Grab		5/5		NA		As above.						
							As above.						
	Grab		5/5		NA		As above.						Cement Backfill
							As above.						
-70	Grab		5/5		NA								
							As above, medium stiff, moist, trace clay, medium (1/8" to 1" in size) cemented nodules, nonplastic.						
	Grab		1/5		NA		No recovery from 73 to 76 ft bgs.						
							Silt, brown (7.5YR5/4), soft, moist, sand is very fine grained, trace clay, no cementation, low plasticity. Approximately 10% sand, 85% silt and 5% clay.						
-80	Grab		5/5		NA		As above, slight (approximately 5%) increase in fine to very fine sand, moist.						
							As above, wet, increase (approximately 10%) in very fine sand.						
	Grab		5/5		NA								

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log: 16" (OHM)	Geophysical Data: E-Log: 64" (OHM)	Geophysical Data: E-Log: S. P. (OHM)	Geophysical Data: Caliper Log (inch)	Geophysical Data: Guard Log (OHM.M)	Well Construction
-90	Grab		5/5		NA		As above, moist, decrease (approximately 10%) in very fine sand.						
							As above, increase (approximately 10%) in very fine to fine sand.						
							As above, decrease (approximately 5%) in very fine sand.						
	Grab		5/5		NA		As above, decrease (approximately 5%) in very fine sand.						
							As above.						Cement Backfill
							As above.						
-100	Grab		5/5		NA		As above.						
							As above.						
	Grab		5/5		NA		As above.						
							As above.						
-110	Grab		5/5		NA		As above.						
							As above, decrease (approximately 5%) in very fine sand, increase in density to stiff.						
	Grab		5/5		NA								

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log: 16" (OHM)	Geophysical Data: E-Log: 64" (OHM)	Geophysical Data: E-Log: S. P. (OHM)	Geophysical Data: Caliper Log (inch)	Geophysical Data: Guard Log (OHM.M)	Well Construction
-120	Grab		5/5		NA		As above, increase (approximately 15%) in very fine sand, decrease in density to soft, wet.						
							Silt with sand, as above, decrease (approximately 15%) in very fine sand, increase in density to stiff.						
	Grab		5/5		NA		Silt, as above.						
-130	Grab		5/5		NA								Cement Backfill
							As above, decrease (approximately 5%) in very fine sand, increase in density to very stiff.						
	Grab		5/5		NA								
							As above, increase (approximately 5%) in very fine sand.						
							Silt with clay, as above, decrease (approximately 5%) in very fine sand.						
-140	Grab		5/5		NA								
							Silty with sand and clay, as above.						
							Silt with clay, as above, decrease (approximately 10%) in very fine sand.						
	Grab		4/5		NA								
							Clayey silt, as above.						

BMI Site - Hydrogeologic Characterization

Henderson, Nevada

Basic Remediation COMPANY

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log: 16" (OHM)	Geophysical Data: E-Log: 64" (OHM)	Geophysical Data: E-Log: S. PT. (OHM)	Geophysical Data: Caliper Log (inch)	Geophysical Data: Guard Log (OHM.M)	Well Construction
-150	Grab		5/5		NA								
	Grab		5/5		NA		Silt with sand and clay, as above, increase (approximately 10%) in very fine sand.						Cement Backfill
							Silt with clay, as above, decrease (approximately 5%) in very fine sand.						
-160	Grab		5/5		NA								
							Silt with sand and clay, as above, increase (approximately 10%) in very fine sand.						
	Grab		5/5		NA		Silt with clay, as above, decrease (approximately 10%) in very fine sand.						
							Clayey silt, as above.						
-170	Grab		5/5		NA								
	Grab		5/5		NA								
-180							CL: Silty clay, brown (7.5YR4/4), hard, moist, sand is very fine grained, silt with clay, no cementation, moderate to high plasticity.						

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log 16" (OHM)	E-Log 64" (OHM)	E-Log S. PT. (OHM)	Caliper Log (inch)	Guard Log (OHM.M)	Well Construction
	Grab		5/5		NA		Approximately 5% fine sand, 45% silt and 50% clay.						
	Grab		5/5		NA		ML: Clayey silt, brown (7.5YR5/3), very stiff, moist, sand is very fine grained, silt and clay, no cementation, low plasticity. Approximately 5% fine sand, 55% silt and 40% clay.						
							CL: Silty clay, pinkish gray (7.5YR7/2), very stiff, moist, coarse, medium and fine sands are gypsum fragments, silt and clay, no cementation, moderate plasticity. Trace coarse sand, 5% medium sand, 15% fine sand, 30% silt and 50% clay.						
-190	Grab		5/5		NA		ML: Clayey silt, pinkish gray (7.5YR6/2), very stiff, moist, sand is very fine grained, silt and clay, no cementation, low plasticity. 5% coarse sand, 5% medium sand, 10% fine sand, 50% silt and 30% clay.						Cement Backfill
							Silt with sand and clay, color change to white (10YR8/1), very stiff, some cemented very fine sand nodules, no cementation, non plastic.						
	Grab		5/5		NA								
							Clayey silt with sand, as above, decrease (appproximately 10%) in medium sand.						
-200	Grab		5/5		NA								
							Clayey silt, as above.						
	Grab		5/5		NA								Cement Backfill
							Color change to greenish gray (Gley 1 6/10Y), hard.						
-210	Grab		5/5		NA								

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log: 16" (OHM)	Geophysical Data: E-Log: 64" (OHM)	Geophysical Data: E-Log: S. PT. (OHM)	Geophysical Data: Caliper Log (inch)	Geophysical Data: Guard Log (OHM.M)	Well Construction
							Color change to brown (10YR5/3), hard.						
	Grab		5/5		NA		Color change to brown (7.5YR4/3).						
							Color change to brown (7.5YR5/3).						
-220	Grab		5/5		NA		SM: Poorly graded silty sand with clay, brown (7.5YR5/3), hard, moist, medium grained sand subrounded, fine to very fine sand, silt with clay, no cementation, nonplastic. Approximately 5% medium sand, 50% fine sand, 40% silt and 5% clay.						
							ML: Clayey silt, brown (7.5YR5/3), hard, moist, very fine sand, silt and clay, no cementation, nonplastic to low plasticity. Approximately 5% fine sand, 70% silt and 25% clay.						
	Grab		5/5		NA								
							As above, slight increase (approximately 5%) in clay.						
-230	Grab		5/5		NA		As above.						
							Color change to pinkish gray (7.5YR7/2), hard, moist, sand is fine to very fine grained, silt and clay, nocementation, increase (approximately 5%) in fine sand, decrease in clay.						
	Grab		5/5		NA		Color change to brown (7.5YR5/3), moderate plasticity, increase (approximately 5%) in fine sand, decrease in clay.						
							As above, decrease (approximately 5%) in fine sand, increase in clay.						
-240	Grab		5/5		NA		Clayey silt with sand, as above, increase (approximately 15%) in fine sand.						

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log 16" (OHM)	E-Log 64" (OHM)	E-Log S. PT. (OHM)	Caliper Log (inch)	Guard Log (OHM.M)	Well Construction
	Grab		5/5		NA		As above, decrease (approximately 10%) in fine sand.						Cement Backfill
							Silt with clay, as above.						
-250	Grab		5/5		NA		As above, decrease (approximately 5%) in fine sand.						
							Clayey silt, as above, increase (approximately 5%) in fine sand.						
	Grab		5/5		NA		Clayey silt with sand, as above.						Cement Backfill
-260	Grab		5/5		NA		Silt with clay, as above, increase (approximately 10%) in fine sand, decrease in clay.						
							As above, increase (approximately 5%) in fine sand, decrease in clay.						
	Grab		5/5		NA		Clayey silt, as above, decrease (approximately 10%) in fine sand.						
-270	Grab		5/5		NA								
							Silt with sand and clay, as above, increase (approximately 10%) in fine						

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log: 16" (OHM)	Geophysical Data: E-Log: 64" (OHM)	Geophysical Data: E-Log: S. P.T. (OHM)	Geophysical Data: Caliper Log (inch)	Geophysical Data: Guard Log (OHM.M)	Well Construction
	Grab		0/5		NA		sand.						
-280	Grab		5/5		NA		Clayey silt, as above, decrease (approximately 5%) in fine sand.						
							Silt with sand, as above.						
	Grab		5/5		NA		Sandy silt, as above, increase (approximately 20%) in fine sand.						
							Clayey silt, as above, increase (approximately 15%) in silt, trace fine sand.						
-290	Grab		5/5		NA								
							As above, increase (approximately 10%) in fine sand.						
							Silt with sand, as above. Approximately 15% fine sand, 80% silt and 5% clay.						
	Grab		5/5		NA								Cement Backfill
-300	Grab		5/5		NA		Silt, as above. Approximatley 10% fine sand, 85% silt and 5% clay.						
			5/5		NA								

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log: 16" (OHM)	Geophysical Data: E-Log: 64" (OHM)	Geophysical Data: E-Log: S. P. (OHM)	Geophysical Data: Caliper Log (inch)	Geophysical Data: Guard Log (OHM.M)	Well Construction
-310	Grab		5/5		NA		SM: Poorly graded silty sand, brown (7.5YR4/4), hard, moist to wet, medium grained subrounded sand, some fine to very fine sand, silt with no clay, no cementation, nonplastic. Trace coarse sand, 10% medium sand, 60% fine sand and 30% silt.						
							ML						
							SM: Poorly graded silty sand, brown (7.5YR4/4), hard, very moist, medium subrounded sand, sand is very fine to fine grained, no cementation, nonplastic. Approximately 10% medium sand, 50% fine sand and 40% silt.						
	Grab		5/5		NA		ML: Sandy silt, brown (7.5YR4/4), hard, moist, some medium grained subrounded sand, some fine to very fine grained sand, no cementation, no to low plasticity.						Cement Backfill
-320	Grab		5/5		NA		SM: Poorly graded silty sand, brown (7.5YR4/4), stiff, very moist to wet, some coarse subrounded sand, some medium subrounded sand, some fine to very fine sand, none to weak cementation, nonplastic. Approximately 5% coarse sand, 10% medium sand, 50% fine sand and 35% silt.						
							ML: Sandy wilt with clay, brown (7.5YR4/4), hard, moist, trace subrounded medium sand, some fine to very fine sand, silt with clay, no cementation, low to nonplastic. Trace medium sand, 45% fine sand, 50% silt and 5% clay.						
	Grab		5/5		NA		SM: Silty sand, brown (7.5YR4/4), stiff, very moist, some medium grained subrounded sand, some fine to very fine grained sand, silt with trace clay at 325 ft bgs, no to weak cementation, nonplastic. Approximately 5% medium sand, 50% fine sand and 45% silt.						
							ML						
							CL: Silty clay, light brown (7.5YR6/4), hard, moist to dry, trace very fine grained sand, silt and clay, no cementation, moderate plasticity. Trace fine to very fine grained sand, 40% silt and 60% clay.						
-330	Grab		5/5		NA		ML						
							CH: Clay with silt, light brown (7.5YR6/3), hard, moist to dry, no cementation high plasticity. Approximately 10% silt and 90% clay.						
							CL: Silty clay, brown (7.5YR5/3), hard, moist, silt and clay, no cementation, low to moderate plasticity. Approximately 5% very fine sand, 30% silt and 65% clay.						
	Grab		5/5		NA		ML: Clayey silt, brown (7.5YR5/3), hard, moist, silt and clay, no cementation, low to moderate plasticity. Approximately 70% silt and 30% clay.						
							CL: Silty clay, brown (7.5YR5/3). Approximately 30% silt and 70% clay.						

Log of Boring No. BRC-SB-01-A

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log 16" (OHM)	E-Log 64" (OHM)	E-Log S. PT. (OHM)	Caliper Log (inch)	Guard Log (OHM.M)	Well Construction
-340	Grab		5/5		NA		ML: Clayey silt, brown (7.5YR5/3). Approximately 60% silt and 40% clay..						
							CL: Silty clay, brown (7.5YR5/3). Approximately 40% silt and 60% clay.						
							SM: Poorly graded silty sand, brown (7.5YR4/3), soft, very moist to wet, sand is prediominately fine grained, silt, no clay, no cementation, nonplastic. Approximately 80% fine to very fine sand and 20% silt.						
							ML: Poorly graded clayey silt, brown (7.5YR4/3), soft, very moist to wet, no cementation, nonplastic. Approximately 60% silt and 40% clay.						
	Grab		5/5		NA		CL: Approximately 10% silt, 90% clay.						
							ML: Silt with clay, brown (7.5YR4/4), hard, moist, sand is fine to very fine grained, no cementation, nonplastic. Approximately 10% fine to very fine sand, 85% silt and 5% clay.						
							SM: Silty sand, brown (7.5YR4/4). Approximately 10% medium sand, 70% fine sand and 20% silt.						
-350							ML: Sandy silt with clay, brown (7.5YR4/4). Approximately 15% fine sand, 85% silt and trace clay..						
	Grab		5/5		NA		SM: Poorly graded silty sand, brown (7.5YR5/3), very stiff, moist to wet, some medium grained subrounded sand, silt with trace clay, no cementation, low plasticity. Approximately 30% medium sand, 50% fine sand and 20% silt.						
							ML: Clayey silt with sand, brown (7.5YR5/3). Approximately 5% fine sand, 50% silt and 45% clay.						
							SM: Poorly graded silty sand, brown (7.5YR5/3). Approximately 10% medium sand, 50% fine sand, 40% silt and trace clay.						
	Grab		5/5		NA		ML: Clayey silt, brown (7.5YR5/3), hard, moist, sand is fine to very fine grained, silt and clay, no cementation, low plasticity. Approximately 35% fine to very fine sand, 50% silt and 5% clay.						Cement Backfill
							SM: Poorly graded silty sand, brown (7.5YR5/3). Approximately 5% medium sand, 60% fine sand and 35% silt.						
							ML: Clayey silt, brown (7.5YR5/3). Approximately 10% fine to very fine sand, 70% silt and 20% clay.						
-360	Grab		5/5		NA		CL: Silty clay, light brown (7.5YR6/3). Approximately 20% silt and 80% clay.						
							ML: Clayey silt, brown (7.5YR5/3). Approximately 30% fine sand, 60% silt and 10% clay.						
							CL: Silty clay, light brown (7.5YR6/3), hard, moist, silt and clay with trace gypsum fragments up to 1/4", no cementation, moderate plasticity. Trace coarse sand, 20% silt and 80% clay.						
	Grab		5/5		NA		SM: Silty sand, brown (7.5YR4/4), very stiff, moist, medium grained subrounded sand, some fine to very fine grained sand, no clay, no to weak cementation, nonplastic. Approximately 10% medium sand, 70% fine sand and 20% silt.						
							ML: Clayey silt, brown (7.5YR4/4), hard, moist, some very fine grained sand and silt and clay, no cementation, low plasticity. Approximately 10% fine sand, 70% silt and 20% clay.						

BMI Site - Hydrogeologic Characterization

Henderson, Nevada

Log of Boring No. BRC-SB-01-A

Basic Remediation COMPANY

Depth Elevation (BGS)	Sample Type	Sample Interval	Sample Recovery	Sample Retained for Analysis	PID	Lithology	Soil Description	Geophysical Data: E-Log: 16" (OHM)	Geophysical Data: E-Log: 64" (OHM)	Geophysical Data: E-Log: S. PT. (OHM)	Geophysical Data: Caliper Log (inch)	Geophysical Data: Guard Log (OHM.M)	Well Construction
-370	Grab		4/5		NA		CL: Silty clay, brown (7.5YR5/3), hard, moist, silt and clay, no cementation, moderate plasticity. Approximately 10% fine sand, 60% silt and 30% clay.						
							ML: Clayey silt, brown (7.5YR4/4). Approximately 10% fine sand, 60% silt and 30% clay.						
							CL: Silty clay, brown (7.5YR5/3), hard, moist, silt and clay, no cementation, moderate plasticity. Approximately 5% fine sand, 40% silt and 55% clay.						
	Grab		5/5		NA		ML: Silt with clay, brown (7.5YR4/4), hard, moist, sand is fine to very fine grained, silt with clay, no cementation, no to low plasticity. Approximately 10% fine sand, 80%, silt and 10% clay.						Cement Backfill
							Clayey silt, as above. Approximately 10% fine sand, 50% silt and 40% clay.						
-380	Grab		5/5		NA		Silt with clay, as above. Approximately 10% fine sand, 80% silt and 10% clay.						
	Grab		5/5		NA		Clayey silt, as above. Approximately 80% silt and 20% clay.						Cement Backfill
							Wet from 386.5 to 386.7 ft bgs.						
-390	Grab		5/5		NA		Silt with clay, as above. Appoximately 5%fine sand, 85% silt and 10% clay.						
							Clayey silt, as above. Approximately 80% silt and 20% clay.						
	Grab		5/5		NA		Silt, as above. Approximately 5% fine sand, 90% silt and 5% clay.						
							Silt with clay, as above. Approximately 5% fine sand, 90% silt and 5% clay.						
-400													

Log of Boring No. BRC-SB-27-B

BMI Site - Hydrogeologic Characterization

Henderson, Nevada

Drilling Method: Sonic
Drilling Equipment: Rotary Sonic
Drilling Contractor: Resonant Sonic
Driller: ProSonic

Borehole Total Depth: 143 ft bgs
Borehole Diameter: 8.5 in
Boring Location: Location 27 (Well ID: AA-27)
Depth to Water (ft. bgs): NA

Sample Type: S.S.
Sample Interval Continuous

Logged By: Jennifer Wiley
Date Started: 07/06/04
Date Completed: 07/07/04

Monitoring Well Construction

Type of Surface Seal:	Bentonite-Grout	**Screen Slot Size:**	0.010 in
Blank Casing Type/Size:	4" Sch 80 PVC	**Top of Screen (ft. bgs):**	61.5 ft bgs
Screen Type/Size:	4" Sch 80 PVC	**Bottom of Screen (ft. bgs):**	81.5 ft bgs
Transition Sand Type:	N/A	**Type of Sand Pack:**	#2 x 12

Depth Elevation (MSLD)	Sample Type	Sample Interval	Sample Recovery (feet)	Sample Retained for Analysis	PID	Lithology	Soil Description	Well Construction
0							For lithologic interpretation, see boring log BRC-SB-27-A	Locking monument well box with concrete apron and ballards Cement Bentonite Grout 4" Blank PVC Riser Pipe
-10								
-20								

Depth Elevation (MSLD)	Sample Type	Sample Interval	Sample Recovery (feet)	Sample Retained for Analysis	PID	Lithology	Soil Description	Well Construction
-30							For lithologic interpretation, see boring log BRC-SB-27-A	Cement Bentonite Grout 4" Blank PVC Riser Pipe
-40								
-50								Bentonite seal

Depth Elevation (MSLD)	Sample Type	Sample Interval	Sample Recovery (feet)	Sample Retained for Analysis	PID	Lithology	Soil Description	Well Construction
-60							For lithologic interpretation, see boring log BRC-SB-27-A	#10 x 20 Sand Pack 4" 0.010 Slot PVC screen
-70								
-80								Threaded PVC Well Base Cap Cement Backfill
-90								

Depth Elevation (MSLD)	Sample Type	Sample Interval	Sample Recovery (feet)	Sample Retained for Analysis	PID	Lithology	Soil Description	Well Construction
-100							For lithologic interpretation, see boring log BRC-SB-27-A	Cement Backfill
-110								
-120								

Depth Elevation (MSLD)	Sample Type	Sample Interval	Sample Recovery (feet)	Sample Retained for Analysis	PID	Lithology	Soil Description	Well Construction
-130							For lithologic interpretation, see boring log BRC-SB-27-A	Cement Backfill
-140								

EXPLORATION LOG
AA-UW 1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26725562.64, E 839434.53
EXPLORATION DATE: 7/30/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 48.70'
DATE MEASURED: 8/1/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
-2.5									
0		SM	Grayish brown silty SAND, little gravel, dry and dense. PIDs (10.6 & 11.7 eV)= 0. 1, 0.0 ppmV. 25% angular gravel, 70% subrounded sand, 5% fines; Trace mica; poorly sorted with feldspars and pyroxene.						
2.5									
5			...light brown. PIDs (10.6 & 11.7 eV)= 0. 1, 0.0 ppmV.						
7.5									
10			...reddish brown. PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV.						
12.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26725562.64, E 839434.53
EXPLORATION DATE: 7/30/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 48.70'
DATE MEASURED: 8/1/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
15									
17.5			...weakly cemented. PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV.						
20			...uncemented. PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV.						
22.5									
25									
27.5									
30			...PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26725562.64, E 839434.53
EXPLORATION DATE: 7/30/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 48.70'
DATE MEASURED: 8/1/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
32.5									
35			...trace gravel.						
37.5									
40			...weakly cemented layers inches thick alternating with uncemented layers to 46 feet bgs. PIDs (10.6 & 11.7 eV)= 0. 1, 0.0 ppmV.						
42.5									
45			...brown. ...dark reddish brown, moist, weakly cemented.						
47.5		SC	Dark reddish brown clayey SAND with gravel, wet and medium dense.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26725562.64, E 839434.53
EXPLORATION DATE: 7/30/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 48.70'
DATE MEASURED: 8/1/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
			...strong brown. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
		CL	MUDDY CREEK FORMATION: Yellowish red sandy lean CLAY, wet and very stiff. Occasional thin (1/2 inch thick) sandstone layers. 5% subangular gravel, 10% subangular sand, 85% fines; <1% micas; poorly sorted with feldspar and pyroxene.						
			...PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
		GP-GC	Dark brown poorly graded GRAVEL with sand, trace clay, moist and medium dense.						
			END OF TEST PIT AT 65.0 FEET						

50
52.5
55
57.5
60
62.5
65

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26722943.77, E 838125.09
EXPLORATION DATE: 7/31-8/3/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 64.57'
DATE MEASURED: 8/4/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
-2.5									
0		GW	Light grayish brown well graded GRAVEL with silt and sand, dry and medium dense. PIDs (10.6 & 11.7 eV)= 0. 7, 0.1 ppmV. 55% angular to subangular gravel, 405 subanular sand, 5% fines; <1% mica; poorly sorted with feldspar, amphiboe, and pyroxene.						
2.5		SM	Reddish brown silty SAND with gravel, dry and dense.						
5			...PIDs (10.6 & 11.7 eV)= 0. 9, 0.1 ppmV. 5% angular gravel, 85% subrounded to subangular sand, 10% fines; <1% mica, poorly sorted.						
7.5									
10			...PIDs (10.6 & 11.7 eV)= 0. 3, 0.1 ppmV.						
12.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26722943.77, E 838125.09
EXPLORATION DATE: 7/31-8/3/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 64.57'
DATE MEASURED: 8/4/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
15			...brown.						
17.5			...weakly cemented to 20 feet.						
20			...uncemented. Increasing gravel size to 2 inches. PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV.						
22.5									
25			...pale brown.						
27.5									
30		GW	Light brown well graded GRAVEL with silt and sand, few cobbles, dry and very dense. ...PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV. 50%						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26722943.77, E 838125.09
EXPLORATION DATE: 7/31-8/3/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 64.57'
DATE MEASURED: 8/4/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
			angular gravel, 40% subrounded to subangular sand, 10% fines; <1% mica; poorly sorted withfeldspar and pyroxene.						
32.5		SM	Light brown silty SAND, trace gravel, dry and very dense. PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV. 7% subangular gravel, 90% subrounded to subangular sand, 3% fines; <1% mica; poorly sorted with feldspar and pyroxene.						
35									
37.5									
40			...PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV.						
42.5			...weakly cemented to 45 feet.						
45			...uncemented.						
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26722943.77, E 838125.09
EXPLORATION DATE: 7/31-8/3/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 64.57'
DATE MEASURED: 8/4/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
			...weakly cemented to 50 feet.						
50		GW	Brown well graded GRAVEL with silt and sand, dry and very dense. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV. 50% subangular to angular gravel, 40% subrounded sand, 10% fines; <1% mica; poorly sorted with feldspar and pyroxene.						
52.5			...moist.						
55		SM	Reddish brown silty SAND with gravel, moist and very dense. Weakly cemented layers 0.5 to 1.0 inch thick. 20% angular gravel, 70% subrounded to subangular sand, 10% fines; <1% mica; poorly sorted with feldspar, pyroxene, and trace gypsum.						
57.5									
60			...dark brown. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
62.5		CL	MUDDY CREEK FORMATION: Yellowish red sandy lean CLAY, moist and very stiff. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV. 5% angular to subangular gravel, 15% subrounded sand, 85% fines; <1% mica; poorly sorted course fraction (sand and gravel).						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26722943.77, E 838125.09
EXPLORATION DATE: 7/31-8/3/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 64.57'
DATE MEASURED: 8/4/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
65									
67.5									
70			...PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
72.5									
75			END OF TEST PIT AT 75.0 FEET						
77.5									
80									

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EXPLORATION LOG
AA-UW 3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26720040.77, E 836519.18
EXPLORATION DATE: 8/5/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 63.89'
DATE MEASURED: 8/6/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
-2.5									
0		SM	Light brown silty SAND with gravel, dry and dense. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV. 10% angular to subangular gravel, 80% subrounded sand, 10% fines; <1% mica; poorly sorted with feldspar and mafic minerals (pyroxene).						
2.5									
5			...PIDs (10.6 & 11.7 eV)= 0.1, 0.0 ppmV.						
7.5									
10		GW	Brown well graded GRAVEL with silt and sand, dry and very dense. PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV. 60% angular to subangular gravel, 30% subrounded to subangular sand, 10% fines; <1% mica; poorly sorted withfeldspar and mafic minerals (pyroxene).						
12.5									

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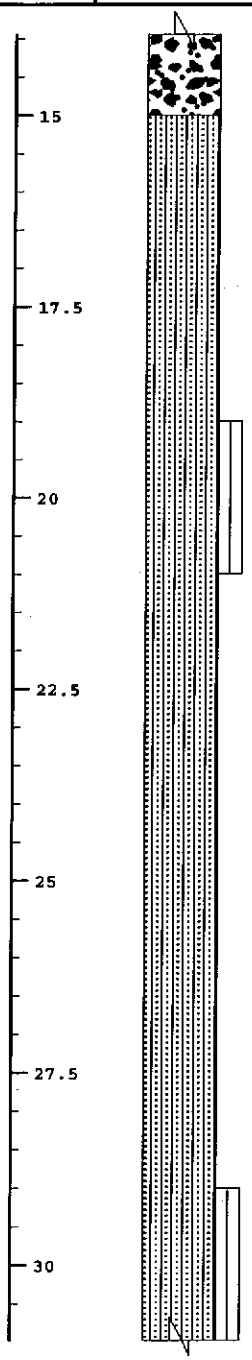
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26720040.77, E 836519.18
EXPLORATION DATE: 8/5/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 63.89'
DATE MEASURED: 8/6/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
15		SM	Brown silty SAND with gravel, dry and very dense. PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV. 15% angular to subangular gravel, 75% subrounded sand, 10% fines; <1% mica; poorly sorted with feldspar and mafic minerals (pyroxene).						
17.5									
20			...PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
22.5									
25			...light brown, few cobbles.						
27.5									
30			...few cobbles. PIDs (10.6 & 11.7 eV)= 0.2, 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26720040.77, E 836519.18
EXPLORATION DATE: 8/5/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 63.89'
DATE MEASURED: 8/6/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
32.5			...PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
35			...yellowish red ...weakly cemented to 40.0 feet.						
37.5									
40			...PIDs (10.6 & 11.7 eV)= 0. 0, 0.0 ppmV.						
42.5									
45									
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26720040.77, E 836519.18
EXPLORATION DATE: 8/5/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 63.89'
DATE MEASURED: 8/6/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
50			...weakly cemented layers 0.5 inch thick. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV. 20% subangular to angular gravel, 65% subrounded sand, 15% fines; <1% mica; poorly sorted with feldspar.						
52.5			...moist						
55									
57.5									
60			...dark brown. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
62.5									
65									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26720040.77, E 836519.18
EXPLORATION DATE: 8/5/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 63.89'
DATE MEASURED: 8/6/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
67.5		CL	MUDDY CREEK FORMATION: Reddish brown sandy lean CLAY, wet and very stiff. <1% angular gravel, 5% subrounded sand, 94% fines; <1% mica; poorly sorted course fraction (sand and gravel),						
70			...moist. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
72.5									
75									
77.5		SP	Dark brown poorly graded SAND, trace gravel, wet and very dense. <1% subangular gravel, 5% subrounded sand, 95% fines; <1% mica; poorly sorted course fraction (sand and gravel).						
		CL	Reddish brown sandy lean CLAY, moist and very stiff. ...<1% subangular gravel, 5% subrounded sand, 95% fines; <1% mica; poorly sorted course fraction (sand and gravel) .						
80			**END OF TEST PIT AT 80.0 FEET**						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 2671895.69, E 834777.38
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 39.59'
DATE MEASURED: 8/7/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
-2.5									
0		SM	Brown silty SAND with gravel, dry and dense. PIDs (10.6 & 11.7 eV)= 0.2, 0.0 ppmV. 15% angular to subangular gravel, 75% subrounded sand, 10% fines; <1% mica; poorly sorted with feldspars and pyroxene.						
2.5									
5			...light brown. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
7.5									
10			...brown. PIDs (10.6 & 11.7 eV)= 0.1, 0.0 ppmV.						
12.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 2671895.69, E 834777.38
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 39.59'
DATE MEASURED: 8/7/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
15			...light brown. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
17.5									
20			...PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
22.5									
25			...brown. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
27.5									
30			...reddish brown, increasing gravel size to 2 inches. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 2671895.69, E 834777.38
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 39.59'
DATE MEASURED: 8/7/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
32.5		CL	MUDDY CREEK FORMATION: Reddish brown sandy lean CLAY, white gypsum salt and crystals, wet and very stiff. Gypsum is present from 32 feet to 35 feet.						
35			...PIDs (10.6 & 11.7 eV)= 0.1, 0.0 ppmV.						
37.5			...wet.						
		CL-ML	Dark brown silty CLAY with sand, trace gravel, wet and very stiff.						
40		CL	Reddish brown sandy lean CLAY, wet and very stiff. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
42.5			...light gray with orange oxidation mottling.						
			...light olive brown.						
45			...PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 2671895.69, E 834777.38
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 39.59'
DATE MEASURED: 8/7/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
50			...reddish brown. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
52.5		SC	Reddish brown clayey SAND, wet and dense.						
55		CL	Reddish brown sandy lean CLAY, wet and very stiff.						
			END OF TEST PIT AT 55.0 FEET						
57.5									
60									
62.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 5

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26718163.09, E 832800.88
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 45.39'
DATE MEASURED: 8/8/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
-2.5									
0		GP	Light brown poorly graded GRAVEL with sand, dry and dense. PIDs (10.6 & 11.7 eV)= 0. 4, 0.1 ppmV. 60% angular gravel, 30% subrounded sand, 10% fines; <1% mica; poorly sorted with feldspars and mafic minerals (pyroxene).						
2.5									
5		GW-GM	Light brown well graded GRAVEL with silt and sand, dry and dense. Gravel size increases to 2 inches. PIDs (10.6 & 11.7 eV)= 0. 2, 0.0 ppmV. 75% angular gravel, 15% subrounded to subangular sand, 10% fines; <1% mica; poorly sorted with feldspar and mafic minerals (pyroxene). ...large cobble or boulder encountered. ...drill through large cobble or boulder. ...PIDs (10.6 & 11.7 eV)= 0.1 0.0 ppmV.						
7.5									
10									
12.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 5

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26718163.09, E 832800.88
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 45.39'
DATE MEASURED: 8/8/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
15		GP	Light brown poorly graded GRAVEL with silt and sand, dry and very dense. PIDs (10.6 & 11.7 eV)= 0.0 0.0 ppmV. 80% angular gravel, 15% subrounded to subangular sand, 5 % fines; <1% mica; poorly sorted with feldspar and mafic minerals (pyroxene).						
17.5									
20		SM	Light reddish brown silty SAND, trace gravel, dry and very dense. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV. 5% angular gravel, 90% subrounded to subangular sand, 5% fines; <1% mica; poorly sorted gravel with feldspar and mafic minerals (pyroxene), well sorted sand.						
22.5									
25			...PIDs (10.6 & 11.7 eV)= 0.1 0.0 ppmV.						
27.5									
30		GW	Light reddish brown well graded GRAVEL with silt and sand, dry and very dense. PIDs (10.6 &						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 5

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26718163.09, E 832800.88
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 45.39'
DATE MEASURED: 8/8/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
			11.7 eV)= 0.0, 0.0 ppmV. 45% subangular gravel, 40% subrounded to subangular sand, 5% fines; <1% mica; poorly sorted with feldspar.						
35		SM	Reddish gray silty SAND with gravel, dry and very dense. PIDs (10.6 & 11.7 eV)= 0.0 0.0 ppmV. 20% angular to subangular gravel, 75% subrounded to subangular sand, 5% fines; <1% mica; poorly sorted with feldspar. ...brown, moist.						
40		SC	Mottled light gray and reddish brown clayey SAND with gravel, moist and very dense.						
42.5		SM	Reddish gray silty SAND with gravel, dry and very dense. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV. 30% angular gravel, 60% subrounded to subangular sand, 10% fines; <1% mica; poorly sorted with feldspar. ...moist. ...wet.						
45		SC	MUDDY CREEK FORMATION: Reddish brown with white mottling clayey SAND, trace weathered white caliche nodules, moist and very dense. PIDs (10.6 & 11.7 eV)= 0.0 0.0 ppmV. 15% subangular gravel, 50% subrounded to sunangular sand, 35% fines; <1% mica; poorly sorted with gypsum and						
47.5									

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EXPLORATION LOG
AA-UW 5

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26718163.09, E 832800.88
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 45.39'
DATE MEASURED: 8/8/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
			feldspar.						
50		CL	Reddish brown sandy lean CLAY, moist and very stiff. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV. 1% subangular gravel, 10% subrounded sand, 89% fines; <1% mica; poorly sorted course fraction (sand and gravel)						
52.5									
55		CL	...wet to 57 feet.						
57.5			...set well at 57.0 feet bgs.						
60			**END OF TEST PIT AT 60.0 FEET**						
62.5									
65									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 6

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26719633.12, E 831429.68
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 55.3'
DATE MEASURED: 8/8/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
-2.5									
0		SM	Pinkish gray silty SAND with gravel, dry and medium dense. PIDs (10.6 & 11.7 eV)= 0.3, 0.0 ppmV. 20% angular gravel, 70% subrounded sand, 10% fines; <1% mica; poorly sorted with feldspars and mafic minerals (pyroxene). ...dense.						
2.5									
5			...reddish gray, very dense. PIDs (10.6 & 11.7 eV)= 0. 2, 0.0 ppmV.						
7.5									
10			...light reddish brown. PIDs (10.6 & 11.7 eV)= 0.2 0.0 ppmV.						
12.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 6

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26719633.12, E 831429.68
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 55.3'
DATE MEASURED: 8/8/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
15		GW	Light brown well graded GRAVEL with silt and sand, dry and very dense. PIDs (10.6 & 11.7 eV)= 0.1 0.0 ppmV. 55% angular to subangular gravel, 35% subrounded to subangular sand, 10 % fines; <1% mica; poorly sorted with feldspar and mafic minerals (pyroxene).						
17.5									
20			...PIDs (10.6 & 11.7 eV)= 0.1, 0.0 ppmV.						
22.5									
25		SM	Reddish gray silty SAND with gravel, dry and very dense. PIDs (10.6 & 11.7 eV)= 0.1 0.0 ppmV. 35% angular gravel, 55% subrounded to subangular sand, 10% fines; <1% mica; poorly sorted gravel with feldspar and mafic minerals (pyroxene), well sorted sand. ...little cobbles.						
27.5									
30			...cobbles to 6 inches in diameter. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						

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EXPLORATION LOG
AA-UW 6

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26719633.12, E 831429.68
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 55.3'
DATE MEASURED: 8/8/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
32.5									
35		CL	MUDDY CREEK FORMATION: Light gray to light grayish brown sandy lean CLAY, some gypsum, dry and very stiff. 5% subangular gravel, 25% subrounded sand, 70% fines; <1% mica; poorly sorted gravel, well sorted sand, with 20% gypsum.						
37.5		SM	Reddish gray silty SAND with gravel, dry and very dense. PIDs (10.6 & 11.7 eV)= 0.0 0.0 ppmV. 20% angular to subangular gravel, 75% subrounded to subangular sand, 5% fines; <1% mica; poorly sorted with feldspar. ...brown, moist.						
40		SC	Mottled light gray and reddish brown clayey SAND with gravel, moist and very dense.						
42.5		SM	Reddish gray silty SAND with gravel, dry and very dense. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV. 30% angular gravel, 60% subrounded to subangular sand, 10% fines; <1% mica; poorly sorted with feldspar. ...moist. ...wet, light olive brown.						
45		SC	...brown. Decreasing percent gravel and sand. 1% Gravel, 10% sand, 89% fines. PIDs (10.6 & 11.7 eV)= 0.0 0.0 ppmV.						
47.5									

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No.

EXPLORATION LOG
AA-UW 6

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072228V1
EXPLORATION LOCATION: N 26719633.12, E 831429.68
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/COOKE

INITIAL DEPTH TO WATER: NA
DATE MEASURED: NA
FINAL DEPTH TO WATER: 55.3'
DATE MEASURED: 8/8/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	% SWELL	WELL CONSTRUCTION
50		CL	Reddish brown sandy lean CLAY, moist and very stiff. PIDs (10.6 & 11.7 eV)= 0.0, 0.0 ppmV.						
52.5									
55		CL	...wet to 57 feet.						
57.5		SC	Olive gray clayey SAND, wet and very dense. 1% subangular gravel, 65% subrounded sand, 34% fines; <1% mica; poorly sorted gravel and well sorted sand with feldspar and mafic minerals. ...0.0% gravel, 70 % subangular sand, 30% fines; <1% mica; well sorted sand with feldspar and mafic minerals.						
60			**END OF TEST PIT AT 60.0 FEET**						
62.5									
65									

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty sand
	Clayey sand
	Low plasticity clay
	Poorly graded gravel with clay
	Well graded gravel
	Poorly graded sand
	Silty low plasticity clay
	Poorly graded gravel
	Well graded gravel with silt
Misc. Symbols	
	Boring continues
	Water table at date indicated

Symbol	Description
Soil Samplers	
	Bulk/Grab sample
	Rock core
Monitor Well Details	
	riser with cover and protective casing
	bentonite pellets
	bentonite slurry
	silica sand, blank PVC
	slotted pipe w/ sand
	end of well installation

Notes:

1. Exploratory borings were drilled on 8/7/07 using a 4-inch diameter continuous flight power auger.

2. No free water was encountered at the time of drilling or when re-checked the following day.

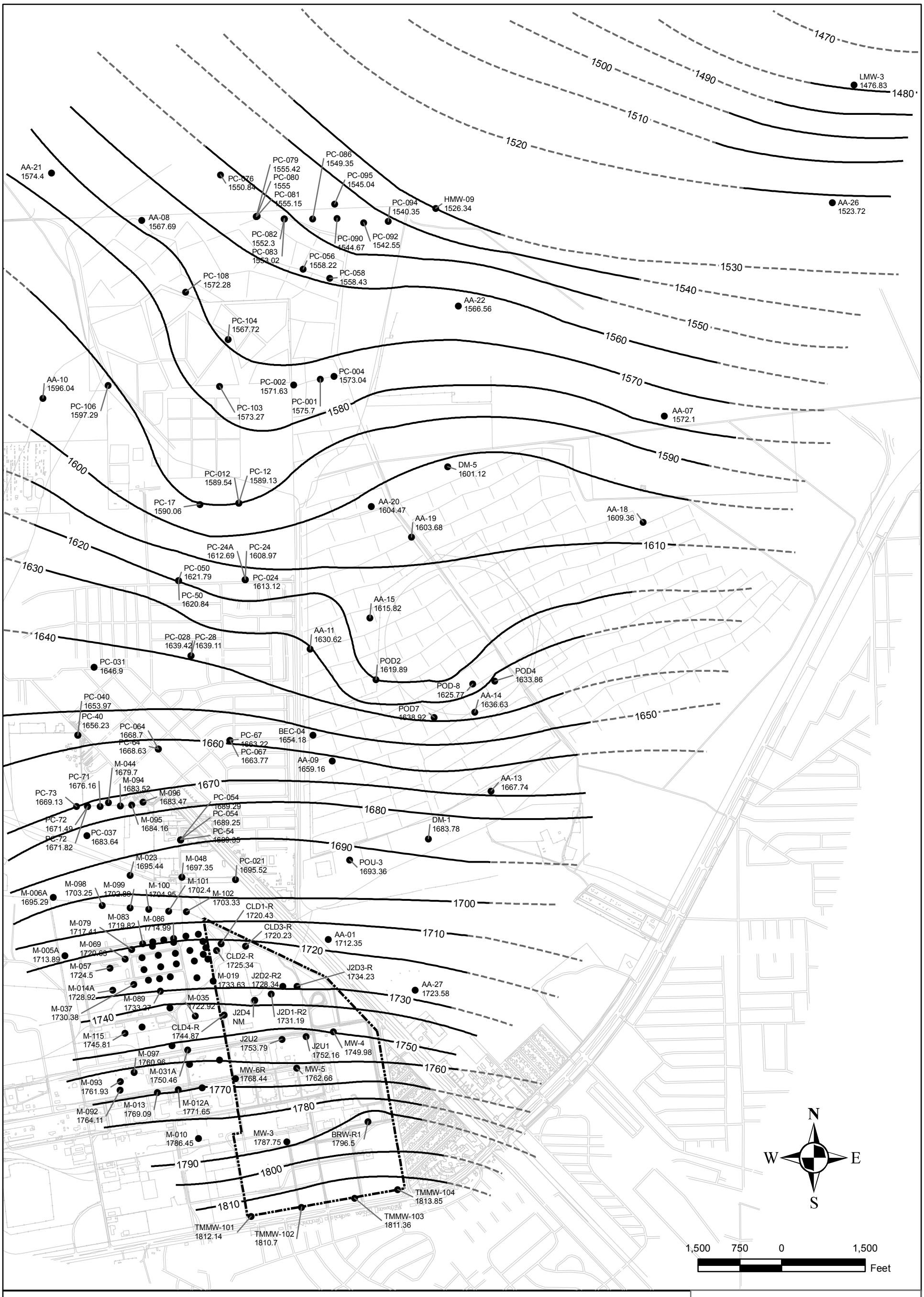
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

Appendix C

Off-Site Source Information



BRW-R1
1796.5
MONITORING WELL WITH GROUNDWATER ELEVATION
(FEET ABOVE MEAN SEA LEVEL)

WATER LEVEL CONTOUR
(DASHED WHERE INFERRED)

Data from Timet (April 2006)

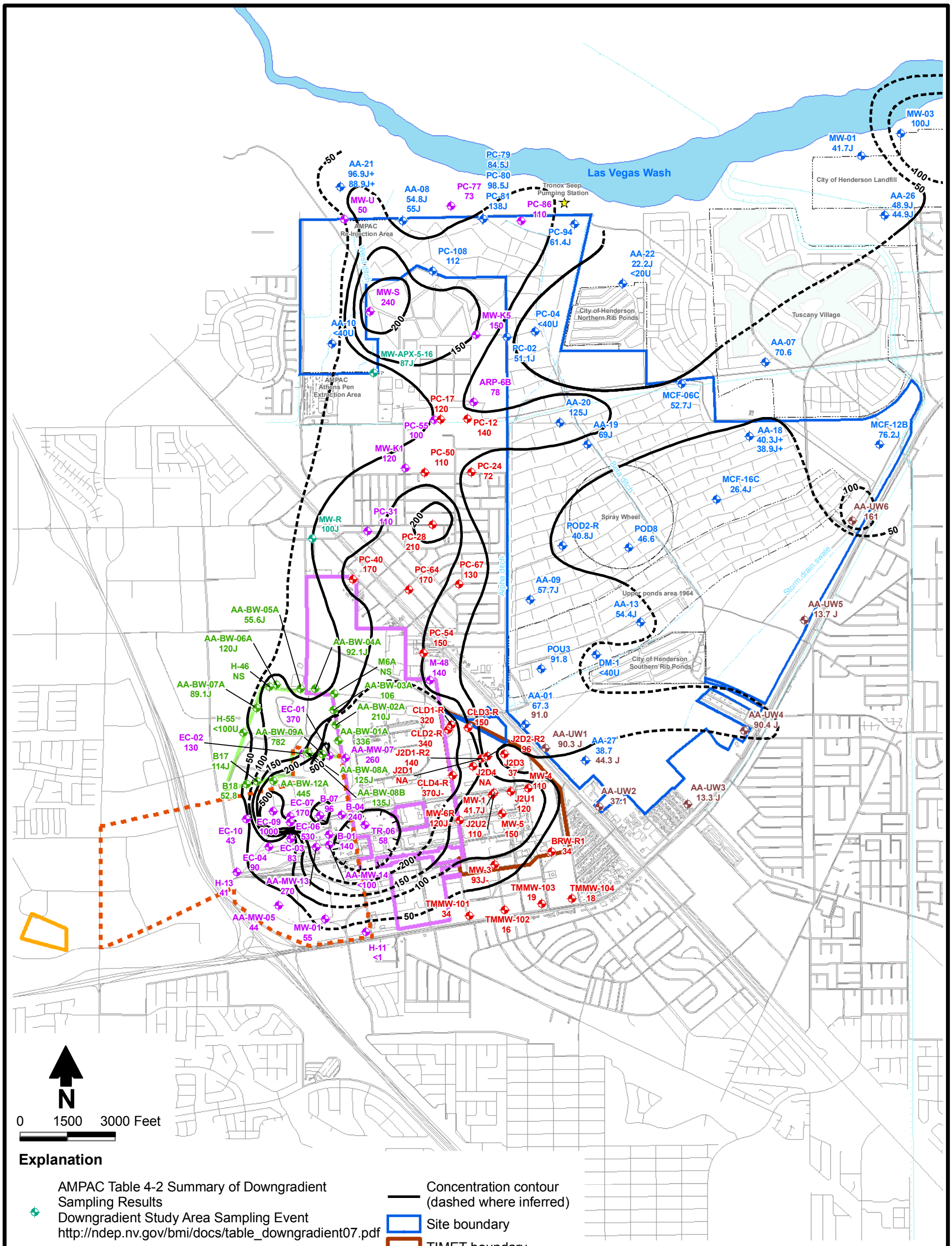
Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-1
POTENTIOMETRIC SURFACE MAP

TIMET

2007-04-05 :\TIMET\CSM-RI\MXD\TIMET_siteWL.mxd TTEMI-MO michelle.handley

S:/PROJECTS/BRC/ES09.0281_BRC_WH_AND_PRE-CSM_TASKS/GIS/MXDS/CHEMISTRY/ARSENIC_2006_2009_SHALLOW.MXD 900321



Explanation

- AMPAC Table 4-2 Summary of Downgradient Sampling Results Downgradient Study Area Sampling Event http://ndep.nv.gov/bmi/docs/table_downgradient07.pdf
- Reported results from BRC sampling 1st round April-June, 2006
- MWH Figure D-15 Arsenic in aluvial aquifer October-November 2007
- TIMET Figure 4-14 Arsenic in groundwater Spring 2006
- Second Quarter 2008 data (Companies Report dated 7/17/08)
- Data for proposed upgradient wells from 2009 sampling event

- Concentration contour (dashed where inferred)
- Site boundary
- TIMET boundary
- Tronox boundary
- AMPAC facility
- POSSM (The Companies)
- Las Vegas wash
- Streets
- Site AOC3 boundary

Note:
1. Values > MCL (10 µg/L)
2. NA = Not analyzed
3. NS = Not sampled
4. ND = Non detect
5. < = Non-detect at or above the reported concentration
6. For off-site wells, the screened zone is assumed to be shallow

BMI Common Areas (Eastside)
Henderson, Nevada

FIGURE C-2
Arsenic in the Shallow Zone (µg/L)
2006-2009

Basic Remediation COMPANY

Prepared by: DBS&A CRS Date 12-30-09

S:/PROJECTS/BRC/ES09.0281_BRC_WH_AND_Pre_CSM_tasks/GIS/MXDS/CHEMISTRY/ARSENIC_2006_SHALLOW.MXD 905011

Daniel B. Stephens & Associates, Inc.

N
W E
S

AA-21
7.5

AA-08
7.5 J-

PC-79
0.02 U
PC-80
0.02 U
PC-81
0.2 UJ

PC-94
15.1 J-

AA-26
4.5

PC-108
0.041

10

AA-22
2.9

PC-2
18.8

PC-4
32.7

AA-10
8.2

AA-07
13.1

PC-017
25

PC-012
48

AA-20
34.7

AA-19
165

BEC-09
64.8

AA-18
11.2

PC-050
26

PC-024
47

PC-024
12

PC-028
33

POD2-R
25.8 J+

POD-8
40.9

BEC-06
38.2

PC-040
4 U

PC-064
74

PC-067
59

AA-09
23.8 J

AA-13
29.7

PC-054
35

DM-1
19.2 J

POU-3
10 J+

CLD1-R
11

CLD3-R
28

AA-01
11.8 J

CLD2-R
5.7

J2D2-R2
38

J2D3
13

AA-27
14.1 J+

J2D1
NA

J2D4
NA

J2D1-R2
15

J2U1
10

CLD4-R
13

J2U2
44

MW-4
2.8

MW-01
6.6 J-

MW-6R
3.2

MW-5
7.6

BRW-R1
11

MW-3
9.6

TMMW-104
0.59

TMMW-101
1 U

TMMW-103
12

TMMW-102
3.3

1,500 750 0 1,500
Feet

MW-4
2.8
MONITORING WELL WITH NITRATE AS NITROGEN CONCENTRATION (mg/L)

BRW-R1
11
MONITORING WELL WITH NITRATE AS NITROGEN CONCENTRATION EXCEEDING SCREENING LEVEL

J2D1
NA
WELL NOT ANALYZED

mg/L MILLIGRAM PER LITER

10
NITRATE AS NITROGEN CONTOUR (mg/L)

APPROXIMATE CONTOUR LOCATION

NOTES:
1. The screening level used for nitrate is the EPA National Drinking Water Standard Maximum Contaminant Level (MCL). The MCL for nitrate is 10 mg/L.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-3
NITRATE AS NITROGEN IN GROUNDWATER SPRING 2006

TIMET

2007-01-05 :\TIMET\CSM-R\MXD\TIMET_siteN.mxd TTEMI-MO michelle.handley

N
W E
S

AA-21
6220

AA-08
2480

PC-79
1790

PC-80
1370

PC-81
1690

PC-94
1560

AA-26
608

PC-108
1400

AA-22
968

AA-10
2640

PC-4
3600

PC-2
1390

AA-07
566

1000

PC-017
3500

PC-012
2900

AA-20
4800 J-

AA-18
1010

AA-19
1620

BEC-09
4870 J-

PC-050
3200

PC-024
4600

PC-028
1200

POD2-R
1900

POD-8
2420

BEC-06
3570

PC-040
5800

PC-064
1800

PC-067
5900

AA-09
2550 J

1000

AA-13
680

PC-054
890

DM-1
761 J

POU-3
3190

CLD1-R
980

CLD3-R
7000

AA-01
1780

J2D1-R2
1800

CLD2-R
460

J2D3
1100

J2D4
NA

AA-27
886

J2D2-R2
3300

CLD4-R
2300

J2U2
1000

J2U1
690

MW-4
210

MW-5
570

MW-6R
620

MW-01
454

BRW-R1
290

MW-3
370

TMMW-104
130

TMMW-101
140

TMMW-103
590

TMMW-102
100

1,500 750 0 1,500
Feet

MW-4 210 — MONITORING WELL WITH CHLORIDE CONCENTRATION (mg/L)

MW-3 370 — MONITORING WELL WITH CHLORIDE CONCENTRATION EXCEEDING SCREENING LEVEL

J2D1 NA — WELL NOT ANALYZED

mg/L — MILLIGRAM PER LITER

1000 — CHLORIDE CONTOUR (mg/L)

APPROXIMATE CONTOUR LOCATION

NOTES:
1. The screening level used for chloride is the EPA National Secondary Drinking Water Standard. The standard for chloride is 250 mg/L.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-4
CHLORIDE IN GROUNDWATER
SPRING 2006

TIMET

2007-02-12 :\TIMET\CSM-R1\MXD\TIMET_siteCHLORIDE.mxd TTEMI-MO michelle.handley

N
W E
S

AA-21
3110

AA-08
2170

PC-79
1380

PC-80
856

PC-81
1220

PC-94
1960

AA-26
1210

PC-108
715

AA-22
1390

AA-10
2310

PC-2
2560

PC-4
3290

AA-07
1100

PC-017
2300

PC-012
2500

AA-20
3430

2000

AA-19
9670

BEC-09
2440

AA-18
534

4000

PC-050
2000

PC-024
2100

PC-028
2300

POD2-R
2900

POD-8
1210

BEC-06
1780

PC-040
2200

PC-064
2300

PC-067
2800

AA-09
2740

AA-13
1160

PC-054
2900

POU-3
2550

DM-1
2680

CLD1-R
970

CLD3-R
3200

J2D2-R2
1500

AA-01
1500

CLD2-R
680

AA-27
2410

J2D3
2400

J2D1-R2
1800

J2D1
NA

2000

J2U1
2500

CLD4-R
2000

J2U2
1800

MW-4
2300

J2D4
NA

MW-6R
1400

MW-01
2300

MW-5
1800

BRW-R1
2100

MW-3
2100

TMMW-104
630

TMMW-101
1100

TMMW-102
620

TMMW-103
1200

1,500 750 0 1,500
Feet

CLD2-R 680 — MONITORING WELL WITH SULFATE CONCENTRATION (mg/L) EXCEEDING SCREENING LEVEL

J2D1 NA — WELL NOT ANALYZED

mg/L — MILLIGRAM PER LITER

1000 — SULFATE CONTOUR (mg/L)

APPROXIMATE CONTOUR LOCATION

NOTES:
1. The screening level used for sulfate is the EPA National Secondary Drinking Water Standard. The standard for sulfate is 250 mg/L.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-5
SULFATE IN GROUNDWATER
SPRING 2006

TIMET

2007-02-12 :\TIMET\CSM-RIMXD\TIMET_siteS.mxd TTEMI-MO michelle.handley

AA-21
6510

AA-08
5150

PC-79
2790

PC-80
2090

PC-81
3230

PC-94
4070

AA-26
2030

N
W
E
S

PC-108
2410

AA-22
2500

PC-2
4450

PC-4
6750

AA-10
4880

5000

AA-07
2030

PC-017
10000

PC-012
8700

AA-20
6000

AA-19
4690

BEC-09
5680

AA-18
1330

PC-050
9700

PC-024
11000

PC-028
7500

POD2-R
5010

POD-8
3720

BEC-06
4830

PC-040
13000

PC-064
11000

PC-067
15000

10000

AA-09
5670

AA-13
2550

PC-054
7700

DM-1
4690

POU-3
5650

15000

CLD1-R
3700

CLD3-R
17000

CLD2-R
2400

J2D2-R2
8500

AA-01
3430

J2D3
5800

J2D1-R2
6000

AA-27
4080

J2D4
NA

J2D1
NA

J2U1
5300

CLD4-R
7100

J2U2
4600

MW-4
4200

MW-6R
3300

MW-01
3460

MW-5
4100

BRW-R1
3800

MW-3
3900

TMMW-104
1200

TMMW-101
2100

TMMW-103
2900

TMMW-102
1200

1,500 750 0 1,500
Feet

TMMW-104 1200 — MONITORING WELL WITH TOTAL DISSOLVED SOLIDS CONCENTRATION (mg/L)

BRW-R1 3800 — MONITORING WELL WITH TOTAL DISSOLVED SOLIDS CONCENTRATION (mg/L) EXCEEDING SCREENING LEVEL

J2D1 NA — WELL NOT ANALYZED

mg/L — MILLIGRAM PER LITER

10000 — TOTAL DISSOLVED SOLIDS CONTOUR (mg/L)

APPROXIMATE CONTOUR LOCATION

NOTES:
1. The screening level used for total dissolved solids is the State of Nevada Administration Code, Toxic Standards Applicable to Designated Waters. The standard for total dissolved solids is 1,900 mg/L.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-6
TOTAL DISSOLVED SOLIDS IN GROUNDWATER SPRING 2006

TIMET

2007-01-05 :\TIMET\CSM-RI\MXD\TIMET_siteTDS.mxd TTEMI-MO michelle.handley

N
W E
S

AA-21
96.9 J+

AA-08
54.9 J

PC-79
84.5 J
PC-80
98.5 J
PC-81
138 J

PC-94
61.4 J

AA-26
44.8 J

PC-108
112

AA-22
100 U

PC-2
51.1 J

PC-4
200 U

AA-10
200 U

AA-07
70.6

PC-017
120

PC-012
140

AA-20
125 J

AA-19
69 J

BEC-09
89.9 J

AA-18
40.3 J+

PC-050
110

PC-024
72

100

PC-028
210

POD2-R
40.8 J

POD-8
46.6

BEC-06
37.4

PC-040
170

PC-064
170

PC-067
130

AA-09
57.7 J

AA-13
54.4 J

PC-054
150

DM-1
200 U

POU-3
91.8

CLD3-R
150

200

CLD1-R
320

AA-01
67.3

J2D2-R2
96

CLD2-R
340

300

J2D3
37

AA-27
38.7

J2D1-R2
140

J2D4
NA

J2D1
NA

J2U1
120

CLD4-R
370 J-

J2U2
110

MW-4
110

MW-5
150

MW-6R
120 J-

MW-01
41.7 J

BRW-R1
34

MW-3
93 J-

TMMW-104
18

TMMW-101
34

TMMW-103
19

TMMW-102
16

1,500 750 0 1,500
Feet

MW-3
93 J-
MONITORING WELL WITH ARSENIC CONCENTRATION EXCEEDING SCREENING LEVEL

J2D1
NA
WELL NOT ANALYZED

µg/L MICROGRAM PER LITER

100 ARSENIC CONTOUR (µg/L)

APPROXIMATE CONTOUR LOCATION

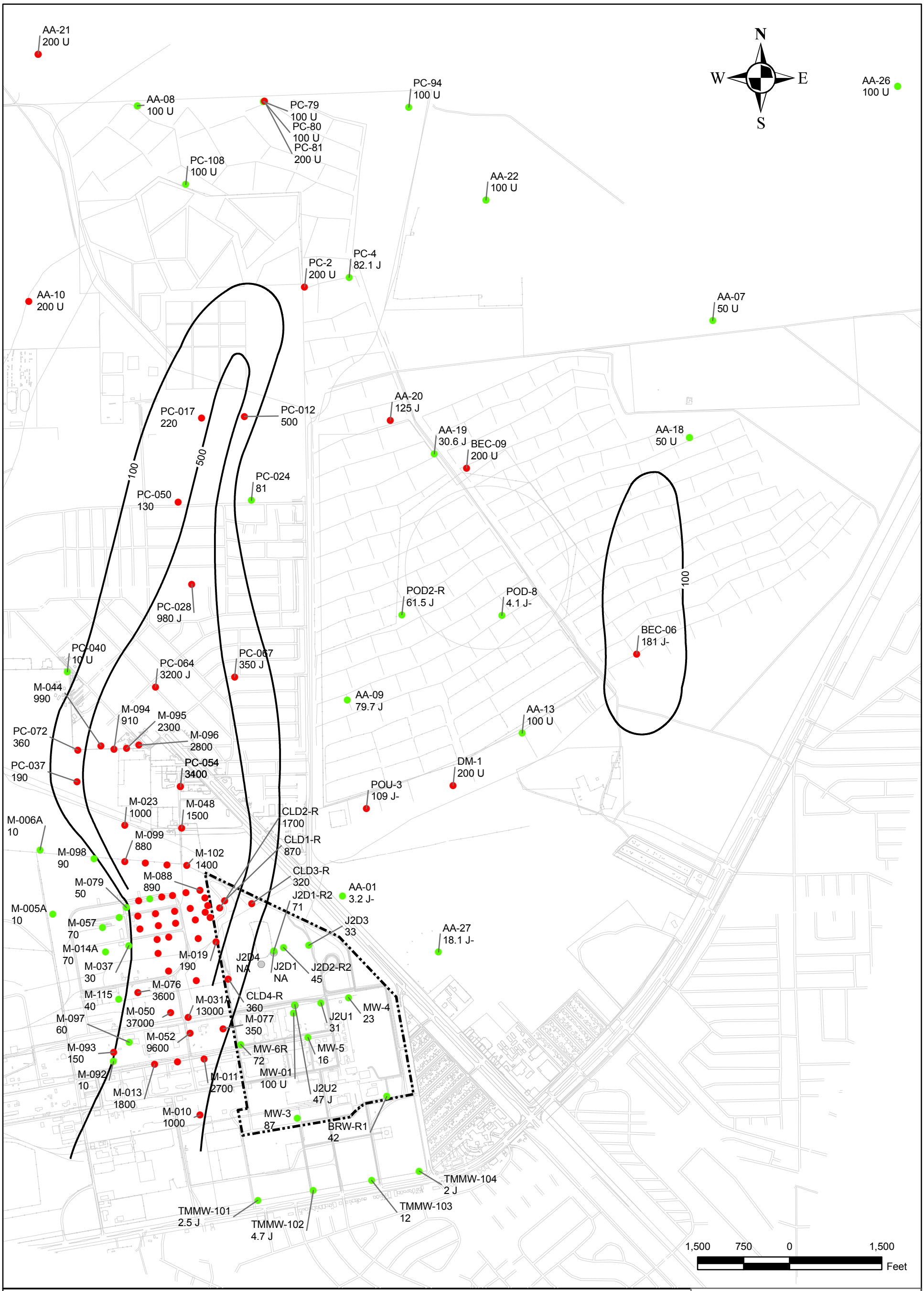
NOTES:
1. The screening level used for arsenic is the EPA National Drinking Water Standard Maximum Contaminant Level (MCL). The MCL for arsenic is 10 µg/L.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-7
ARSENIC IN GROUNDWATER
SPRING 2006

TIMET

2007-2-12 :\TIMET\CSM-R1\MXD\TIMET_siteAS.mxd TTEMI-MO michelle.handley



BRW-R1 42 — MONITORING WELL WITH CHROMIUM CONCENTRATION (µg/L)

M-010 1000 — MONITORING WELL WITH CHROMIUM CONCENTRATION EXCEEDING SCREENING LEVEL

J2D1 NA — WELL NOT ANALYZED

µg/L — MICROGRAM PER LITER

100 — CHROMIUM CONTOUR (µg/L)

APPROXIMATE CONTOUR LOCATION

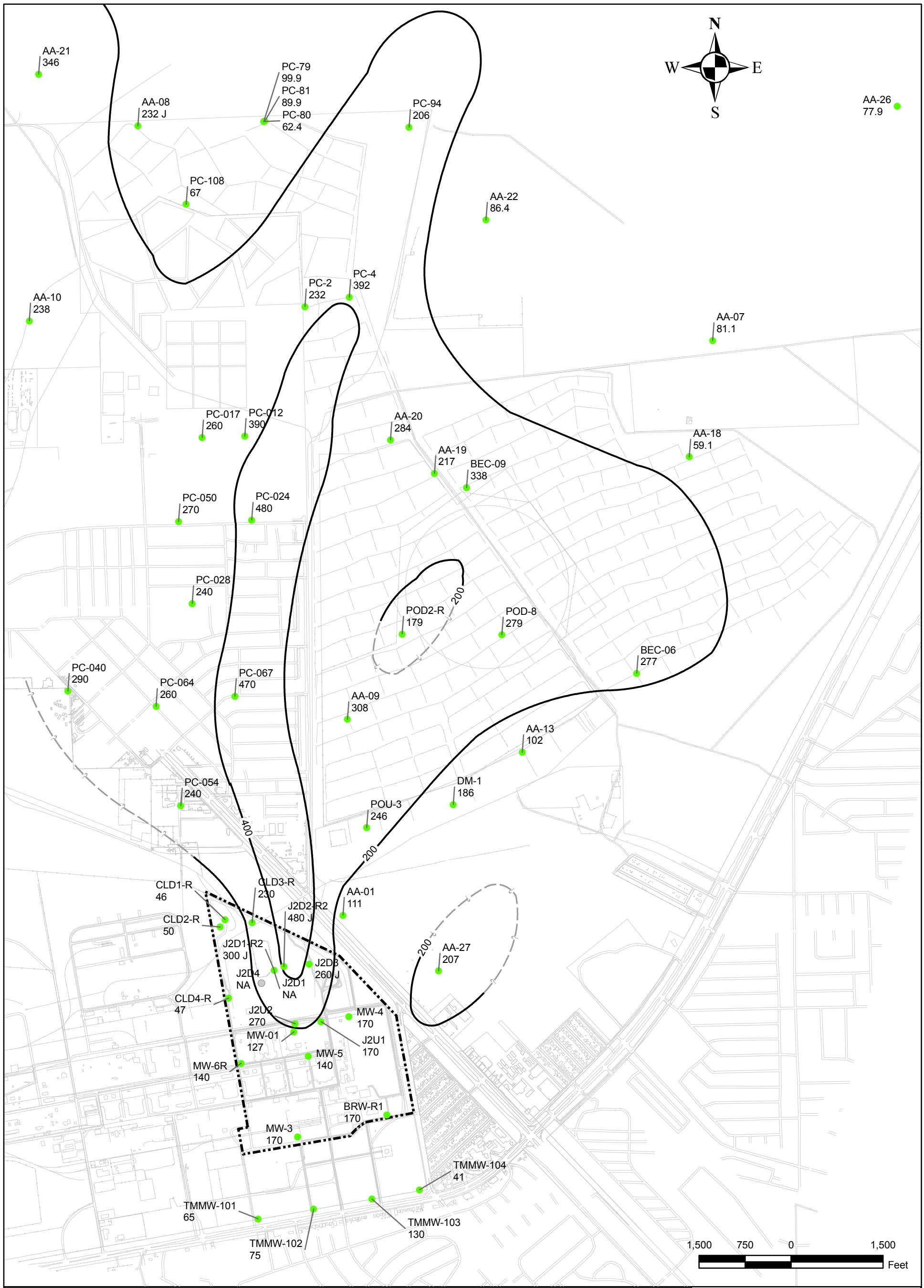
NOTES:
1. The screening level used for chromium is the EPA National Drinking Water Standard Maximum Contaminant Level (MCL). The MCL for chromium is 100 µg/L.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-8
CHROMIUM IN GROUNDWATER
SPRING 2006

TIMET

2007-02-12 .\TIMET\CSM-R1\MXD\TIMET_siteCHROMIUM.mxd TTEMI-MO michelle.handley



BRW-R1 170 — MONITORING WELL WITH MAGNESIUM CONCENTRATION (mg/L)

J2D1 NA — WELL NOT ANALYZED

mg/L — MILLIGRAM PER LITER

100 — MAGNESIUM CONTOUR (mg/L)

APPROXIMATE CONTOUR LOCATION

NOTES:
1. There are no EPA National Primary or Secondary Drinking Water Standards for magnesium.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-9
MAGNESIUM IN GROUNDWATER
SPRING 2006

TIMET

2007-3-30 :\TIMET\CSM-RI\MXD\TIMET_siteMAGNESIUM.mxd TTEMI-MO michelle.handley

N
W E
S

AA-21 40.3
AA-08 28.1
PC-79 29.6 J
PC-80 26.7
PC-81 39 J
PC-94 27.6 J
AA-26 7.8 J
PC-108 18.2
AA-22 16.8
AA-10 29.8
PC-2 68.8
PC-4 46.3 J
AA-07 22.6
AA-20 18.8 J
AA-19 103
PC-017 71
PC-012 58
AA-18 8.4
BEC-09 38.3
PC-050 79
PC-024 38
PC-028 100
POD2-R 93.5
POD-8 47.6 J
BEC-06 1.8 J
PC-040 85
PC-064 43
PC-067 230
AA-09 35.4
AA-13 60.5
PC-054 160
DM-1 50.5
POU-3 17.8 J
CLD1-R 39
CLD3-R 120
J2D2-R2 67
AA-01 54.8 J
CLD2-R 35
J2D1-R2 66
J2D4 NA
J2D1 NA
J2D3 56
J2U2 140
AA-27 66.1 J
CLD4-R 9.6
MW-4 31
MW-01 7.4 J
MW-6R 64
MW-5 23
J2U1 47
BRW-R1 11
MW-3 55
TMMW-104 7.5
TMMW-101 12
TMMW-103 8
TMMW-102 13

1,500 750 0 1,500
Feet

MW-5 23 — MONITORING WELL WITH TOTAL URANIUM CONCENTRATION (µg/L)

MW-3 55 — MONITORING WELL WITH TOTAL URANIUM CONCENTRATION EXCEEDING SCREENING LEVEL

J2D1 NA — WELL NOT ANALYZED

µg/L MICROGRAM PER LITER

100 — TOTAL URANIUM CONTOUR (µg/L)

APPROXIMATE CONTOUR LOCATION

NOTES:
1. The screening level used for uranium is the EPA National Drinking Water Standard Maximum Contaminant Level (MCL). The MCL for uranium is 30 µg/L.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-10
TOTAL URANIUM IN GROUNDWATER
SPRING 2006

TIMET

2007-02-12 :\TIMET\CSM-RI\MXD\TIMET_siteU.mxd TTEMI-MO michelle.handley

AA-21
0.53 J

AA-08
0.37 J

PC-79
1 U

PC-80
1 U

PC-81
1 U

PC-94
1.3

AA-26
0.58 J

N
W
E
S

PC-108
1 U

AA-22
1 U

PC-2
14

PC-4
91

AA-10
3

AA-07
32

PC-012
210

PC-017
3.3

AA-20
87 J-

AA-19
33 J-

BEC-09
23

AA-18
8.3

100

PC-050
2.9

PC-024
630

PC-028
340

POD2-R
58

POD-8
0.87 J

100

BEC-06
400

PC-067
1300

PC-064
500

AA-09
92

AA-13
0.59 J-

PC-054
360

DM-1
0.92 J

POU-3
450

CLD1-R
250

CLD3-R
1100

AA-01
4

500

CLD2-R
140

J2D1-R2
57

J2D2-R2
58

J2D4
NA

J2D1
NA

J2D3
21

AA-27
1.6

CLD4-R
910

J2U2
75

MW-4
5.3

MW-01
1.1

J2U1
5.5

MW-5
2.7

MW-6R
11

BRW-R1
4.1

MW-3
21

TMMW-104
1 U

TMMW-101
5.8

TMMW-103
4.2

TMMW-102
1.6

1,500 750 0 1,500
Feet

BRW-R1
4.1
MONITORING WELL WITH CHLOROFORM CONCENTRATION (µg/L)

J2D1
NA
WELL NOT ANALYZED

µg/L MICROGRAM PER LITER

100 ARSENIC CONTOUR (µg/L)

APPROXIMATE CONTOUR LOCATION

NOTES:
1. There are no EPA National Primary or Secondary Drinking Water Standards for chloroform.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-11
CHLOROFORM IN GROUNDWATER
SPRING 2006

TIMET

2007-02-12 ..\TIMET\CSM-R1\MXD\TIMET_siteChloroform.mxd TTEMI-MO michelle.handley

AA-21
1 U

AA-08
1.7

PC-79
2.8

PC-80
0.33 J

PC-81
1 U

PC-94
0.88 J

AA-26
1 U

N
W
E
S

PC-108
1 U

AA-22
1 U

PC-2
1 U

PC-4
2.2

AA-10
0.61 J

AA-07
1 U

PC-017
2.1

PC-012
0.26 J

AA-20
6.5

AA-19
1.4 J-

BEC-09
0.59 J

AA-18
1 U

PC-050
1.9

5

PC-028
12 U

POD2-R
2.7

POD-8
1 U

BEC-06
0.93 J

PC-064
16 U

PC-067
12 J

AA-09
19

AA-13
0.27 J-

DM-1
1 U

POU-3
41 J

CLD1-R
3.4

CLD3-R
28

CLD2-R
1.9

J2D2-R2
110

AA-01
81

J2D1-R2
83

J2D3
13

AA-27
1 U

J2D1
NA

5

CLD4-R
0.65 J

J2U2
68

MW-4
61

J2D4
NA

MW-01
1 U

MW-5
2.1

J2U1
0.97 J

MW-6R
1 U

BRW-R1
1 U

MW-3
0.43 J

TMMW-104
1 U

TMMW-101
1 U

TMMW-102
1 U

TMMW-103
1 U

1,500 750 0 1,500
Feet

MW-3
0.43 J
MONITORING WELL WITH TETRACHLOROETHENE CONCENTRATION (µg/L)

J2U2
68
MONITORING WELL WITH TETRACHLOROETHENE CONCENTRATION EXCEEDING SCREENING LEVEL

J2D1
NA
WELL NOT ANALYZED

µg/L MICROGRAM PER LITER

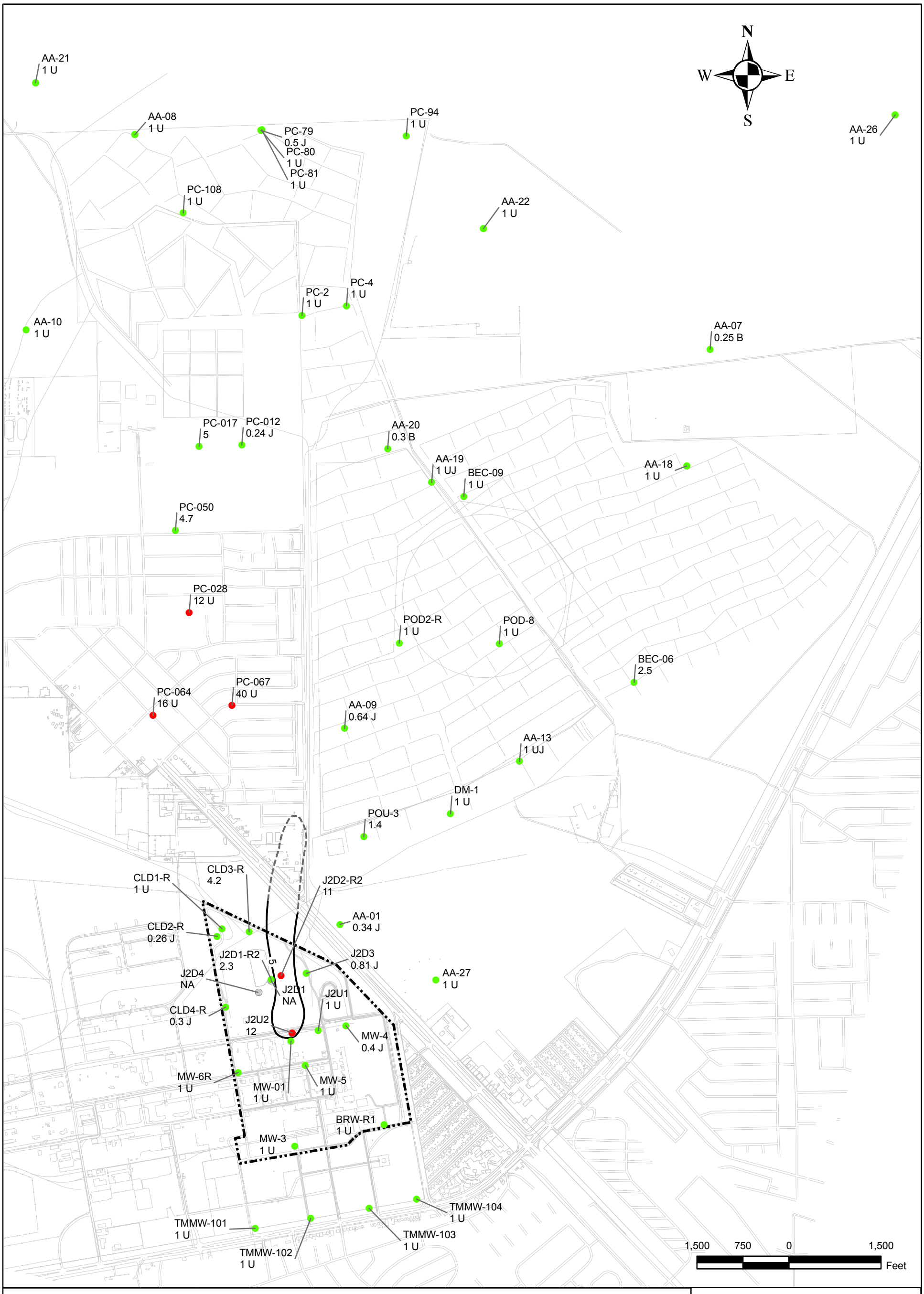
NOTES:
1. The screening level used for tetrachloroethene is the EPA National Drinking Water Standard Maximum Contaminant Level (MCL). The MCL for tetrachloroethene is 5 µg/L.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-12
TETRACHLOROETHENE IN GROUNDWATER
SPRING 2006

TIMET

2007-02-12 :\TIMET\CSM-R\MXD\TIMET_sitePCE.mxd TTEMI-MO michelle.handley



BRW-R1 1 U — MONITORING WELL WITH TRICHLOROETHENE CONCENTRATION (µg/L)

J2U2 12 — MONITORING WELL WITH TRICHLOROETHENE CONCENTRATION EXCEEDING SCREENING LEVEL

J2D1 NA — WELL NOT ANALYZED

µg/L — MICROGRAM PER LITER

5 — TRICHLOROETHENE CONTOUR (µg/L)

APPROXIMATE CONTOUR LOCATION

NOTES:

1. The screening level used for trichloroethene is the EPA National Drinking Water Standard Maximum Contaminant Level (MCL). The MCL for trichloroethene is 5 µg/L.
2. Qualifiers are defined in Table 3 of Data Validation Summary Report.

Conceptual Site Model
Titanium Metals Corporation
Henderson, Nevada

FIGURE C-13
TRICHLOROETHENE IN GROUNDWATER SPRING 2006

TIMET

2007-01-05 :\TIMET\CSM-R1\MXD\TIMET_siteTCE.mxd TTEMI-MO michelle.handley

BMI COMMON AREA DISPOSAL
(UPPER & LOWER BMI PONDS)

(NE CORNER OF PROPERTY)

OPERATIONS BY:

DELBERT MADSEN & ESTATE OF
DELBERT MADSEN. (2 ACRES)
LOU #67

SOUTHERN NEVADA AUTO PARTS (SNAP)
AREA (10 ACRES)
LOU #68

DILLON POTTER SITE (2 ACRES)
LOU #69

ON-SITE HAZARDOUS WASTE
LANDFILL (CLOSED)
LOU #10

UNNAMED DRAINAGE
DITCH SEGMENT
(BML LANDFILL)
LOU #6

SB1-6
SB1-5
SB1-7
SB1-4
SB1-3
SB1-2
SB1-1

TRADE EFFLUENT
SETTLING PONDS
LOU #1

POND WC-1
LOU #22
WC-WEST
WC-1

POND WC-2
LOU #23
WC-EAST
WC-2

OPEN AREA DUE SOUTH
OF TRADE EFFLUENT
DISPOSAL PONDS
LOU #2

GROUNDWATER REMEDIATION UNIT (AREA)
LOU #32

GROUNDWATER
BARRIER WALL

AREA AFFECTED BY
JULY 1990 FIRE
LOU #55

LOADING DOCK
RAIL ROAD TRACKS
BLDG E-1
BLDG E-2
BLDG E-3
BLDG E-4
BLDG E-5
BLDG E-6
TREATMENT UNIT

AP PLANT AREA NEW
BLDG D-1 WASHDOWN,
AP TRANSFER LINES TO
SODIUM CHLORATE PROCESS
LOU #58

NEW D-1
BLDG

DRUM RECYCLING AREA
LOU #31

OLD D-1
BLDG

AP AREA PAD
LOU #30

CONT.
TRASH
PAD

AP PLANT
AREA OLD BLDG
D-1 WASHDOWN
LOU #56

AP-5
POND

LOU #19

M-25

NEW AP-6
POND

BETA DITCH

BENCHMARK - BM2
LATITUDE - 36°02'50.35"N
LONGITUDE - 115°00'01.62"W
ALTITUDE - 1,765.220 FT

C-1
POND
LOU #20

AP PLANT SI's AND
TRANSFER LINES
TO/FROM AP SI's
LOU #57

M-89

AP-1
POND
LOU #16&17

AP-2
POND
LOU #16&17

AP-4
POND
LOU #18

BETA DITCH
& SMALL DIVERSION DITCH
LOU #5

AP PLANT AREA
TANK FARM
LOU #53
MCC

LOU #16&17

AP-3
POND

M-17

LOU #21
MN-1
POND

AP PLANT AREA SCREENING
BUILDING, DRYER
BUILDING & ASSOC. SUMP
LOU #52

DRYER
BLDG

D-2 BLDG
C-BLDG
OPER.SHACK
RAIL ROAD TRACK

AP PLANT CHANGE
HOUSE/LAB
SEPTIC TANK
LOU #54

SB6-1
SB6-2

FORMER OLD MAIN COOLING TOWER
& RECIRCULATION LINES
LOU #46

STEAM
PLANT

LEACH BEDS, AND
MANGANESE TAILINGS AREA
LOU #24

S8-1S

LAB
STORAGE

LAB, AP OFFICES
& CHANGE HOUSE

AP MAINT. SHOP

SATELLITE
ACCUMULATION POINT/
AP MAINTENANCE SHOP
LOU #39

NEW P-2 POND
LOU #9

P-2

S-1
CLOSED

POND S-1
LOU #13

SB2-8
SB2-2
SB2-13
SB2-10
SB2-11
SB2-7
P-3
CLOSED
P-2
CLOSED
P-1
CLOSED
POND P-1
LOU #14
SB2-9
SB2-1
SB2-12
SB2-3
SB2-6
SB2-4
SB2-5
M-21

LEACH PLANT AREA
LEACH TANKS
LOU #50

LEACH PLANT AREA
SULFURIC ACID STORAGE
LOU #49

FORMER SATELLITE
ACCUMULATION POINT,
AP-LABORATORY
LOU #38

OLD P-3 POND
LOU #8

LEACH PLANT
ANALYTE TANKS
LOU #48

TRUCK EMPTYING/
DUMPING SITE
LOU #35

SB4-1
SB4-2
SB4-6
SB4-5
SB4-3
SB4-7
SB4-8
SB4-4

OLD P-2 POND
LOU #7

SB5-1
SB5-2
SB5-3
BERM

DIESEL
TANK

OPERATIONS BY KOCH
MATERIALS CO.
LOU # 64

FORMER MANGANESE
TAILINGS AREA, WESTERN
LOU #34

ACID DRAIN
SYSTEM
LOU #60

AVENUE F

DIESEL STORAGE
TANK
LOU #45

LEACH PLANT
AREA MANGANESE
ORE PILES
LOU #47

FORMER MANGANESE TAILINGS
AREA, EASTERN
LOU #34

11TH STREET

LEACH PLANT AREA
TRANSFER LINES
(TO/FROM UNIT 6)
LOU #51

TIMET

CHEMSTAR

BENCHMARK - BM1
LATITUDE - 36°02'34.83"N
LONGITUDE - 114°59'58.45"W
ALTITUDE - 1,812.660 FT

STORM SEWER
SYSTEM
AREA
LOU #59

NEVADA PRECAST
CONCRETE PRODUCTS
LOU #65

SB-7

M-97

AVENUE G

ABOVE-GROUND DIESEL
STORAGE TANK, LEASED BY
FLINTKOTE COMPANY
LOU #66

FORMER
AST

HAZARDOUS WASTE
STORAGE AREA
LOU #12

FORMER SATELLITE ACCUMULATION POINT,
UNIT-6, MAINTENANCE SHOP
LOU #37

J.B. KELLEY, INC
TRUCKING SITE
(CONCRETE VAULTS)
LOU #63

HARDESTY CHEMICAL
COMPANY SITE
LOU #4

TRASH STORAGE AREA
LOU #26

PLATINUM DRYING UNIT
LOU #15

SODIUM CHLORATE FILTER
CAKE HOLDING AREA
LOU #11

OLD SODIUM CHLORATE
PLANT DECOMMISSIONING
LOU #61

UNIT 6 BASEMENT
LOU #44

EBONY CONSTRUCTION CO.
LOU #65

FORMER
UST SITE

HAZARDOUS WASTE
STORAGE AREA
LOU #28

UNIT 4 & 5 BASEMENTS
LOU #43

UNIT-6
UNIT-7
(TIMET)
UNIT-8
(TIMET)

PCB STORAGE AREA
LOU #27

UNIT-4
UNIT-5

12TH STREET
11TH STREET
10TH STREET
9TH STREET
8TH STREET

UNIT 1
TENANT STAINS
LOU #41

S9-1S(A)
S9-1S(B)

LOCATION OF A PORTION
OF FORMER HARDESTY
FACILITY

UNIT-3
UNIT-2
UNIT-1

AVENUE H

OPERATIONS BY:
BUCKLES CONSTRUCTION CO.
LOU #65

6TH STREET
7TH STREET
5TH STREET
4TH STREET

SODIUM PERCHLORATE PLATINUM
BY-PRODUCT FILTER, UNIT 5
LOU #33

PCB TRANSFORMER SPILL
LOU #40

R R TRACK #10

SAFETY &
MEDICAL CLINIC

ADMINISTRATION

GASOLINE
TANK

SOLID WASTE DUMPSTER
LOU #29

PROCESS HARDWARE
STORAGE AREA (BETWEEN
UNITS 1 & 2)
LOU #25

FORMER SATELLITE ACCUMULATION
POINT, UNIT-3, MAINTENENCE SHOP
LOU #36

UNIT 2 SALT REDLER
LOU #42

FACILITY BACKGROUND
MONITORING WELL

CONTROL
HOUSE

S-3

GREEN VENTURES
INTERNATIONAL
LOU #65

STATE INDUSTRIES, INC. SITE
(KMCC TENANT)
LOU #62

KMCC
PURCHASING

FIGURE C-14
KERR-McGEE SOURCE AREAS INDENTIFIED IN THE LOU

KERR-McGEE CHEMICAL LLC FACILITY
HENDERSON, NEVADA

SB6-1 •	SOIL SAMPLING LOCATION WITH DESIGNATION
M-10 ⊖	MONITORING WELL LOCATION WITH DESIGNATION
———	KMCC PROPERTY BOUNDARY
++++++	RAILROAD TRACKS
———	BETA DITCH
LOU#19	ITEMS IDENTIFIED BY NEVADA DIVISION OF ENVIRONMENTAL PROTECTION IN THE 1994 LETTER OF UNDERSTANDING (LOU)
[NOT SHOWN]	LOU #3 – AIR POLLUTION EMISSIONS ASSOCIATED w/ INDUSTRIAL PROCESSES
SI	SURFACE IMPOUNDMENT

0 200' 400' 600'

1 INCH = 200 FEET

N

JANUARY 2005

Plate 6.dwg

Table C-1
Chemical Source areas at Kerr-McGee (Tronox)

From 2005 Conceptual Site Model

Chemical	Listed Potential Source LOUs
Chloroform[1]	4, 6
Nitrate	16, 17
Perchlorate	15-19, 30-33, 43, 52, 53, 55-58
Total Dissolved Solids	20-23, 32, 42
Uranium[1]	6

Note:

[1] *Chloroform detected in sampling from LOU #4 and #6, and uranium detected at LOU#6, but not listed as source areas in the CSM*

Appendix D

Summary of Soil Sampling Metals Data

Appendix D
Summary of Background Metals Evaluation
Shallow McCollough Dataset

	McCullough Site at 0-20 ft bgs (Shallow)								McCullough Background at 0-20 ft bgs (Shallow)								*t*	Quantile	Slippage	WRS	Greater		
Chemical	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	Test *p*	Test *p*	Test *p*	Test *p*	than Bckrnd (1)?	Units	Basis
Aluminum	15	15	100%	9360	13800	11400	11630	1023	101	101	100%	3740	15300	8470	9131	2668	1.0 E-8	9.8 E-2	1.0 E+0	3.4 E-4	NO	mg/kg	Quantile and Slippage; max background > max site.
Antimony	15	15	100%	0.12	0.53	0.15	0.25	0.16	43	101	43%	0.12	0.50	0.16	0.19	0.085	7.1 E-2	4.9 E-2	1.6 E-2	9.3 E-1	NO	mg/kg	Multiple tests
Arsenic	15	15	100%	2.4	4.6	3.3	3.3	0.58	101	101	100%	2.1	7.2	3.9	4.1	1.1	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Barium	15	15	100%	137	609	214	242	107	101	101	100%	73	465	175	182	65	2.7 E-2	3.6 E-2	1.3 E-1	1.4 E-3	NO	mg/kg	Multiple tests
Beryllium	15	15	100%	0.62	0.89	0.71	0.72	0.084	101	101	100%	0.16	0.89	0.54	0.58	0.16	4.8 E-6	2.5 E-1	1.0 E+0	7.2 E-4	NO	mg/kg	Quantile and Slippage; max background and site are equal.
Boron	4	15	27%	4.6	13	10	8.2	3.6	34	95	36%	5.2	12	1.6	3.6	2.8	8.9 E-5	8.0 E-1	6.9 E-2	9.1 E-8	YES	mg/kg	Low detection frequency; Site median and mean are greater than background.
Cadmium	9	15	60%	0.094	0.13	0.13	0.38	0.47	6	101	6%	0.095	0.16	0.065	0.068	0.013	1.2 E-2	2.8 E-11	1.0 E+0	2.3 E-2	YES	mg/kg	Low detection frequency; Site median and mean are greater than background.
Calcium	15	15	100%	15100	41700	24800	26330	7898	95	95	100%	9440	82800	24500	29030	14960	8.5 E-1	9.4 E-1	1.0 E+0	4.5 E-1	NO	mg/kg	Multiple tests
Chromium (VI)	1	13	8%	0.22	0.22	0.22	0.35	0.16	0	95	0%	NA	NA	0.13	0.13	0.0043	1.6 E-4	1.0 E+0	NA	3.5 E-8	YES	mg/kg	ND in background.
Chromium (Total)	15	15	100%	11	19	14	14	2.7	101	101	100%	2.6	17	9.0	9.0	3.0	1.0 E-6	2.1 E-4	1.8 E-3	5.2 E-7	YES	mg/kg	Multiple tests
Cobalt	15	15	100%	8.1	11	9.5	9.5	0.82	101	101	100%	3.7	16	8.8	8.7	2.3	6.3 E-3	7.3 E-1	1.0 E+0	4.0 E-2	NO	mg/kg	Multiple tests
Copper	15	15	100%	16	54	18	24	12	101	101	100%	10	26	18	17	3.6	3.0 E-2	3.1 E-1	1.8 E-3	3.1 E-2	NO	mg/kg	Multiple tests
Iron	15	15	100%	18000	25100	20700	21270	2528	101	101	100%	5410	19700	13500	13200	3320	1.0 E-10	1.4 E-11	6.6 E-10	6.1 E-10	YES	mg/kg	Multiple tests
Lead	15	15	100%	8.0	18	9.5	10	2.2	101	101	100%	3.0	35	7.3	8.5	4.3	1.6 E-2	3.1 E-1	1.0 E+0	6.3 E-4	NO	mg/kg	Quantile and slippage; max background is greater than max site.
Lithium	9	15	60%	9.6	29	13	15	5.4	95	95	100%	7.5	27	13	14	4.4	2.9 E-1	5.6 E-1	1.3 E-1	1.8 E-3	NO	mg/kg	Multiple tests
Magnesium	15	15	100%	9690	12700	10300	10620	906	101	101	100%	4690	17500	10200	10180	2799	1.1 E-1	9.3 E-1	1.0 E+0	2.2 E-1	NO	mg/kg	Multiple tests
Manganese	15	15	100%	390	604	468	477	69	101	101	100%	151	863	409	416	127	4.7 E-3	1.3 E-1	1.0 E+0	1.5 E-2	NO	mg/kg	Quantile and slippage; max background is greater than max site.
Mercury	6	15	40%	0.0087	0.024	0.018	0.017	0.0049	79	101	78%	0.0084	0.11	0.014	0.018	0.016	NA	9.9 E-1	1.0 E+0	2.3 E-3	NO	mg/kg	Low detection frequency; background max and mean are greater than at site.
Molybdenum	15	15	100%	0.32	1.7	0.49	0.59	0.33	101	101	100%	0.17	2.0	0.48	0.53	0.25	2.6 E-1	2.8 E-1	1.0 E+0	2.9 E-1	NO	mg/kg	Multiple tests
Nickel	15	15	100%	14	19	18	17	1.8	101	101	100%	7.9	30	16	16	4.1	3.4 E-2	3.1 E-1	1.0 E+0	8.8 E-2	NO	mg/kg	Multiple tests
Niobium	2	15	13%	1.7	1.8	1.3	1.4	0.72	0	95	0%	NA	NA	0.51	0.51	0	9.2 E-5	1.1 E-9	NA	0.0 E+0	YES	mg/kg	ND in background.
Palladium	15	15	100%	0.38	0.76	0.62	0.60	0.12	95	95	100%	0.16	1.5	0.42	0.48	0.24	3.6 E-3	1.0 E-1	1.0 E+0	2.8 E-3	NO	mg/kg	Quantile and slippage; max background is greater than max site.
Phosphorus	15	15	100%	1010	2130	1520	1519	294	95	95	100%	862	2010	1490	1474	278	2.9 E-1	5.6 E-1	1.4 E-1	3.4 E-1	NO	mg/kg	Multiple tests
Platinum	0	15	0%	NA	NA	0.010	0.027	0.021	5	95	5%	0.045	0.099	0.022	0.024	0.012	3.4 E-1	7.3 E-4	1.0 E+0	9.7 E-1	NO	mg/kg	ND at Site
Potassium	15	15	100%	1140	2920	1690	1846	550	95	95	100%	625	3890	1580	1754	759	2.9 E-1	5.6 E-1	1.0 E+0	1.6 E-1	NO	mg/kg	Multiple tests
Selenium	3	15	20%	0.32	0.58	0.16	0.23	0.12	39	101	39%	0.10	0.60	0.079	0.17	0.12	2.8 E-2	7.6 E-1	1.0 E+0	5.0 E-8	NO	mg/kg	Low detection frequency; site and background datasets similar.
Silicon	15	15	100%	181	1210	818	758	270	95	95	100%	335	4150	721	1007	811	9.9 E-1	9.9 E-1	1.0 E+0	5.7 E-1	NO	mg/kg	Multiple tests
Silver	12	15	80%	0.095	0.27	0.14	0.15	0.067	6	101	6%	0.043	0.083	0.13	0.13	0.018	9.2 E-2	1.3 E-1	5.4 E-5	1.0 E+0	YES	mg/kg	Low detection frequency; max site is greater than max background.
Sodium	15	15	100%	450	2650	853	942	507	95	95	100%	128	1320	487	498	285	2.3 E-3	3.4 E-5	1.4 E-1	8.9 E-6	YES	mg/kg	Multiple tests
Strontium	15	15	100%	194	448	332	327	63	95	95	100%	76	808	192	233	133	4.0 E-5	9.6 E-3	1.0 E+0	1.6 E-4	YES	mg/kg	Multiple tests
Thallium	1	15	7%	1.8	1.8	0.10	0.63	0.91	27	101	27%	0.13	1.8	0.27	0.51	0.48	3.1 E-1	7.6 E-1	1.0 E+0	9.7 E-1	NO	mg/kg	Low detection frequency; site and background datasets similar.
Tin	12	15	80%	0.36	0.73	0.60	0.58	0.096	95	95	100%	0.24	0.80	0.51	0.50	0.11	4.1 E-3	2.5 E-2	1.0 E+0	1.4 E-4	NO	mg/kg	Quantile and slippage; site and background data are similar.
Titanium	15	15	100%	688	1360	1120	1106	163	101	101	100%	262	1010	533	552	150	1.9 E-10	2.5 E-9	1.9 E-15	6.1 E-10	YES	mg/kg	Multiple tests
Tungsten	9	15	60%	0.22	0.74	0.30	0.37	0.17	0	95	0%	NA	NA	0.0088	0.0088	0	5.5 E-7	8.2 E-17	NA	0.0 E+0	YES	mg/kg	ND in background.
Uranium	15	15	100%	0.86	1.5	1.1	1.1	0.19	94	94	100%	0.62	2.7	0.97	1.0	0.31	5.4 E-2	4.1 E-2	1.0 E+0	1.2 E-2	NO	mg/kg	Multiple tests
Vanadium	15	15	100%	49	68	57	57	5.7	101	101	100%	20	59	37	38	8.8	1.5 E-11	2.8 E-11	1.9 E-5	2.9 E-9	YES	mg/kg	Multiple tests
Zinc	15	15	100%	38	76	43	49	12	101	101	100%	15	121	39	38	13	3.6 E-3	1.3 E-1	1.0 E+0	1.3 E-3	NO	mg/kg	Quantile and slippage; max background is greater than max site.
Zirconium	14	15	93%	13	30	27	24	7.0	95	95	100%	86	179	129	131	22	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Radium-226	15	15	100%	0.69	1.3	0.88	0.93	0.21	91	95	96%	0.49	2.4	1.1	1.1	0.34	1.0 E+0	8.0 E-1	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests
Radium-228	14	15	93%	1.0	2.0	1.5	1.5	0.26	65	81	80%	1.2	2.9	1.9	1.9	0.39	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests

Appendix D
Summary of Background Metals Evaluation
Shallow McCollough Dataset

	McCullough Site at 0-20 ft bgs (Shallow)								McCullough Background at 0-20 ft bgs (Shallow)								*t*	Quantile	Slippage	WRS	Greater		
Chemical	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	Test *p*	Test *p*	Test *p*	Test *p*	than Bckrnd (1)?	Units	Basis
Thorium-228	15	15	100%	1.3	1.9	1.6	1.6	0.18	101	101	100%	1.2	2.3	1.8	1.7	0.26	1.0 E+0	9.9 E-1	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests
Thorium-230	13	15	87%	0.95	2.3	1.2	1.2	0.34	101	101	100%	0.73	3.0	1.2	1.3	0.39	9.0 E-1	9.3 E-1	1.0 E+0	6.9 E-1	NO	pCi/g	Multiple tests
Thorium-232	15	15	100%	1.1	1.9	1.5	1.5	0.20	101	101	100%	1.2	2.2	1.7	1.7	0.26	9.9 E-1	9.2 E-1	1.0 E+0	9.6 E-1	NO	pCi/g	Multiple tests
Uranium-233/234	13	15	87%	0.31	1.2	0.60	0.61	0.24	51	101	50%	0.70	2.8	1.1	1.2	0.46	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests
Uranium-235/236	4	15	27%	0.019	0.078	0.013	0.027	0.027	45	101	45%	0.037	0.21	0.060	0.070	0.038	1.0 E+0	9.9 E-1	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests
Uranium-238	13	15	87%	0.19	1.1	0.60	0.56	0.30	101	101	100%	0.65	2.4	1.1	1.2	0.36	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests

Note: Summary and background comparison statistics were performed using one-half the detection limit for metals and using GISdT® (Neptune and Company 2007).
BOLD with Highlight indicates Site concentrations are greater than background.
WRS = Wilcoxon Rank Sum Test with the Gehan Modification
mg/kg - milligrams per kilogram
pCi/g - picoCuries per gram
Note: minimum and maximum values are for detected analytes only; mean and median values include non-detects.
p = significance level (compared to 0.025) (see text).
Greater than Background (YES/NO) is based on test results - see Basis column.

Appendix D
Summary of Background Metals Evaluation
Deep McCollough Dataset

Chemical	McCullough Site at >= 20 ft bgs (Deep)								McCullough Background at >= 20 ft bgs (Deep)								*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation							
Aluminum	24	24	100%	7660	13000	10750	10730	1429	79	79	100%	5060	15100	8790	8693	1814	3.6 E-7	5.3 E-4	1.0 E+0	1.1 E-6	YES	mg/kg	Multiple tests
Antimony	19	24	79%	0.11	0.50	0.14	0.18	0.14	73	79	92%	0.089	0.22	0.14	0.14	0.036	7.1 E-2	8.2 E-1	2.1 E-3	6.0 E-1	NO	mg/kg	Multiple tests
Arsenic	24	24	100%	2.8	13	4.0	4.5	1.9	79	79	100%	2.2	13	3.8	4.4	2.0	3.9 E-1	7.6 E-1	1.0 E+0	2.1 E-1	NO	mg/kg	Multiple tests
Barium	24	24	100%	107	368	193	199	57	79	79	100%	85	539	138	156	70	1.9 E-3	4.6 E-4	1.0 E+0	3.3 E-5	YES	mg/kg	Multiple tests
Beryllium	24	24	100%	0.50	0.86	0.64	0.65	0.083	79	79	100%	0.29	0.67	0.55	0.56	0.063	1.5 E-5	6.7 E-5	1.7 E-5	1.5 E-6	YES	mg/kg	Multiple tests
Boron	3	24	13%	3.8	6.3	10	9.3	2.8	20	79	25%	3.0	7.6	1.4	2.4	1.9	9.8 E-13	9.5 E-1	1.0 E+0	3.6 E-15	NO	mg/kg	Low detection frequency; max background greater than max site.
Cadmium	19	24	79%	0.065	0.12	0.11	0.22	0.35	73	79	92%	0.050	0.13	0.083	0.081	0.027	2.9 E-2	2.2 E-2	1.0 E+0	3.8 E-6	NO	mg/kg	Site and background datasets similar.
Calcium	24	24	100%	18200	47500	24350	25490	5913	79	79	100%	10700	46600	24500	24970	7156	3.6 E-1	9.7 E-1	2.3 E-1	3.5 E-1	NO	mg/kg	Multiple tests
Chromium (VI)	1	18	6%	0.40	0.40	0.50	0.43	0.15	18	80	23%	0.18	1.6	0.085	0.16	0.23	7.9 E-8	9.9 E-1	1.0 E+0	9.6 E-12	NO	mg/kg	Low detection frequency; background max 4x the site max.
Chromium (Total)	24	24	100%	7.5	23	13	13	3.3	79	79	100%	7.1	17	10	11	1.8	1.8 E-3	4.6 E-4	5.3 E-2	3.0 E-4	YES	mg/kg	Multiple tests
Cobalt	24	24	100%	5.6	10	8.7	8.4	1.1	79	79	100%	5.3	11	7.5	7.8	1.3	1.3 E-2	3.5 E-1	1.0 E+0	5.2 E-3	NO	mg/kg	Site and background datasets similar.
Copper	24	24	100%	12	38	17	18	4.7	79	79	100%	8.8	24	16	16	2.1	3.6 E-2	3.5 E-2	2.3 E-1	4.1 E-3	NO	mg/kg	Multiple tests
Iron	24	24	100%	11600	26600	19200	19050	3420	79	79	100%	11200	22500	14700	15350	2815	1.6 E-5	6.7 E-5	5.3 E-2	5.7 E-6	YES	mg/kg	Multiple tests
Lead	24	24	100%	7.0	11	9.0	8.9	1.1	79	79	100%	4.9	16	7.1	7.4	1.6	2.5 E-6	4.6 E-4	1.0 E+0	5.7 E-6	YES	mg/kg	Multiple tests
Lithium	12	24	50%	11	49	13	17	7.9	67	79	85%	7.5	124	17	17	14	6.3 E-1	9.2 E-1	1.0 E+0	1.3 E-4	NO	mg/kg	Multiple tests
Magnesium	24	24	100%	8710	21600	10300	10610	2478	79	79	100%	4990	12500	9530	9553	1455	2.8 E-2	5.6 E-1	2.3 E-1	1.2 E-2	NO	mg/kg	Multiple tests
Manganese	24	24	100%	295	513	436	422	57	79	79	100%	217	579	319	343	84	1.3 E-6	2.4 E-3	1.0 E+0	1.6 E-5	YES	mg/kg	Multiple tests
Mercury	8	24	33%	0.0075	0.015	0.014	0.012	0.0059	35	79	44%	0.0072	0.024	0.0033	0.0075	0.0054	NA	9.8 E-1	1.0 E+0	4.6 E-5	NO	mg/kg	Low detection frequency; max background greater than max site.
Molybdenum	24	24	100%	0.31	1.5	0.43	0.52	0.27	62	79	78%	0.31	1.9	0.50	0.54	0.37	5.9 E-1	9.0 E-1	1.0 E+0	8.0 E-1	NO	mg/kg	Multiple tests
Nickel	24	24	100%	9.9	20	15	15	2.1	79	79	100%	8.5	28	15	16	2.4	7.4 E-1	6.1 E-1	1.0 E+0	5.7 E-1	NO	mg/kg	Multiple tests
Niobium	0	24	0%	NA	NA	0.76	0.99	0.56	6	79	8%	1.7	3.8	0.76	0.94	0.66	3.6 E-1	7.7 E-2	1.0 E+0	3.4 E-2	NO	mg/kg	ND at site.
Palladium	24	24	100%	0.31	0.88	0.47	0.52	0.16	79	79	100%	0.20	2.2	0.61	0.67	0.37	1.0 E+0	9.8 E-1	1.0 E+0	9.6 E-1	NO	mg/kg	Multiple tests
Phosphorus	24	24	100%	988	1940	1400	1435	251	79	79	100%	649	1930	1390	1369	208	1.2 E-1	3.5 E-2	2.3 E-1	1.9 E-1	NO	mg/kg	Multiple tests
Platinum	0	24	0%	NA	NA	0.010	0.019	0.018	7	79	9%	0.022	0.049	0.010	0.012	0.0071	3.7 E-2	1.1 E-1	1.0 E+0	3.3 E-2	NO	mg/kg	ND at site.
Potassium	24	24	100%	925	2430	1445	1445	338	79	79	100%	850	2450	1430	1499	357	7.5 E-1	9.2 E-1	1.0 E+0	7.0 E-1	NO	mg/kg	Multiple tests
Selenium	2	24	8%	0.29	0.40	0.16	0.19	0.061	0	79	0%	NA	NA	0.16	0.16	0	1.5 E-2	2.4 E-3	NA	1.2 E-3	YES	mg/kg	ND in background.
Silicon	24	24	100%	197	1310	814	772	245	79	79	100%	139	1080	617	591	282	1.9 E-3	9.7 E-2	2.3 E-1	2.9 E-3	YES	mg/kg	Site max, mean and median are greater than background.
Silver	21	24	88%	0.063	0.45	0.15	0.16	0.091	79	79	100%	0.074	2.2	0.15	0.25	0.38	9.7 E-1	4.0 E-1	1.0 E+0	5.2 E-1	NO	mg/kg	Multiple tests
Sodium	24	24	100%	619	1230	988	967	185	79	79	100%	428	3250	776	864	378	3.7 E-2	7.6 E-2	1.0 E+0	2.7 E-3	NO	mg/kg	Multiple tests
Strontium	24	24	100%	213	429	286	298	55	79	79	100%	123	793	250	275	104	7.6 E-2	5.1 E-1	1.0 E+0	8.4 E-3	NO	mg/kg	Multiple tests
Thallium	1	24	4%	1.9	1.9	0.10	0.25	0.39	4	79	5%	0.15	0.34	0.10	0.11	0.032	4.6 E-2	1.6 E-2	2.0 E-1	7.9 E-4	YES	mg/kg	Low detection frequency; site max > 5 times max background.
Tin	21	24	88%	0.35	0.70	0.57	0.54	0.12	76	79	96%	0.25	0.78	0.55	0.53	0.14	3.9 E-1	2.1 E-1	1.0 E+0	1.2 E-1	NO	mg/kg	Multiple tests
Titanium	24	24	100%	424	1310	1030	982	223	79	79	100%	445	912	671	680	110	3.9 E-7	1.8 E-12	3.0 E-14	2.7 E-8	YES	mg/kg	Multiple tests
Tungsten	9	24	38%	0.24	0.35	0.25	0.27	0.17	25	79	32%	0.19	3.6	0.10	0.21	0.40	1.7 E-1	5.6 E-1	1.0 E+0	6.1 E-4	NO	mg/kg	Low detection frequency; max background greater than max site.
Uranium	24	24	100%	1.0	4.0	1.5	1.6	0.56	79	79	100%	0.89	2.8	1.4	1.6	0.42	3.5 E-1	9.5 E-1	2.3 E-1	2.7 E-1	NO	mg/kg	Quantile and Slippage
Vanadium	24	24	100%	31	69	55	52	9.6	79	79	100%	27	73	43	46	10	4.2 E-3	3.5 E-2	1.0 E+0	3.2 E-3	NO	mg/kg	Slippage and quantile; site and background datasets similar.
Zinc	24	24	100%	32	70	40	42	7.4	79	79	100%	18	41	32	32	3.8	5.9 E-7	1.8 E-12	8.3 E-8	4.0 E-11	YES	mg/kg	Multiple tests
Zirconium	21	24	88%	12	32	27	24	7.3	79	79	100%	16	34	26	25	3.7	8.6 E-1	9.7 E-2	1.0 E+0	4.4 E-1	NO	mg/kg	Multiple tests
Radium-226	24	24	100%	0.57	1.8	0.92	1.0	0.25	65	65	100%	0.98	2.3	1.6	1.7	0.33	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests

Appendix D
Summary of Background Metals Evaluation
Deep McCollough Dataset

Chemical	McCullough Site at >= 20 ft bgs (Deep)								McCullough Background at >= 20 ft bgs (Deep)								*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation							
Radium-228	23	24	96%	1.2	2.0	1.6	1.6	0.15	64	64	100%	0.86	2.3	1.4	1.5	0.30	3.6 E-2	6.0 E-1	1.0 E+0	3.2 E-3	NO	pCi/g	Multiple tests
Thorium-228	24	24	100%	1.1	2.0	1.7	1.6	0.21	79	79	100%	1.1	2.3	1.8	1.8	0.25	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests
Thorium-230	21	24	88%	0.92	2.4	1.3	1.4	0.34	79	79	100%	1.1	2.7	1.6	1.7	0.36	1.0 E+0	9.9 E-1	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests
Thorium-232	24	24	100%	1.1	2.1	1.5	1.5	0.21	79	79	100%	0.91	2.0	1.5	1.6	0.21	8.8 E-1	6.1 E-1	2.3 E-1	9.3 E-1	NO	pCi/g	Multiple tests
Uranium-233/234	23	24	96%	0.21	3.2	0.63	0.75	0.56	76	76	100%	0.87	2.6	1.6	1.6	0.37	1.0 E+0	1.0 E+0	2.4 E-1	1.0 E+0	NO	pCi/g	Multiple tests
Uranium-235/236	12	24	50%	0.013	0.13	0.020	0.027	0.026	68	76	89%	0.029	0.12	0.065	0.063	0.022	1.0 E+0	1.0 E+0	2.4 E-1	1.0 E+0	NO	pCi/g	Multiple tests
Uranium-238	21	24	88%	0.18	1.7	0.46	0.57	0.32	76	76	100%	0.99	2.8	1.5	1.5	0.37	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	pCi/g	Multiple tests

Note: Summary and background comparison statistics were performed using one-half the detection limit for metals and using GISdT® (Neptune and Company 2007).
BOLD with Highlight indicates Site concentrations are greater than background.
WRS = Wilcoxon Rank Sum Test with the Gehan Modification
mg/kg - milligrams per kilogram
pCi/g - picoCuries per gram
Note: minimum and maximum values are for detected analytes only; mean and median values include non-detects.
p = significance level (compared to 0.025) (see text).
Greater than Background (YES/NO) is based on test results - see Basis column.

Appendix D
Summary of Background Metals Evaluation
Shallow River Dataset

	River Site at 0-20 ft bgs (Shallow)								River Background at 0-20 ft bgs (Shallow)								*t*	Quantile	Slippage	WRS	Greater		
Chemical	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	Test *p*	Test *p*	Test *p*	Test *p*	than Bckrnd?	Units	Basis
Aluminum	2	2	100%	7600	7910	7755	7755	219	33	33	100%	5330	15500	9260	9742	2812	1.0 E+0	1.0 E+0	1.0 E+0	8.6 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Antimony	2	2	100%	0.22	0.26	0.24	0.24	0.028	13	33	39%	0.19	0.61	0.063	0.16	0.14	2.7 E-2	1.0 E+0	1.0 E+0	1.7 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Arsenic	2	2	100%	6.7	10	8.5	8.5	2.5	33	33	100%	4.5	28	7.7	8.6	4.4	5.3 E-1	4.5 E-1	1.0 E+0	3.3 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Barium	2	2	100%	453	546	500	500	66	33	33	100%	211	755	428	466	173	3.0 E-1	1.0 E+0	1.0 E+0	2.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Beryllium	2	2	100%	0.36	0.39	0.38	0.38	0.021	33	33	100%	0.28	0.78	0.40	0.44	0.13	9.8 E-1	1.0 E+0	1.0 E+0	7.6 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Boron	0	2	0%	NA	NA	10	10	0.035	15	33	45%	7.1	57	3.3	7.8	9.7	7.4 E-2	1.0 E+0	1.0 E+0	8.9 E-3	NA	mg/kg	Insufficient data for statistical comparisons.
Cadmium	2	2	100%	0.080	0.082	0.081	0.081	0.0014	21	33	64%	0.053	0.26	0.079	0.084	0.064	5.9 E-1	1.0 E+0	1.0 E+0	4.6 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Calcium	2	2	100%	16500	34300	25400	25400	12590	33	33	100%	3430	71300	25400	27830	13950	5.8 E-1	4.5 E-1	1.0 E+0	5.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Chromium (VI)	0	2	0%	NA	NA	0.50	0.50	0	0	33	0%	NA	NA	0.21	0.22	0.019	1.6 E-39	1.0 E+0	NA	8.5 E-3	NA	mg/kg	Insufficient data for statistical comparisons.
Chromium (Total)	2	2	100%	9.4	11	10	10	1.1	33	33	100%	3.2	24	9.9	11	4.6	7.2 E-1	1.0 E+0	1.0 E+0	5.0 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Cobalt	2	2	100%	4.2	5.0	4.6	4.6	0.57	33	33	100%	3.7	8.9	4.7	5.0	1.2	7.7 E-1	1.0 E+0	1.0 E+0	6.3 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Copper	2	2	100%	8.9	9.7	9.3	9.3	0.57	33	33	100%	8.0	36	11	13	5.7	1.0 E+0	1.0 E+0	1.0 E+0	9.1 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Iron	2	2	100%	9110	10100	9605	9605	700	33	33	100%	6210	21700	9310	10260	3488	7.8 E-1	1.0 E+0	1.0 E+0	4.4 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Lead	2	2	100%	16	16	16	16	0.14	33	33	100%	7.6	53	12	15	9.6	2.7 E-1	4.5 E-1	1.0 E+0	1.0 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Lithium	2	2	100%	19	34	27	27	10	6	33	18%	26	42	7.3	10	12	1.2 E-1	6.1 E-2	1.0 E+0	4.2 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Magnesium	2	2	100%	4850	6930	5890	5890	1471	33	33	100%	1550	15000	7580	8206	2706	8.9 E-1	1.0 E+0	1.0 E+0	9.3 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Manganese	2	2	100%	315	427	371	371	79	33	33	100%	178	2070	295	411	368	6.7 E-1	4.5 E-1	1.0 E+0	2.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Mercury	0	2	0%	NA	NA	0.0067	0.0067	0	0	33	0%	NA	NA	0.0067	0.0067	NA	NA	NA	NA	NA	NA	mg/kg	Insufficient data for statistical comparisons.
Molybdenum	2	2	100%	0.52	0.90	0.71	0.71	0.27	33	33	100%	0.28	2.3	0.64	0.79	0.42	6.2 E-1	1.0 E+0	1.0 E+0	5.0 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Nickel	2	2	100%	10	13	11	11	2.0	33	33	100%	9.1	22	12	13	2.9	7.3 E-1	1.0 E+0	1.0 E+0	6.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Niobium	0	2	0%	NA	NA	0.76	0.76	0	1	33	3%	4.6	4.6	1.5	1.6	0.54	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NA	mg/kg	Insufficient data for statistical comparisons.
Palladium	2	2	100%	0.38	0.44	0.41	0.41	0.042	33	33	100%	0.35	1.6	0.73	0.79	0.28	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Phosphorus	2	2	100%	821	982	902	902	114	33	33	100%	296	1710	754	806	277	2.1 E-1	4.5 E-1	1.0 E+0	1.6 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Platinum	0	2	0%	NA	NA	0.020	0.020	0	0	33	0%	NA	NA	0.048	0.048	0	NA	NA	NA	NA	NA	mg/kg	Insufficient data for statistical comparisons.
Potassium	2	2	100%	1710	2960	2335	2335	884	33	33	100%	1090	9000	2820	3525	2038	8.7 E-1	1.0 E+0	1.0 E+0	7.7 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Selenium	0	2	0%	NA	NA	0.32	0.32	0	0	33	0%	NA	NA	0.32	0.32	0	NA	NA	NA	NA	NA	mg/kg	Insufficient data for statistical comparisons.
Silicon	2	2	100%	557	844	701	701	203	33	33	100%	344	7480	1190	1433	1246	9.9 E-1	1.0 E+0	1.0 E+0	9.3 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Silver	2	2	100%	0.079	0.080	0.080	0.080	0.00071	14	33	42%	0.054	0.17	0.055	0.072	0.032	9.6 E-2	1.0 E+0	1.0 E+0	9.1 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Sodium	2	2	100%	502	621	562	562	84	33	33	100%	274	4210	1370	1576	966	1.0 E+0	1.0 E+0	1.0 E+0	9.7 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Strontium	2	2	100%	265	323	294	294	41	33	33	100%	172	761	379	392	144	9.6 E-1	1.0 E+0	1.0 E+0	8.6 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Thallium	0	2	0%	NA	NA	0.21	0.21	0	6	33	18%	0.43	2.0	0.15	0.25	0.33	7.9 E-1	1.0 E+0	1.0 E+0	2.1 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Tin	0	2	0%	NA	NA	0.21	0.21	0	16	33	48%	0.32	1.0	0.15	0.31	0.21	1.0 E+0	1.0 E+0	1.0 E+0	1.5 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Titanium	2	2	100%	440	449	445	445	6.4	33	33	100%	215	611	380	408	114	4.1 E-2	1.0 E+0	1.0 E+0	3.1 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Tungsten	2	2	100%	0.40	0.51	0.46	0.46	0.078	2	33	6%	0.96	1.0	0.25	0.29	0.18	7.3 E-2	1.7 E-1	1.0 E+0	6.0 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Uranium	2	2	100%	0.69	1.2	0.95	0.95	0.36	33	33	100%	0.56	4.3	0.92	1.2	0.74	7.4 E-1	1.0 E+0	1.0 E+0	6.1 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Vanadium	2	2	100%	24	30	27	27	4.7	33	33	100%	19	55	29	30	7.1	7.6 E-1	1.0 E+0	1.0 E+0	7.6 E-1	NA	mg/kg	Insufficient data for statistical comparisons.

Appendix D
Summary of Background Metals Evaluation
Shallow River Dataset

Chemical	River Site at 0-20 ft bgs (Shallow)								River Background at 0-20 ft bgs (Shallow)								*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation							
Zinc	2	2	100%	35	46	40	40	7.6	33	33	100%	25	71	35	37	9.9	3.2 E-1	4.5 E-1	1.0 E+0	1.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Zirconium	2	2	100%	9.6	11	10	10	0.99	13	33	39%	9.1	17	0.40	4.8	5.7	9.8 E-4	4.5 E-1	1.0 E+0	1.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Radium-226	1	2	50%	0.80	0.80	0.77	0.77	0.033	31	33	94%	0.57	2.8	0.99	1.1	0.51	9.0 E-1	1.0 E+0	1.0 E+0	9.1 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Radium-228	2	2	100%	1.1	1.2	1.1	1.1	0.11	28	33	85%	1.1	2.9	1.4	1.5	0.55	9.9 E-1	1.0 E+0	1.0 E+0	9.2 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Thorium-228	2	2	100%	1.0	1.3	1.2	1.2	0.23	33	33	100%	1.1	3.4	1.6	1.8	0.51	9.5 E-1	1.0 E+0	1.0 E+0	9.7 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Thorium-230	2	2	100%	1.0	1.5	1.3	1.3	0.36	27	33	82%	1.0	3.6	1.3	1.5	0.57	6.4 E-1	1.0 E+0	1.0 E+0	5.6 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Thorium-232	2	2	100%	1.2	1.3	1.2	1.2	0.071	33	33	100%	1.1	2.8	1.5	1.5	0.32	1.0 E+0	1.0 E+0	1.0 E+0	9.7 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Uranium-233/234	2	2	100%	0.27	0.50	0.38	0.38	0.16	33	33	100%	0.70	4.8	1.2	1.5	0.81	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Uranium-235/236	0	2	0%	NA	NA	0.012	0.012	0.0054	11	33	33%	0.088	0.24	0.088	0.10	0.057	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Uranium-238	2	2	100%	0.24	0.37	0.31	0.31	0.093	33	33	100%	0.55	4.0	0.94	1.2	0.67	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	pCi/g	Insufficient data for statistical comparisons.

Note: Summary and background comparison statistics were performed using one-half the detection limit for metals and using GISdT® (Neptune and Company 2007).
BOLD with Highlight indicates Site concentrations are greater than background.
WRS = Wilcoxon Rank Sum Test with the Gehan Modification
mg/kg - milligrams per kilogram
pCi/g - picoCuries per gram
Note: minimum and maximum values are for detected analytes only; mean and median values include non-detects.
p = significance level (compared to 0.025) (see text).
Greater than Background (YES/NO) is based on test results - see Basis column.

Apppendix D
Summary of Background Metals Evaluation
Deep River Dataset

Chemical	River Site at >= 20 ft bgs (Deep)								River Background at >= 20 ft bgs (Deep)								*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation							
Aluminum	2	2	100%	5830	6280	6055	6055	318	36	36	100%	5680	13400	8355	8613	1504	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Antimony	2	2	100%	0.19	0.21	0.20	0.20	0.014	36	36	100%	0.14	0.37	0.21	0.22	0.052	9.0 E-1	1.0 E+0	1.0 E+0	7.3 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Arsenic	2	2	100%	6.3	6.5	6.4	6.4	0.14	36	36	100%	4.7	14	7.2	7.5	2.1	1.0 E+0	1.0 E+0	1.0 E+0	7.5 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Barium	2	2	100%	259	277	268	268	13	36	36	100%	188	1350	329	399	215	1.0 E+0	1.0 E+0	1.0 E+0	9.0 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Beryllium	2	2	100%	0.31	0.31	0.31	0.31	0	36	36	100%	0.34	0.72	0.46	0.47	0.073	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Boron	0	2	0%	NA	NA	10	10	0.035	8	36	22%	5.0	24	1.4	3.0	4.1	4.6 E-13	6.4 E-2	1.0 E+0	2.1 E-3	NA	mg/kg	Insufficient data for statistical comparisons.
Cadmium	2	2	100%	0.076	0.081	0.079	0.079	0.0035	26	36	72%	0.034	0.16	0.079	0.071	0.049	1.9 E-1	1.0 E+0	1.0 E+0	5.0 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Calcium	2	2	100%	23800	40000	31900	31900	11460	36	36	100%	4680	45600	21950	21740	8709	2.1 E-1	4.6 E-1	1.0 E+0	7.5 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Chromium (VI)	0	2	0%	NA	NA	0.50	0.50	0	16	41	39%	0.16	1.1	0.085	0.21	0.22	9.5 E-11	1.0 E+0	1.0 E+0	1.1 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Chromium (Total)	2	2	100%	7.7	7.8	7.8	7.8	0.071	36	36	100%	7.2	24	10	11	3.1	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Cobalt	2	2	100%	3.7	4.4	4.1	4.1	0.50	36	36	100%	3.5	5.7	4.6	4.6	0.58	8.3 E-1	1.0 E+0	1.0 E+0	9.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Copper	2	2	100%	8.7	11	9.7	9.7	1.3	36	36	100%	8.0	14	10	10	1.3	6.9 E-1	1.0 E+0	1.0 E+0	7.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Iron	2	2	100%	8050	8480	8265	8265	304	36	36	100%	7250	13100	10900	10540	1518	1.0 E+0	1.0 E+0	1.0 E+0	9.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Lead	2	2	100%	12	13	12	12	0.71	36	36	100%	9.5	35	12	14	5.9	9.5 E-1	1.0 E+0	1.0 E+0	4.1 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Lithium	2	2	100%	39	40	40	40	0.85	36	36	100%	20	47	30	31	7.1	3.2 E-6	6.4 E-2	1.0 E+0	5.1 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Magnesium	2	2	100%	5100	5920	5510	5510	580	36	36	100%	5210	13900	7210	7629	1884	9.8 E-1	1.0 E+0	1.0 E+0	9.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Manganese	2	2	100%	285	430	358	358	103	36	36	100%	88	777	162	213	124	1.4 E-1	6.4 E-2	1.0 E+0	3.9 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Mercury	0	2	0%	NA	NA	0.0033	0.0033	0	5	28	18%	0.0070	0.010	0.0033	0.0042	0.0020	NA	1.0 E+0	1.0 E+0	7.4 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Molybdenum	2	2	100%	0.37	0.65	0.51	0.51	0.20	31	36	86%	0.26	0.72	0.39	0.38	0.17	2.6 E-1	4.6 E-1	1.0 E+0	1.6 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Nickel	2	2	100%	10	12	11	11	1.1	36	36	100%	9.2	18	13	13	2.1	9.0 E-1	1.0 E+0	1.0 E+0	9.3 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Niobium	0	2	0%	NA	NA	0.76	0.76	0	3	36	8%	2.5	3.0	0.76	0.92	0.55	9.6 E-1	1.0 E+0	1.0 E+0	6.6 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Palladium	2	2	100%	0.36	0.41	0.39	0.39	0.035	36	36	100%	0.24	1.1	0.60	0.58	0.22	1.0 E+0	1.0 E+0	1.0 E+0	8.7 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Phosphorus	2	2	100%	763	818	791	791	39	36	36	100%	511	1320	820	829	152	8.2 E-1	1.0 E+0	1.0 E+0	7.0 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Platinum	0	2	0%	NA	NA	0.010	0.010	0	0	36	0%	NA	NA	0.010	0.010	0.00025	8.4 E-1	1.0 E+0	NA	5.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Potassium	2	2	100%	1750	1940	1845	1845	134	36	36	100%	2560	12600	3325	4368	2340	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Selenium	0	2	0%	NA	NA	0.16	0.16	0	0	36	0%	NA	NA	0.16	0.16	0.0033	8.4 E-1	1.0 E+0	NA	5.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Silicon	2	2	100%	771	852	812	812	57	36	36	100%	224	1340	618	634	244	1.9 E-2	4.2 E-1	1.0 E+0	8.5 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Silver	2	2	100%	0.091	0.14	0.12	0.12	0.035	36	36	100%	0.046	1.4	0.12	0.19	0.23	9.4 E-1	1.0 E+0	1.0 E+0	5.5 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Sodium	2	2	100%	794	924	859	859	92	36	36	100%	600	2770	1250	1401	597	1.0 E+0	1.0 E+0	1.0 E+0	9.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Strontium	2	2	100%	255	256	256	256	0.71	36	36	100%	146	559	252	270	95	8.2 E-1	1.0 E+0	1.0 E+0	4.5 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Thallium	0	2	0%	NA	NA	0.10	0.10	0	0	36	0%	NA	NA	0.10	0.10	0.0025	8.4 E-1	1.0 E+0	NA	5.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Tin	0	2	0%	NA	NA	0.21	0.21	0.0035	16	36	44%	0.25	0.49	0.026	0.18	0.18	1.6 E-1	1.0 E+0	1.0 E+0	2.5 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Titanium	2	2	100%	470	513	492	492	30	36	36	100%	309	712	525	516	98	7.7 E-1	1.0 E+0	1.0 E+0	6.6 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Tungsten	2	2	100%	0.41	0.48	0.45	0.45	0.050	9	36	25%	0.26	0.60	0.10	0.17	0.15	9.8 E-3	5.1 E-2	1.0 E+0	8.7 E-3	NA	mg/kg	Insufficient data for statistical comparisons.
Uranium	2	2	100%	1.2	1.6	1.4	1.4	0.28	36	36	100%	0.64	2.2	1.2	1.2	0.34	2.1 E-1	4.6 E-1	1.0 E+0	1.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Vanadium	2	2	100%	27	28	27	27	0.50	36	36	100%	25	41	31	32	4.4	1.0 E+0	1.0 E+0	1.0 E+0	9.4 E-1	NA	mg/kg	Insufficient data for statistical comparisons.

Apppendix D
Summary of Background Metals Evaluation
Deep River Dataset

Chemical	River Site at >= 20 ft bgs (Deep)								River Background at >= 20 ft bgs (Deep)								*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation							
Zinc	2	2	100%	32	44	38	38	7.9	36	36	100%	26	68	38	40	9.3	5.9 E-1	4.6 E-1	1.0 E+0	5.3 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Zirconium	2	2	100%	12	13	13	13	1.1	29	36	81%	10	21	15	13	6.6	5.4 E-1	1.0 E+0	1.0 E+0	8.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Radium-226	2	2	100%	0.91	1.3	1.1	1.1	0.26	28	28	100%	0.49	1.4	0.98	0.97	0.23	3.1 E-1	4.7 E-1	1.0 E+0	2.5 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Radium-228	2	2	100%	1.2	1.4	1.3	1.3	0.11	28	28	100%	0.88	1.8	1.4	1.3	0.24	5.3 E-1	1.0 E+0	1.0 E+0	6.0 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Thorium-228	2	2	100%	1.3	1.5	1.4	1.4	0.20	33	33	100%	0.94	1.7	1.4	1.4	0.17	4.5 E-1	4.5 E-1	1.0 E+0	4.4 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Thorium-230	2	2	100%	1.5	2.2	1.8	1.8	0.48	33	33	100%	0.55	1.9	1.0	1.0	0.30	1.3 E-1	6.1 E-2	5.7 E-2	1.6 E-2	NA	pCi/g	Insufficient data for statistical comparisons.
Thorium-232	2	2	100%	1.1	1.3	1.2	1.2	0.13	33	33	100%	0.90	1.7	1.4	1.3	0.20	8.5 E-1	1.0 E+0	1.0 E+0	8.9 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Uranium-233/234	2	2	100%	0.46	0.72	0.59	0.59	0.18	31	34	91%	0.64	2.1	1.0	1.1	0.30	9.4 E-1	1.0 E+0	1.0 E+0	9.9 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Uranium-235/236	0	2	0%	NA	NA	0.012	0.012	0.0013	19	34	56%	0.035	0.096	0.038	0.037	0.022	1.0 E+0	1.0 E+0	1.0 E+0	9.6 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Uranium-238	2	2	100%	0.33	0.57	0.45	0.45	0.17	30	34	88%	0.57	2.2	1.0	1.1	0.30	9.6 E-1	1.0 E+0	1.0 E+0	9.9 E-1	NA	pCi/g	Insufficient data for statistical comparisons.

Note: Summary and background comparison statistics were performed using one-half the detection limit for metals and using GISdT® (Neptune and Company 2007).
BOLD with Highlight indicates Site concentrations are greater than background.
WRS = Wilcoxon Rank Sum Test with the Gehan Modification
mg/kg - milligrams per kilogram
pCi/g - picoCuries per gram
Note: minimum and maximum values are for detected analytes only; mean and median values include non-detects.
p = significance level (compared to 0.025) (see text).
Greater than Background (YES/NO) is based on test results - see Basis column.

Appendix D
Summary of Background Metals Evaluation
Shallow Mixed Dataset

	Mixed Site at 0-20 ft bgs (Shallow)								Mixed Background at 0-20 ft bgs (Shallow)								*t* Test	Quantile Test	Slippage Test	WRS Test	Greater than		
Chemical	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	*p*	*p*	*p*	*p*	Bckrnd?	Units	Basis
Aluminum	2	2	100%	6410	8190	7300	7300	1259	11	11	100%	4840	10900	6180	6698	2069	3.2 E-1	4.2 E-1	1.0 E+0	8.4 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Antimony	2	2	100%	0.17	0.20	0.19	0.19	0.021	6	11	55%	0.13	0.44	0.16	0.17	0.11	3.8 E-1	1.0 E+0	1.0 E+0	6.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Arsenic	2	2	100%	3.5	4.6	4.1	4.1	0.78	11	11	100%	2.9	5.9	5.3	4.9	1.0	8.3 E-1	1.0 E+0	1.0 E+0	8.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Barium	2	2	100%	447	520	484	484	52	11	11	100%	211	836	424	468	190	4.1 E-1	1.0 E+0	1.0 E+0	2.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Beryllium	2	2	100%	0.48	0.57	0.53	0.53	0.064	11	11	100%	0.38	0.62	0.52	0.50	0.081	3.6 E-1	4.2 E-1	1.0 E+0	3.1 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Boron	0	2	0%	NA	NA	21	21	0	0	9	0%	NA	NA	3.2	3.2	0	NA	NA	NA	NA	NA	mg/kg	Insufficient data for statistical comparisons.
Cadmium	2	2	100%	0.090	0.11	0.10	0.10	0.014	2	11	18%	0.11	0.14	0.065	0.076	0.025	8.4 E-2	1.0 E+0	1.0 E+0	9.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Calcium	2	2	100%	24700	27000	25850	25850	1626	9	9	100%	8160	36400	16100	18640	10070	3.6 E-2	4.9 E-1	1.0 E+0	1.7 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Chromium (VI)	0	2	0%	NA	NA	0.50	0.50	0	0	9	0%	NA	NA	0.13	0.13	0.0025	3.6 E-19	1.0 E+0	NA	9.5 E-3	NA	mg/kg	Insufficient data for statistical comparisons.
Chromium (Total)	2	2	100%	8.0	11	9.7	9.7	2.4	11	11	100%	5.0	12	8.8	8.9	1.9	3.5 E-1	4.2 E-1	1.0 E+0	2.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Cobalt	2	2	100%	5.5	6.9	6.2	6.2	0.99	11	11	100%	5.1	12	6.1	6.9	2.3	7.4 E-1	1.0 E+0	1.0 E+0	4.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Copper	2	2	100%	13	14	13	13	0.64	11	11	100%	11	31	18	19	5.6	9.9 E-1	1.0 E+0	1.0 E+0	9.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Iron	2	2	100%	10900	13900	12400	12400	2121	11	11	100%	9180	14000	11200	11700	1710	3.6 E-1	4.2 E-1	1.0 E+0	3.5 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Lead	2	2	100%	12	12	12	12	0.071	11	11	100%	8.9	21	9.9	13	4.7	6.9 E-1	1.0 E+0	1.0 E+0	2.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Lithium	2	2	100%	12	18	15	15	4.3	9	9	100%	9.1	15	12	12	1.9	2.5 E-1	4.9 E-1	1.8 E-1	1.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Magnesium	2	2	100%	6660	7370	7015	7015	502	11	11	100%	4580	9090	5450	6059	1348	7.1 E-2	4.2 E-1	1.0 E+0	1.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Manganese	2	2	100%	342	661	502	502	226	11	11	100%	345	1090	469	507	200	5.1 E-1	4.2 E-1	1.0 E+0	5.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Mercury	1	2	50%	0.0084	0.0084	0.0059	0.0059	0.0036	6	11	55%	0.0097	0.019	0.0097	0.010	0.0068	NA	1.0 E+0	1.0 E+0	8.9 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Molybdenum	2	2	100%	0.38	0.59	0.49	0.49	0.15	11	11	100%	0.22	1.3	0.90	0.86	0.35	9.6 E-1	1.0 E+0	1.0 E+0	9.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Nickel	2	2	100%	13	14	13	13	0.35	11	11	100%	8.9	14	11	11	1.3	1.3 E-3	3.8 E-2	1.0 E+0	3.8 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Niobium	0	2	0%	NA	NA	1.5	1.5	0	0	9	0%	NA	NA	1	1	0	NA	NA	NA	NA	NA	mg/kg	Insufficient data for statistical comparisons.
Palladium	2	2	100%	0.24	0.39	0.32	0.32	0.11	9	9	100%	0.14	0.48	0.22	0.27	0.11	3.2 E-1	4.9 E-1	1.0 E+0	1.7 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Phosphorus	2	2	100%	845	1060	953	953	152	9	9	100%	636	984	804	798	105	1.9 E-1	4.9 E-1	1.8 E-1	4.9 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Platinum	0	2	0%	NA	NA	0.02	0.02	0	0	9	0%	NA	NA	0.043	0.043	0	NA	NA	NA	NA	NA	mg/kg	Insufficient data for statistical comparisons.
Potassium	2	2	100%	1230	1470	1350	1350	170	9	9	100%	1240	1840	1380	1473	241	7.6 E-1	1.0 E+0	1.0 E+0	8.3 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Selenium	0	2	0%	NA	NA	0.16	0.16	0	8	11	73%	0.17	0.59	0.26	0.26	0.17	9.6 E-1	1.0 E+0	1.0 E+0	2.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Silicon	2	2	100%	825	970	898	898	103	9	9	100%	527	883	690	708	114	8.8 E-2	5.5 E-2	1.8 E-1	2.9 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Silver	2	2	100%	0.076	0.086	0.081	0.081	0.0071	2	11	18%	0.048	0.056	0.13	0.12	0.032	1.0 E+0	1.0 E+0	1.7 E-1	9.5 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Sodium	2	2	100%	386	539	463	463	108	9	9	100%	111	901	265	352	280	2.0 E-1	4.9 E-1	1.0 E+0	1.7 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Strontium	2	2	100%	159	258	209	209	70	9	9	100%	69	219	92	122	56	1.5 E-1	4.9 E-1	1.8 E-1	7.9 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Thallium	0	2	0%	NA	NA	0.10	0.10	0	7	11	64%	0.12	1.4	0.27	0.66	0.51	1.0 E+0	1.0 E+0	1.0 E+0	9.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Tin	0	2	0%	NA	NA	0.21	0.21	0	8	9	89%	0.20	0.34	0.22	0.24	0.075	8.8 E-1	1.0 E+0	1.0 E+0	1.7 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Titanium	2	2	100%	473	479	476	476	4.2	11	11	100%	200	398	244	272	70	9.6 E-7	3.8 E-2	1.3 E-2	1.5 E-2	NA	mg/kg	Insufficient data for statistical comparisons.
Tungsten	1	2	50%	0.22	0.22	0.16	0.16	0.085	0	9	0%	NA	NA	0.0088	0.0088	0	1.2 E-1	1.8 E-1	NA	8.3 E-4	NA	mg/kg	Insufficient data for statistical comparisons.
Uranium	2	2	100%	0.79	0.79	0.79	0.79	0	9	9	100%	0.43	0.84	0.71	0.68	0.14	2.0 E-2	1.0 E+0	1.0 E+0	1.2 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Vanadium	2	2	100%	23	35	29	29	8.8	11	11	100%	19	26	23	23	1.9	2.6 E-1	4.2 E-1	1.5 E-1	2.1 E-1	NA	mg/kg	Insufficient data for statistical comparisons.

Appendix D
Summary of Background Metals Evaluation
Shallow Mixed Dataset

Chemical	Mixed Site at 0-20 ft bgs (Shallow)								Mixed Background at 0-20 ft bgs (Shallow)								*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation							
Zinc	2	2	100%	25	31	28	28	4.3	11	11	100%	21	52	25	31	11	6.9 E-1	1.0 E+0	1.0 E+0	3.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Zirconium	2	2	100%	11	11	11	11	0.071	9	9	100%	60	93	69	75	13	1.0 E+0	1.0 E+0	1.0 E+0	9.8 E-1	NA	mg/kg	Insufficient data for statistical comparisons.
Radium-226	2	2	100%	0.80	1.1	0.95	0.95	0.22	5	9	56%	0.58	0.93	0.76	0.74	0.13	1.0 E-1	4.9 E-1	1.8 E-1	7.9 E-2	NA	pCi/g	Insufficient data for statistical comparisons.
Radium-228	2	2	100%	1.4	1.9	1.6	1.6	0.32	3	3	100%	2.1	2.9	2.4	2.5	0.41	9.6 E-1	1.0 E+0	1.0 E+0	9.6 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Thorium-228	2	2	100%	1.3	1.6	1.4	1.4	0.20	11	11	100%	1.2	1.9	1.4	1.5	0.22	5.8 E-1	1.0 E+0	1.0 E+0	5.4 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Thorium-230	2	2	100%	1.0	1.4	1.2	1.2	0.27	11	11	100%	0.66	1.4	0.84	0.91	0.20	1.7 E-1	4.2 E-1	1.5 E-1	5.6 E-2	NA	pCi/g	Insufficient data for statistical comparisons.
Thorium-232	2	2	100%	1.1	1.5	1.3	1.3	0.27	11	11	100%	1.1	1.9	1.4	1.4	0.23	6.8 E-1	4.2 E-1	1.0 E+0	5.8 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Uranium-233/234	2	2	100%	0.22	0.23	0.23	0.23	0.0092	2	11	18%	0.76	0.79	0.76	0.74	0.13	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Uranium-235/236	0	2	0%	NA	NA	0.0015	0.0015	0.00046	5	11	45%	0.054	0.13	0.053	0.059	0.031	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	pCi/g	Insufficient data for statistical comparisons.
Uranium-238	2	2	100%	0.17	0.22	0.20	0.20	0.034	11	11	100%	0.57	0.94	0.66	0.72	0.13	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NA	pCi/g	Insufficient data for statistical comparisons.

Note: Summary and background comparison statistics were performed using one-half the detection limit for metals and using GISdT® (Neptune and Company 2007).
BOLD with Highlight indicates Site concentrations are greater than background.
WRS = Wilcoxon Rank Sum Test with the Gehan Modification
mg/kg - milligrams per kilogram
pCi/g - picoCuries per gram
Note: minimum and maximum values are for detected analytes only; mean and median values include non-detects.
p = significance level (compared to 0.025) (see text).
Greater than Background (YES/NO) is based on test results - see Basis column.

Appendix D
Summary of Background Metals Evaluation
Deep Mixed Dataset

Chemical	Mixed Site at >= 20 ft bgs (Deep)								Mixed Background at >= 20 ft bgs (Deep)								*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation							
Aluminum	4	4	100%	7600	13400	9540	10020	2474	24	24	100%	7060	12300	9375	9514	1391	3.6 E-1	7.1 E-1	1.4 E-1	4.7 E-1	NO	mg/kg	Multiple tests
Antimony	4	4	100%	0.17	0.20	0.19	0.19	0.013	23	24	96%	0.12	0.26	0.16	0.17	0.043	3.5 E-2	1.0 E+0	1.0 E+0	1.0 E-1	NO	mg/kg	Multiple tests
Arsenic	4	4	100%	4.7	6.0	5.2	5.3	0.56	24	24	100%	4.4	10	7.0	7.1	1.4	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NO	mg/kg	Multiple tests
Barium	4	4	100%	560	869	663	689	130	24	24	100%	262	743	488	500	127	2.7 E-2	2.5 E-1	1.4 E-1	1.1 E-2	NO	mg/kg	Multiple tests
Beryllium	4	4	100%	0.44	0.65	0.50	0.52	0.090	24	24	100%	0.44	0.73	0.56	0.56	0.070	7.5 E-1	7.1 E-1	1.0 E+0	8.0 E-1	NO	mg/kg	Multiple tests
Boron	0	4	0%	NA	NA	10	10	0.025	3	24	13%	4.0	5.0	1.4	1.8	1.1	3.3 E-23	1.7 E-3	1.0 E+0	1.7 E-5	NO	mg/kg	ND at Site.
Cadmium	4	4	100%	0.065	0.080	0.077	0.075	0.0067	22	24	92%	0.051	0.13	0.097	0.087	0.032	9.5 E-1	1.0 E+0	1.0 E+0	9.6 E-1	NO	mg/kg	Multiple tests
Calcium	4	4	100%	13100	23600	22400	20380	4916	24	24	100%	0.43	40500	23100	22760	9662	7.6 E-1	1.0 E+0	1.0 E+0	7.2 E-1	NO	mg/kg	Multiple tests
Chromium (VI)	0	4	0%	NA	NA	0.50	0.50	0	2	14	14%	0.18	0.34	0.088	0.11	0.070	1.2 E-11	1.0 E+0	1.0 E+0	9.2 E-4	NO	mg/kg	ND at Site.
Chromium (Total)	4	4	100%	7.5	15	8.0	9.6	3.5	24	24	100%	1.1	18	15	14	3.5	9.6 E-1	1.0 E+0	1.0 E+0	9.9 E-1	NO	mg/kg	Multiple tests
Cobalt	4	4	100%	3.9	5.0	4.2	4.3	0.48	24	24	100%	4.7	13	7.5	7.5	1.5	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Copper	4	4	100%	9.0	13	11	11	1.7	24	24	100%	9.9	19	15	15	2.1	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Iron	4	4	100%	9600	10900	10140	10190	577	24	24	100%	11900	17200	15400	15120	1528	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Lead	4	4	100%	9.7	14	12	12	1.7	24	24	100%	7.4	21	11	12	2.9	5.1 E-1	7.1 E-1	1.0 E+0	3.1 E-1	NO	mg/kg	Multiple tests
Lithium	4	4	100%	14	17	15	15	1.463	24	24	100%	13	33	21	21	4.1	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Magnesium	4	4	100%	5230	6390	5725	5768	477	24	24	100%	5920	12800	9435	9386	1697	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Manganese	4	4	100%	263	413	302	320	69	24	24	100%	158	836	328	368	189	8.2 E-1	7.1 E-1	1.0 E+0	5.3 E-1	NO	mg/kg	Multiple tests
Mercury	1	4	25%	0.0078	0.0078	0.0033	0.0045	0.0022	10	24	42%	0.0076	0.025	0.0033	0.0068	0.0054	NA	1.0 E+0	1.0 E+0	8.1 E-1	NO	mg/kg	Low detection frequency; site and background datasets similar.
Molybdenum	4	4	100%	0.31	0.59	0.45	0.45	0.12	24	24	100%	0.28	1.8	0.56	0.61	0.30	9.6 E-1	1.0 E+0	1.0 E+0	9.1 E-1	NO	mg/kg	Multiple tests
Nickel	4	4	100%	9.1	10	9.3	9.5	0.61	24	24	100%	9.7	17	15	15	1.9	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Niobium	0	4	0%	NA	NA	0.76	0.76	0	3	24	13%	2.8	3.6	0.76	1.0	0.80	9.6 E-1	1.0 E+0	1.0 E+0	7.7 E-1	NO	mg/kg	Multiple tests
Palladium	4	4	100%	0.33	0.81	0.57	0.57	0.20	24	24	100%	0.41	1.1	0.71	0.69	0.20	8.4 E-1	1.0 E+0	1.0 E+0	8.0 E-1	NO	mg/kg	Multiple tests
Phosphorus	4	4	100%	598	828	622	668	109	24	24	100%	594	1200	920	930	124	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Platinum	0	4	0%	NA	NA	0.02	0.02	0	0	24	0%	NA	NA	0.02	0.02	0	NA	NA	NA	NA	NO	mg/kg	ND in both datasets
Potassium	4	4	100%	2100	3000	2430	2490	426	24	24	100%	1220	3440	1960	2038	550	6.1 E-2	2.5 E-1	1.0 E+0	3.8 E-2	NO	mg/kg	Multiple tests
Selenium	0	4	0%	NA	NA	0.32	0.32	0	0	24	0%	NA	NA	0.32	0.32	0	NA	NA	NA	NA	NO	mg/kg	ND in both datasets
Silicon	4	4	100%	974	1120	1052	1050	82	24	24	100%	109	516	193	213	85	1.7 E-5	1.7 E-3	4.9 E-5	8.1 E-4	YES	mg/kg	Multiple tests
Silver	4	4	100%	0.056	0.12	0.089	0.089	0.026	24	24	100%	0.077	0.35	0.11	0.14	0.070	9.8 E-1	1.0 E+0	1.0 E+0	9.5 E-1	NO	mg/kg	Multiple tests
Sodium	4	4	100%	677	1650	1190	1176	430	24	24	100%	235	537	319	337	78	1.5 E-2	1.7 E-3	4.9 E-5	8.1 E-4	YES	mg/kg	Multiple tests
Strontium	4	4	100%	231	564	392	395	139	24	24	100%	153	362	219	230	53	4.8 E-2	3.8 E-2	1.6 E-2	9.1 E-3	YES	mg/kg	t-Test and Quantile.
Thallium	0	4	0%	NA	NA	0.2	0.2	0	0	24	0%	NA	NA	0.2	0.2	0	NA	NA	NA	NA	NO	mg/kg	ND in both datasets
Tin	0	4	0%	NA	NA	0.21	0.21	0	15	24	63%	0.43	0.60	0.45	0.32	0.24	9.9 E-1	1.0 E+0	1.0 E+0	7.9 E-1	NO	mg/kg	ND at Site.
Titanium	4	4	100%	441	468	445	450	12	24	24	100%	323	638	500	495	71	1.0 E+0	1.0 E+0	1.0 E+0	9.7 E-1	NO	mg/kg	Multiple tests
Tungsten	0	4	0%	NA	NA	0.10	0.10	0	15	24	63%	0.24	0.76	0.26	0.28	0.19	1.0 E+0	1.0 E+0	1.0 E+0	9.8 E-1	NO	mg/kg	ND at Site.
Uranium	4	4	100%	0.86	0.98	0.92	0.92	0.057	24	24	100%	0.75	1.6	1.1	1.1	0.18	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NO	mg/kg	Multiple tests
Vanadium	4	4	100%	22	27	22	23	2.7	24	24	100%	29	45	39	39	4.2	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests

Appendix D
Summary of Background Metals Evaluation
Deep Mixed Dataset

Chemical	Mixed Site at >= 20 ft bgs (Deep)								Mixed Background at >= 20 ft bgs (Deep)								*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation							
Zinc	4	4	100%	26	28	27	27	1.0	24	24	100%	27	46	33	33	4.4	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	mg/kg	Multiple tests
Zirconium	4	4	100%	10	11	11	11	0.38	15	24	63%	7.7	18	12	9.0	7.3	1.1 E-1	1.0 E+0	1.0 E+0	5.8 E-1	NO	mg/kg	Multiple tests
Radium-226	4	4	100%	0.70	1.3	0.75	0.87	0.28	14	14	100%	0.39	1.3	0.98	1.0	0.25	8.0 E-1	7.7 E-1	1.0 E+0	9.3 E-1	NO	pCi/g	Multiple tests
Radium-228	4	4	100%	1.3	1.5	1.4	1.4	0.11	13	14	93%	1.1	1.8	1.3	1.3	0.32	2.1 E-1	7.7 E-1	1.0 E+0	2.4 E-1	NO	pCi/g	Multiple tests
Thorium-228	4	4	100%	1.2	1.6	1.3	1.3	0.22	23	23	100%	1.1	1.9	1.6	1.6	0.20	9.5 E-1	1.0 E+0	1.0 E+0	9.7 E-1	NO	pCi/g	Multiple tests
Thorium-230	4	4	100%	1.1	1.9	1.2	1.4	0.36	23	23	100%	0.60	1.5	1.1	1.1	0.20	9.8 E-2	2.7 E-1	1.5 E-1	4.1 E-2	NO	pCi/g	Multiple tests
Thorium-232	4	4	100%	1.1	1.4	1.1	1.2	0.14	23	23	100%	1.1	1.9	1.5	1.5	0.21	1.0 E+0	1.0 E+0	1.0 E+0	9.9 E-1	NO	pCi/g	Multiple tests
Uranium-233/234	4	4	100%	0.23	1.0	0.31	0.46	0.36	7	11	64%	0.98	1.3	1.0	1.1	0.12	9.6 E-1	1.0 E+0	1.0 E+0	9.9 E-1	NO	pCi/g	Multiple tests
Uranium-235/236	1	4	25%	0.027	0.027	0.0035	0.0084	0.013	10	11	91%	0.029	0.062	0.039	0.041	0.013	1.0 E+0	1.0 E+0	1.0 E+0	1.0 E+0	NO	pCi/g	Low detection frequency; max background greater than site max.
Uranium-238	4	4	100%	0.21	1.0	0.24	0.43	0.41	7	11	64%	0.90	1.2	1.0	1.0	0.070	9.4 E-1	1.0 E+0	1.0 E+0	9.8 E-1	NO	pCi/g	Multiple tests

Note: Summary and background comparison statistics were performed using one-half the detection limit for metals and using GISdT® (Neptune and Company 2007).
BOLD with Highlight indicates Site concentrations are greater than background.
WRS = Wilcoxon Rank Sum Test with the Gehan Modification
mg/kg - milligrams per kilogram
pCi/g - picoCuries per gram
Note: minimum and maximum values are for detected analytes only; mean and median values include non-detects.
p = significance level (compared to 0.025) (see text).
Greater than Background (YES/NO) is based on test results - see Basis column.

Appendix D
Summary of Background Metals Evaluation
Upper Muddy Creek Formation (UMCf) Dataset

Chemical	UMCf Site								UMCf Background								*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation							
Aluminum	10	10	100%	7090	18100	13700	13410	3967	24	24	100%	3190	19700	9335	9847	4171	1.5 E-2	6.0 E-2	1.0 E+0	1.6 E-2	NO	mg/kg	Quantile and Slippage; site and background datasets similar.
Antimony	6	10	60%	0.15	0.55	0.20	0.25	0.20	23	24	96%	0.066	0.34	0.16	0.17	0.064	1.3 E-1	1.5 E-1	6.8 E-2	2.3 E-1	NO	mg/kg	Multiple tests
Arsenic	10	10	100%	5.6	27	12	13	5.9	24	24	100%	2.1	25	7.7	8.8	5.4	3.7 E-2	2.3 E-1	2.9 E-1	1.5 E-2	NO	mg/kg	Multiple tests
Barium	10	10	100%	39	873	124	195	253	24	24	100%	65	620	203	264	166	7.8 E-1	8.3 E-1	2.9 E-1	9.8 E-1	NO	mg/kg	Multiple tests
Beryllium	10	10	100%	0.38	1.1	0.84	0.79	0.26	24	24	100%	0.17	1.1	0.59	0.56	0.24	1.2 E-2	8.8 E-3	1.0 E+0	9.0 E-3	YES	mg/kg	Multiple tests
Boron	6	10	60%	11	29	19	20	7.2	7	24	29%	4.4	23	1.4	5.7	8.0	5.2 E-5	6.0 E-2	5.5 E-4	2.4 E-6	YES	mg/kg	Low detection frequency; site max, mean and median greater than background.
Cadmium	6	10	60%	0.066	0.55	0.37	0.42	0.43	18	24	75%	0.060	0.20	0.099	0.083	0.054	1.8 E-2	2.3 E-1	4.9 E-3	3.9 E-4	YES	mg/kg	Multiple tests
Calcium	10	10	100%	5280	153000	27200	51500	54110	24	24	100%	4190	38600	22150	22610	10060	6.4 E-2	2.3 E-1	2.0 E-2	8.1 E-2	NO	mg/kg	Multiple tests
Chromium (VI)	1	10	10%	0.25	0.25	0.40	0.42	0.16	2	23	9%	0.18	0.19	0.090	0.098	0.028	6.3 E-5	6.8 E-1	5.0 E-2	2.6 E-6	YES	mg/kg	Low detection frequency; site max, mean and median greater than background.
Chromium (Total)	10	10	100%	11	42	23	23	9.8	24	24	100%	2.9	28	13	13	7.5	5.4 E-3	6.0 E-2	2.0 E-2	2.6 E-3	YES	mg/kg	Multiple tests
Cobalt	10	10	100%	2.9	11	7.6	7.2	2.4	24	24	100%	1.6	9.7	6.5	5.8	2.7	6.9 E-2	5.4 E-1	2.9 E-1	5.2 E-2	NO	mg/kg	Multiple tests
Copper	10	10	100%	6.1	39	22	21	10	24	24	100%	4.1	21	14	12	5.4	1.4 E-2	8.8 E-3	1.6 E-4	2.3 E-3	YES	mg/kg	Multiple tests
Iron	10	10	100%	6610	20900	16400	15740	5074	24	24	100%	3620	20100	12800	12550	5283	5.9 E-2	5.4 E-1	2.0 E-2	5.2 E-2	NO	mg/kg	Multiple tests
Lead	10	10	100%	5.4	13	8.5	9.1	2.7	24	24	100%	4.4	16	11	11	3.5	9.3 E-1	9.8 E-1	1.0 E+0	9.2 E-1	NO	mg/kg	Multiple tests
Lithium	10	10	100%	32	131	52	61	30	24	24	100%	18	189	32	53	52	2.8 E-1	6.0 E-2	1.0 E+0	1.8 E-2	NO	mg/kg	Multiple tests
Magnesium	10	10	100%	15200	75000	36850	41640	21990	24	24	100%	2780	31000	10250	11300	6175	8.7 E-4	2.1 E-5	2.2 E-5	1.6 E-5	YES	mg/kg	Multiple tests
Manganese	10	10	100%	252	462	323	331	70	24	24	100%	126	786	295	307	157	2.7 E-1	5.4 E-1	1.0 E+0	1.8 E-1	NO	mg/kg	Multiple tests
Mercury	3	10	30%	0.0086	0.012	0.011	0.014	0.0093	5	20	25%	0.0080	0.012	0.0033	0.0050	0.0031	NA	5.5 E-1	1.0 E+0	2.5 E-3	NO	mg/kg	Low detection frequency; site and background datasets similar.
Molybdenum	10	10	100%	0.34	3.8	1.3	1.6	1.2	23	24	96%	0.12	1.1	0.50	0.50	0.27	1.0 E-2	8.8 E-3	1.6 E-4	1.1 E-3	YES	mg/kg	Multiple tests
Nickel	10	10	100%	9.9	23	20	18	5.0	24	24	100%	4.5	31	14	14	6.3	2.7 E-2	6.0 E-2	1.0 E+0	2.8 E-2	NO	mg/kg	Multiple tests
Niobium	0	10	0%	NA	NA	0.76	1.6	1.2	1	24	4%	4.0	4.0	0.76	0.90	0.66	6.6 E-2	6.7 E-2	1.0 E+0	9.9 E-3	NO	mg/kg	ND at Site.
Palladium	10	10	100%	0.18	0.73	0.38	0.42	0.19	24	24	100%	0.16	1.0	0.62	0.55	0.24	9.5 E-1	9.8 E-1	1.0 E+0	9.3 E-1	NO	mg/kg	Multiple tests
Phosphorus	10	10	100%	434	1350	949	894	283	24	24	100%	299	1370	843	794	295	1.8 E-1	8.3 E-1	1.0 E+0	2.5 E-1	NO	mg/kg	Multiple tests
Platinum	0	10	0%	NA	NA	0.010	0.034	0.031	2	24	8%	0.027	0.033	0.010	0.012	0.0057	2.6 E-2	4.8 E-2	1.0 E+0	1.8 E-2	NO	mg/kg	ND at Site.
Potassium	10	10	100%	2160	7340	3715	3837	1593	24	24	100%	1030	6190	2820	3070	1421	1.0 E-1	6.0 E-2	2.9 E-1	9.0 E-2	NO	mg/kg	Multiple tests
Selenium	2	10	20%	0.30	0.52	0.16	0.25	0.13	0	24	0%	NA	NA	0.16	0.16	0.0082	2.8 E-2	2.0 E-2	NA	9.9 E-2	YES	mg/kg	ND in background.
Silicon	10	10	100%	548	1620	990	1040	304	24	24	100%	188	1000	304	373	207	1.4 E-5	2.1 E-5	9.1 E-4	1.2 E-5	YES	mg/kg	Multiple tests
Silver	9	10	90%	0.11	0.33	0.20	0.21	0.082	24	24	100%	0.051	0.82	0.14	0.21	0.18	4.8 E-1	4.4 E-1	1.0 E+0	8.7 E-2	NO	mg/kg	Multiple tests
Sodium	10	10	100%	541	1310	1050	1037	240	24	24	100%	259	1200	460	610	290	1.2 E-4	3.1 E-2	2.0 E-2	4.7 E-4	YES	mg/kg	Multiple tests
Strontium	10	10	100%	118	555	166	203	128	24	24	100%	69	324	224	207	71	5.3 E-1	9.8 E-1	2.9 E-1	9.5 E-1	NO	mg/kg	Multiple tests
Thallium	2	10	20%	0.28	0.53	0.41	0.65	0.91	0	24	0%	NA	NA	0.10	0.10	0.0051	4.4 E-2	1.6 E-4	NA	9.0 E-5	YES	mg/kg	ND in background.
Tin	6	10	60%	0.58	0.90	0.68	0.64	0.23	20	24	83%	0.24	0.96	0.52	0.47	0.28	3.9 E-2	6.0 E-2	1.0 E+0	1.9 E-3	NO	mg/kg	Multiple tests
Titanium	10	10	100%	260	1190	647	649	277	24	24	100%	175	1000	565	503	200	7.6 E-2	6.0 E-2	2.9 E-1	3.2 E-2	NO	mg/kg	Multiple tests
Tungsten	4	10	40%	0.28	0.93	0.25	0.33	0.31	5	24	21%	0.26	0.58	0.10	0.16	0.13	6.4 E-2	2.3 E-1	8.0 E-2	1.1 E-2	YES	mg/kg	Low detection frequency; site max, mean and median greater than background.
Uranium	10	10	100%	2.2	14	3.6	4.7	3.5	24	24	100%	0.31	4.4	1.2	1.3	0.85	7.0 E-3	2.1 E-5	8.0 E-2	1.3 E-5	YES	mg/kg	Multiple tests
Vanadium	10	10	100%	22	61	37	38	12	24	24	100%	10	46	33	31	13	5.8 E-2	2.3 E-1	4.5 E-3	8.1 E-2	NO	mg/kg	Multiple tests

Appendix D
Summary of Background Metals Evaluation
Upper Muddy Creek Formation (UMCf) Dataset

Chemical	UMCf Site No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	UMCf Background No. of Detects	Total Samples	% Detects	Minimum Detect	Maximum Detect	Median	Mean	Standard Deviation	*t* Test *p*	Quantile Test *p*	Slippage Test *p*	WRS Test *p*	Greater than Bckrnd?	Units	Basis
Zinc	10	10	100%	24	177	52	61	44	24	24	100%	16	61	34	34	12	4.2 E-2	8.8 E-3	8.0 E-2	4.3 E-3	YES	mg/kg	Site max > 2 times max background.
Zirconium	9	10	90%	12	40	26	24	9.6	24	24	100%	6.2	37	18	20	8.5	1.1 E-1	2.3 E-1	2.9 E-1	4.4 E-2	NO	mg/kg	Multiple tests
Radium-226	10	10	100%	1.1	2.9	1.7	1.8	0.67	14	18	78%	0.75	1.6	1.0	1.0	0.21	8.9 E-4	3.3 E-3	2.6 E-3	8.8 E-5	YES	pCi/g	Multiple tests
Radium-228	9	10	90%	0.54	1.7	1.4	1.3	0.36	17	18	94%	0.99	1.6	1.3	1.3	0.17	5.2 E-1	1.8 E-1	1.2 E-1	3.2 E-1	NO	pCi/g	Multiple tests
Thorium-228	10	10	100%	0.47	1.7	1.4	1.3	0.42	24	24	100%	1.0	2.2	1.3	1.4	0.25	7.9 E-1	8.3 E-1	1.0 E+0	5.8 E-1	NO	pCi/g	Multiple tests
Thorium-230	10	10	100%	1.2	9.6	2.4	2.9	2.4	24	24	100%	0.50	2.1	0.98	1.0	0.33	1.9 E-2	2.1 E-5	1.6 E-4	8.2 E-6	YES	pCi/g	Multiple tests
Thorium-232	10	10	100%	0.47	18	1.2	2.8	5.4	24	24	100%	0.97	2.1	1.3	1.3	0.23	2.1 E-1	5.4 E-1	2.9 E-1	7.9 E-1	NO	pCi/g	Multiple tests
Uranium-233/234	10	10	100%	0.44	2.7	1.4	1.6	0.82	12	20	60%	0.63	1.8	1.0	1.1	0.25	1.5 E-2	5.6 E-2	7.7 E-3	2.0 E-1	YES	pCi/g	t-Test and slippage.
Uranium-235/236	7	10	70%	0.029	0.17	0.044	0.071	0.049	14	20	70%	0.029	0.10	0.039	0.043	0.024	9.0 E-2	2.3 E-1	3.0 E-2	5.7 E-2	NO	pCi/g	Multiple tests
Uranium-238	10	10	100%	0.34	2.7	1.3	1.6	0.88	11	20	55%	0.84	1.8	1.0	1.1	0.22	1.5 E-2	5.6 E-2	7.7 E-3	2.1 E-1	YES	pCi/g	t-Test and slippage.

Note: Summary and background comparison statistics were performed using one-half the detection limit for metals and using GISdT® (Neptune and Company 2007).
BOLD with Highlight indicates Site concentrations are greater than background.
WRS = Wilcoxon Rank Sum Test with the Gehan Modification
mg/kg - milligrams per kilogram
pCi/g - picoCuries per gram
Note: minimum and maximum values are for detected analytes only; mean and median values include non-detects.
p = significance level (compared to 0.025) (see text).
Greater than Background (YES/NO) is based on test results - see Basis column.

Appendix D
Summary of Background Metals Evaluation
Borings within each Dataset

Depth	Dataset	Borings
< 20 ft	McC Shallow	AA-UW-1 AA-UW-2 AA-UW-3 AA-UW-4 SB-01-B SB-27-A
< 20 ft	Mixed Shallow	AA-UW-5
< 20 ft	River Shallow	AA-UW-6

Depth	Dataset	Wells
>= 20 ft	McC Deep	AA-UW-1 AA-UW-2 AA-UW-3 AA-UW-4 SB-01-B SB-27-A
>= 20 ft	Mixed Deep	AA-UW-5
>= 20 ft	River Deep	AA-UW-6

Depth	Dataset	Wells
> contact	TMC	AA-UW-1 AA-UW-3 AA-UW-4 AA-UW-5 AA-UW-6 SB-01-B SB-27-A

Appendix E

Summary of Cation-Anion Balance and Related Calculations (2009)

Summary of Cation-Anion Balance and Related Calculations
2009 Groundwater Sampling Event - BMI Common Areas - Eastside

Well	Zone	pH	Major Ion Chemistry Data Input											TDS and EC Input		meq/l Calculations									
			Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	TDS Measured	EC Measured	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4
																20.04	12.16	22.99	39.10	61.02	30.01	48.03	35.50	19.00	61.91	99.50
			(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/L)	(umhos/cm)	(mg/meq) (meq/l)	(mg/meq) (meq/l)	(mg/meq) (meq/l)	(mg/meq) (meq/l)	(mg/meq) (meq/l)	(mg/meq) (meq/l)	(mg/meq) (meq/l)	(mg/meq) (meq/l)	(mg/meq) (meq/l)	(mg/meq) (meq/l)	(mg/meq) (meq/l)
AA-01	Shallow Upgradient	6.9	471	142	364	7.21	93		1640	719	1.2	10.9	1.9 D	3800	4560	23.50	11.68	15.83	0.18	1.52	0.00	34.15	20.25	0.06	0.18	0.02
AA-07	Shallow	7.0	266	87.8 J	224 J	42.1	84		956	261	0.68	10.6	0.4 D	2500	2800	13.27	7.22	9.74	1.08	1.38	0.00	19.90	7.35	0.04	0.17	0.00
AA-08	Shallow	7.2	454	208	657	32.9	163		1820	975	1.3	6.2	3.3 B D	3500	5840	22.65	17.11	28.58	0.84	2.67	0.00	37.89	27.46	0.07	0.10	0.03
AA-09	Shallow	7.5	538	294	923 J	30.5	69		2870	1090	0.54 B	14.4	6 D	6600	7390	26.85	24.18	40.15	0.78	1.13	0.00	59.75	30.70	0.03	0.23	0.06
AA-10	Shallow	7.2	404	200	633 J	36.2	148		1800	1030	1	7.4	4.3 D	4110	5890	20.16	16.45	27.53	0.93	2.43	0.00	37.48	29.01	0.05	0.12	0.04
AA-13	Shallow	7.1	260	114	439	23.2	199		1590	371 J	0.76	49.6	0.097 B D	1800	3630	12.97	9.38	19.10	0.59	3.26	0.00	33.10	10.45	0.04	0.80	0.00
AA-18	Shallow	7.5	110	57.2	156 J	16.8	95		401	208	0.68	10.8	0.11 D	350 U	1720	5.49	4.70	6.79	0.43	1.56	0.00	8.35	5.86	0.04	0.17	0.00
AA-20	Shallow	6.9	556	235	898 J	44.2	78 J		2540	1100	0.22	14.7	5.3 D	6400	7640 J	27.74	19.33	39.06	1.13	1.28	0.00	52.88	30.99	0.01	0.24	0.05
AA-21	Shallow	7.2	512	299	720 J	83.3	189		2800	994	1.6 B	7.4	0.052 B D	5600	7100	25.55	24.59	31.32	2.13	3.10	0.00	58.30	28.00	0.08	0.12	0.00
AA-23R	Shallow	7.4	635	159	408 J	62.7	90.4 J		1880	928	0.48	26.6	1.9 B D	2400	6010 J	31.69	13.08	17.75	1.60	1.48	0.00	39.14	26.14	0.03	0.43	0.02
AA-26	Shallow	7.5	252	90.9	356 J	44.1	70 J		1100	355	0.79	12.1	0.049 B D	600	3420 J	12.57	7.48	15.48	1.13	1.15	0.00	22.90	10.00	0.04	0.20	0.00
AA-27	Shallow Upgradient	7.6	513	192	535	8.58	126		2320	422	2	12.5	0.23 D	3300	4980	25.60	15.79	23.27	0.22	2.06	0.00	48.30	11.89	0.11	0.20	0.00
AA-30	Shallow	7.1	643	347	721 J	180	115 J		2630	1620	0.11	35.6	2.5 B D	5000	8610 J	32.09	28.54	31.36	4.60	1.88	0.00	54.76	45.63	0.01	0.58	0.03
AA-UW-1	Shallow Upgradient	5.8	541	219	353	8.55	90		2150	415 J	1.2	5	0.63 D	3100	4680	27.00	18.01	15.35	0.22	1.47	0.00	44.76	11.69	0.06	0.08	0.01
AA-UW-2	Shallow Upgradient	7.3	378	191	461 J	7.88	120		1970	512	0.9	10.2	0.099 D	4200	4740	18.86	15.71	20.05	0.20	1.97	0.00	41.02	14.42	0.05	0.16	0.00
AA-UW-3	Shallow Upgradient	7.7	338	221	979	16.1	81		3280	267	1	8.9	0.065 D	3500	9870	16.87	18.17	42.58	0.41	1.33	0.00	68.29	7.52	0.05	0.14	0.00
AA-UW-4	Shallow Upgradient	7.6	401	194	919	16	78		2920	304	0.81	12.6	0.077 D	4300	5700	20.01	15.95	39.97	0.41	1.28	0.00	60.80	8.56	0.04	0.20	0.00
AA-UW-4(FD)	Shallow Upgradient	7.6	397	190	914	16.1	81		2930	306	0.82	12.7	0.075 D	3700	5710	19.81	15.63	39.76	0.41	1.33	0.00	61.00	8.62	0.04	0.21	0.00
AA-UW-5	Shallow Upgradient	7.6	90.2	45.4	119	9.03	116 J		222	160	0.66	13.3	0.051 D	700	1400 J	4.50	3.73	5.18	0.23	1.90	0.00	4.62	4.51	0.03	0.21	0.00
AA-UW-5(FD)	Shallow Upgradient	7.5	91.8	46.9	122	9.08	116 J		227	166	0.66	12.9	0.056 D	600	1390 J	4.58	3.86	5.31	0.23	1.90	0.00	4.73	4.68	0.03	0.21	0.00
AA-UW-6	Shallow Upgradient	7.6	384	151	342	62.4	66		2240	201	0.57	8.8	0.05 D	3700	4280	19.16	12.42	14.88	1.60	1.08	0.00	46.64	5.66	0.03	0.14	0.00
BEC-6	Shallow	7.0	575 L	256	720	48.4	58 J		2400 J	1570	U	29.5	15 D	7300	5980 J	28.69	21.05	31.32	1.24	0.95	0.00	49.97	44.23	0.00	0.48	0.15
BEC-9	Shallow	7.1	716	283	514	49.2	134		1920	1290	0.62	40.4	0.27	5300	6650	35.73	23.27	22.36	1.26	2.20	0.00	39.98	36.34	0.03	0.65	0.00
COH-1	Middle	8.2	490 L	8190	18700	6380	100 J		44600 J	24800	U	U	U	117000	155000 J	24.45	673.52	813.40	163.17	1.64	0.00	928.59	698.59	0.00	0.00	0.00
COH-2	Middle	7.5	560	7400	17000 L	4830	95		35400	24600 J	U	U	U	89900	85000	27.94	608.55	739.45	123.53	1.56	0.00	737.04	692.96	0.00	0.00	0.00
COH-2A	Shallow	7.3	332	207	1130 J	45.9	350 J		1980	1410	0.76	1.1	5.4 D	3300	7510 J	16.57	17.02	49.15	1.17	5.74	0.00	41.22	39.72	0.04	0.02	0.05
DBMW-1	Shallow	7.1	587	269	759	59.5	63 J		2930	1090 J	0.61	9.5	6.7 D	8600	7490	29.29	22.12	33.01	1.52	1.03	0.00	61.00	30.70	0.03	0.15	0.07
DBMW-10	Shallow	5.3	223	88.7	273	63.6 J	89.6 J		985 J	338 J	0.59	9.8	0.5 D	3300	2800 J	11.13	7.29	11.87	1.63	1.47	0.00	20.51	9.52	0.03	0.16	0.01
DBMW-11	Shallow	7.4	699	519	839	279	64.4 J		3040 J	1870	U	19.8	14 B D	5400	10400 J	34.88	42.68	36.49	7.14	1.06	0.00	63.29	52.68	0.00	0.32	0.14
DBMW-12	Shallow	6.1	573	581	668	315	67.6 J		3350 J	1320	0.36 B	18.1	12 D	6600	8070 J	28.59	47.78	29.06	8.06	1.11	0.00	69.75	37.18	0.02	0.29	0.12
DBMW-12(FD)	Shallow	6.2	562	504	578	264	67.6 J		3240 J	1270	0.34 B	17.3	12 D	5800	8080 J	28.04	41.45	25.14	6.75	1.11	0.00	67.46	35.77	0.02	0.28	0.12
DBMW-13	Shallow	5.4	596	260	696	144 J	48 J		2700 J	901 J	U	16.9	9.7 D	7400	6660 J	29.74	21.38	30.27	3.68	0.79	0.00	56.21	25.38	0.00	0.27	0.10
DBMW-14	Shallow	5.5	626	228	644	142 J	58 J		2490 J	912 J	0.04 B	16.6	14 D	7100	6540 J	31.24	18.75	28.01	3.63	0.95	0.00	51.84	25.69	0.00	0.27	0.14
DBMW-15	Shallow	7.5	559	204	501	108	53.6 J		2550	375	0.3	8.4	1.3 B D	3700	5020 J	27.89	16.78	21.79	2.76	0.88	0.00	53.09	10.56	0.02	0.14	0.01
DBMW-16	Shallow	5.6	79.6	31.1	170	19.7	74 J		565 J	148 J	0.73	2.1	0.015 B D	1070	1020 J	3.97	2.56	7.39	0.50	1.21	0.00	11.76	4.17	0.04	0.03	0.00
DBMW-17	Shallow	6.4	267	65.6	261	27.3	496 J		1130 J	43.6 J	0.56	1.9	0.012 B D	700	1100 J	13.32	5.39	11.35	0.70	8.13	0.00	23.53	1.23	0.03	0.03	0.00
DBMW-19	Shallow	5.5	593	307	705	95.1	166 J		2660 J	1100	0.62 B	19.4	5.8 D	4300	7010 J	29.59	25.25	30.67	2.43	2.72	0.00	55.38	30.99	0.03	0.31	0.06
DBMW-2	Shallow	7.5	548	302 J	981 J	71.1 J	68.2 J		3240	1240	0.54	7	7.5 D	6400	7590	27.35	24.84	42.67	1.82	1.12	0.00	67.46	34.93	0.03	0.11	0.08
DBMW-20	Shallow	6.9	580	244	585	120	122 J		2120	961	0.22	17.4	3.2 B D	4100	6060 J	28.94	20.07	25.45	3.07	2.00	0.00	44.14	27.07	0.01	0.28	0.03
DBMW-22	Shallow	6.9	484 L	171	283	148	34 J		2400 J	271	0.33	1.1	0.13 D	5000	4010 J	24.15	14.06	12.31	3.79	0.56	0.00	49.97	7.63	0.02	0.02	0.00
DBMW-22(FD)	Shallow	6.8	478 L	170	286	147	33.2 J		2390 J	269	0.25	1.1	0.13 D	5100	3990 J	23.85	13.98	12.44	3.76	0.54	0.00	49.76	7.58	0.01	0.02	0.00
DBMW-3	Shallow	7.6	562	367 J	970 J	104 J	56.4 J		3230	1410	0.24	15.4	7.6 D	6600	8350	28.04	30.18	42.19	2.66	0.92	0.00	67.25	39.72	0.01	0.25	0.08
DBMW-4	Shallow	7.5	631	237	681	84.8	90.8 J		2610	952	0.092 B	27.7	4.1 D	4400	6590 J	31.49	19.49	29.62	2.17	1.49	0.00	54.34	26.82	0.00	0.45	0.04
DBMW-7	Shallow	5.3	658	289	617	71.8	65.2 J		2410	1430	U	42.7	3.1 D	6900	7510 J	32.83	23.77	26.84	1.84	1.07	0.00	50.18	40.28	0.00	0.69	0.03
DBMW-7 (FD)	Shallow	5.4	698	301	662	81.1	131 J		2420	1440	U	40.8	3.3 D	8100	7520 J	34.83	24.75	28.80	2.07	2.15	0.00	50.39	40.56	0.00	0.66	0.03
DBMW-9	Shallow	7.4	560	138	307	63.6	78.8 J		2010 J	398 J	0.58	16.6	1.3 D	6700	4360 J	27.94	11.35	13.35	1.63	1.29	0.00	41.85	11.21	0.03	0.27	0.01
DM-1	Shallow	5.8	570	168	570	13.8	273 J		2310 J	346	0.77	19.1	0.27 B D	2400	5020 J	28.44	13.82	24.79	0.35	4.47	0.00	48.09	9.75	0.04	0.31	0.00
HMW-09	Shallow	8.2	639 L	247	872	80.5	132 J		2720 J	1280	0.68 B	18.3	4.1 D	7800	5100 J	31.89	20.31	37.93	2.06	2.16	0.00	56.63	36.06	0.04	0.30	0.04
HMWWT-6	Shallow	7.7	134	75.3 J	180 J	6.6 J	79.6 J		435	375	0.66	15.3	0.069 D	1600	2240	6.69	6.19	7.83	0.17	1.30	0.00	9.06	10.56	0.03	0.25	0.00
MCF-01A	Deep	6.9	490	146 J	417 J	23.9	35		2530	121	0.24	U	0.00017 J	3900	4240	24.45	12.01	18.14	0.61	0.57	0.00	52.68	3.41	0.01	0.00	0.00
MCF-01B	Shallow	7.2	111	63.9	391	10.7	127		889	271	0.65	1.9	0.7 D	1990	2740	5.54	5.25	17.01	0.27	2.08	0.00	18.51	7.63	0.03	0.03	0.01
MCF-02A	Deep	7.6	21.2	6.49	166 J	10.1	72		183	124	0.81	1	0.00051	1100	974	1.06	0.53	7.22	0.26	1.18	0.00	3.81	3.49	0.04	0.02	0.00
MCF-02B	Middle	7.6	23.9	9.01	194 J	9.49	98		263	97.5	1.3	1.4	0.00013 J	2200	1090	1.19	0.74	8.44	0.24	1.61	0.00	5.48	2.75	0.07	0.02	0.00
MCF-03A	Deep	7.8	26.8	11.1	188 L	13	67		225	141 J	0.85	2.2	0.0011 B D	700	1170	1.34	0.91	8.18	0.33	1.10	0.00	4.68	3.97	0.04	0.04	0.00
MCF-03B	Shallow	7.8	150	88.2	532	12.9	130		1220	314	0.79	11.4	0.084 B D	1900	3360	7.49	7.25	23.14	0.33	2.13	0.00	25.40	8.85	0.04	0.18	0.00
MCF-04	Deep	7.3	496	131	719	90.9	41		2830 J	416	0.44	U	U	64700	5570	24.75	10.77	31.27	2.32	0.67	0.00	58.92	11.72	0.02	0.00	0.00
MCF-05	Middle	7.7	470	15300	19500	13300	127		80900 J	30900	U	U	U	180000	105000	23.45	1258.22	848.19	340.15	2.08	0.00	1684.36	870.42	0.00	0.00	0.00
MCF-06A-R	Deep	6.6	250	15800	37800 J	10800	90.4 J		70700	62000	U	U	U	178000	137000 J	12.48	1299.34	1644.19	276.21	1.48	0.00	1472.00	1746.48	0.00	0.00	0.00
MCF-06B	Shallow	8.2	475	3760	4120	3860	94		19600 J	8030	U	3.9	4.3 D	11500	39600	23.70	309.21	179.21	98.72	1.54	0.00	408.08	226.20	0.00	0.06	0.04

Summary of Cation-Anion Balance and Related Calculations
2009 Groundwater Sampling Event - BMI Common Areas - Eastside

Well	Zone	pH	Major Ion Chemistry Data Input											TDS and EC Input		meq/l Calculations										
			Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	TDS Measured	EC Measured	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4
																20.04	12.16	22.99	39.10	61.02	30.01	48.03	35.50	19.00	61.91	99.50
			(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/L)	(umhos/cm)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)
																(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)
MCF-06C	Shallow	7.3	663	357	688 J	217	66 J		2500	1720	U	47	4.1 B D	6200	8740 J	33.08	29.36	29.93	5.55	1.08	0.00	52.05	48.45	0.00	0.76	0.04
MCF-07	Deep	7.0	434	15200	29500 J	11900	137 J		83300	41500	U	U	0.093 D	166000	127000 J	21.66	1250.00	1283.17	304.35	2.25	0.00	1734.33	1169.01	0.00	0.00	0.00
MCF-08A	Deep	7.3	608	5650	26200	3010	98.4 J		26200	51200 J	U	U	U	99800	116000	30.34	464.64	1139.63	76.98	1.61	0.00	545.49	1442.25	0.00	0.00	0.00
MCF-08B-R	Middle	7.2	509	1890	5790 J	837	70		11400	7830	U	U	0.00013 J	24800	31400	25.40	155.43	251.85	21.41	1.15	0.00	237.35	220.56	0.00	0.00	0.00
MCF-08B-R (FD)	Middle	7.4	507	1800	5570 J	793	76		10900	7660	U	0.098 B	0.00024 J	30700	32900	25.30	148.03	242.28	20.28	1.25	0.00	226.94	215.77	0.00	0.00	0.00
MCF-09A	Deep	7.4	488	1880	5180	650	81		15900	5110	U	U	U	22100	27100	24.35	154.61	225.32	16.62	1.33	0.00	331.04	143.94	0.00	0.00	0.00
MCF-09B	Middle	7.3	445	123	401	45	71		2150	149	0.72	0.023	U	3000	3910	22.21	10.12	17.44	1.15	1.16	0.00	44.76	4.20	0.04	0.00	0.00
MCF-09B(FD)	Middle	7.3	431	118	389	42.8	70		2120	146	0.79	U	U	2200	3920	21.51	9.70	16.92	1.09	1.15	0.00	44.14	4.11	0.04	0.00	0.00
MCF-10A	Deep	7.8	528	235	1320	176	36 J		3920	1620 J	0.2	U	0.000031 J	4200	9430	26.35	19.33	57.42	4.50	0.59	0.00	81.62	45.63	0.01	0.00	0.00
MCF-10B	Middle	7.5	253	102	237	38.9	51		1140	205	0.39	0.093	0.00032 J	2200	2700	12.62	8.39	10.31	0.99	0.84	0.00	23.74	5.77	0.02	0.00	0.00
MCF-11	Middle	7.4	425	129	459	63.5	100		1960	348	1.2	U	0.1 U	2700	4190	21.21	10.61	19.97	1.62	1.64	0.00	40.81	9.80	0.06	0.00	0.00
MCF-12A	Deep	7.4	518	204	1040	398	77		3440	931	0.32	U	0.000049 J	7300	7820	25.85	16.78	45.24	10.18	1.26	0.00	71.62	26.23	0.02	0.00	0.00
MCF-12B	Shallow	7.4	302	136	326 J	82	58		1560	317	0.52	6.6	4 D	2900	3640	15.07	11.18	14.18	2.10	0.95	0.00	32.48	8.93	0.03	0.11	0.04
MCF-12C	Middle	7.2	209	82.5	207 J	73.9	72		1230	115	0.47	1.5	0.43 D	1000	2520	10.43	6.78	9.00	1.89	1.18	0.00	25.61	3.24	0.02	0.02	0.00
MCF-16B	Middle	7.8	543	6020	3360	16300	146 J		42800	2450	U	U	0.0055 J B D	64300	55700 J	27.10	495.07	146.15	416.88	2.39	0.00	891.11	69.01	0.00	0.00	0.00
MCF-16C	Shallow	7.4	601	600	602	308	83.6 J		6290	1050	0.43 B	16.6	8.7 B D	11500	11200 J	29.99	49.34	26.19	7.88	1.37	0.00	130.96	29.58	0.02	0.27	0.09
MCF-18A	Deep	6.4	2670	2680	58900 J	7090	28 J		3590	114000	U	U	0.0061 J D	163000	196000 J	133.23	220.39	2561.98	181.33	0.46	0.00	74.74	3211.27	0.00	0.00	0.00
MCF-18A (FD)	Deep	6.1	2660	2760	60000 J	7310	27.6 J		3500	112000	U	U	0.0092 J D	173000	195000 J	132.73	226.97	2609.83	186.96	0.45	0.00	72.87	3154.93	0.00	0.00	0.00
MCF-19A	Deep	7.6	417	9270 J	20600 J	4920 J	116 J		56400	31900	U	U	U	115000	100000	20.81	762.34	896.04	125.83	1.90	0.00	1174.27	898.59	0.00	0.00	0.00
MCF-19A FD	Deep	7.6	467	10300 J	23600 J	5410 J	116 J		58200	33000	U	U	U	119000	101000	23.30	847.04	1026.53	138.36	1.90	0.00	1211.74	929.58	0.00	0.00	0.00
MCF-20A	Deep	6.8	392	12200 J	29500 J	9470 J	90 J		70100	61300	U	U	U	174000	3840	19.56	1003.29	1283.17	242.20	1.47	0.00	1459.50	1726.76	0.00	0.00	0.00
MCF-21A	Deep	7.2	574	12700	14900	12900	135		68600	16300	U	U	U	119000	86900	28.64	1044.41	648.11	329.92	2.21	0.00	1428.27	459.15	0.00	0.00	0.00
MCF-22A	Deep	6.8	521 J	109 J	268 J	119 J	79.2 J		2450 J	134	0.68	U	U	4400	3800 J	26.00	8.96	11.66	3.04	1.30	0.00	51.01	3.77	0.04	0.00	0.00
MCF-23A	Deep	6.0	512 J	7400	14700 J	3620	82.4 J		37700 J	15800	U	U	U	77300	68500 J	25.55	608.55	639.41	92.58	1.35	0.00	784.93	445.07	0.00	0.00	0.00
MCF-24A	Deep	6.2	512	12200	7950	15300	141		75100 J	10600	U	U	U	5300	77400	25.55	1003.29	345.80	391.30	2.31	0.00	1563.61	298.59	0.00	0.00	0.00
MCF-24B	Middle	6.3	324 J	2520	1470 J	4750	134 J		17400 J	1460	U	0.59	0.0045 J D	27500	25500 J	16.17	207.24	63.94	121.48	2.20	0.00	362.27	41.13	0.00	0.01	0.00
MCF-25A	Deep	6.3	470	157	1060	162	75		3660 J	601	0.25	U	U	148000	9220	23.45	12.91	46.11	4.14	1.23	0.00	76.20	16.93	0.01	0.00	0.00
MCF-27	Deep	7.8	69.2	21.7	235	13.3	68 J		477	89.8	0.75	0.95	0.00079	600	1530 J	3.45	1.78	10.22	0.34	1.11	0.00	9.93	2.53	0.04	0.02	0.00
MCF-28B	Middle	7.4	565	3850	9880	2190	80.4 J		22900 J	14800	U	U	U	45300	54900 J	28.19	316.61	429.75	56.01	1.32	0.00	476.79	416.90	0.00	0.00	0.00
MCF-29B	Middle	7.5	538 J	9910 J	24800 J	11500 J	116 J		53200 J	35100	U	U	U	119000	107000 J	26.85	814.97	1078.73	294.12	1.90	0.00	1107.64	988.73	0.00	0.00	0.00
MCF-30A	Deep	8.6	571 J	8700	41200 J	8690	147 J	102 J	27400 J	99600	U	U	U	175000	180000 J	28.49	715.46	1792.08	222.25	2.41	3.40	570.48	2805.63	0.00	0.00	0.00
MCF-30B	Middle	8.8	470 J	11700	31100 J	9990	186 J	120 J	66700 J	58700	U	U	U	168000	137000 J	23.45	962.17	1352.76	255.50	3.05	4.00	1388.72	1653.52	0.00	0.00	0.00
MCF-31B	Middle	7.4	615 J	7160 J	24300 J	4230 J	126 J		31100 J	38400	U	U	U	89700	98400 J	30.69	588.82	1056.98	108.18	2.06	0.00	647.51	1081.69	0.00	0.00	0.00
MCF-32B	Middle	6.0	518	164	494	142	62.8 J		3190 J	342 J	0.23	0.0092 B	0.019 B D	2900	3210 J	25.85	13.49	21.49	3.63	1.03	0.00	66.42	9.63	0.01	0.00	0.00
MW-13	Shallow	7.0	526	207	531 J	117	128 J		2070	908 J	0.51	21	2.1 D	3700	5840 J	26.25	17.02	23.10	2.99	2.10	0.00	43.10	25.58	0.03	0.34	0.02
MW-15	Shallow	7.3	409	184	710 J	74.3	151 J		2450	472 J	2.5	0.026	0.000084 J	4300	5170 J	20.41	15.13	30.88	1.90	2.47	0.00	51.01	13.30	0.13	0.00	0.00
MW-3	Shallow	7.4	443	202	769 J	76.3	89 J		1990	1200	1.1	U	0.1 B D	3100	6840 J	22.11	16.61	33.45	1.95	1.46	0.00	41.43	33.80	0.06	0.00	0.00
MW-4	Shallow	7.4	518	974	2140	808	69 J		6880	4910	0.36 B	13.8	9.4 D	14400	17200 J	25.85	80.10	93.08	20.66	1.13	0.00	143.24	138.31	0.02	0.22	0.09
PC-108	Shallow	6.2	263	95.6	641	19.7	420 J		780	827	1.1	U	0.00064	1700	4430 J	13.12	7.86	27.88	0.50	6.88	0.00	16.24	23.30	0.06	0.00	0.00
PC-2	Shallow	7.4	453	305	989 J	60.6	87		2960	1130	0.59	11.4	4.8 D	6000	7460	22.60	25.08	43.02	1.55	1.43	0.00	61.63	31.83	0.03	0.18	0.05
PC-24	Shallow	7.1	835	379	1750 J	24.1	83		2100	3630 J	0.8 B	39.2	19 D	9800	13400	41.67	31.17	76.12	0.62	1.36	0.00	43.72	102.25	0.04	0.63	0.19
PC-28	Shallow	7.4	628	231	1130 J	10.6	93		2870	1200 J	0.77 B	41.9	500 D	6600	8440	31.34	19.00	49.15	0.27	1.52	0.00	59.75	33.80	0.04	0.68	5.03
PC-4	Shallow	7.0	574	341	1160 J	129	95		3110	1630	0.42	25.8	7.5 D	7400	9140	28.64	28.04	50.46	3.30	1.56	0.00	64.75	45.92	0.02	0.42	0.08
PC-67	Shallow	5.6	709	349	2940 J	25.2	144 J		3120	4300	1.4	48	53 B D	11000	18400 J	35.38	28.70	127.88	0.64	2.36	0.00	64.96	121.13	0.07	0.78	0.53
PC-76	Shallow	7.4	418	232	649 J	37.1	187 J		2010	908	0.93	2.7	0.84 D	4400	5820 J	20.86	19.08	28.23	0.95	3.06	0.00	41.85	25.58	0.05	0.04	0.01
PC-79	Shallow	7.3	282	112	558	22.5	202		1110	687	1.1	0.64	3 D	4400	4330	14.07	9.21	24.27	0.58	3.31	0.00	23.11	19.35	0.06	0.01	0.03
PC-80	Shallow	7.3	191	48.9	480	20.3	284		614	494	1.7	0.012	0.038 D	2500	3210	9.53	4.02	20.88	0.52	4.65	0.00	12.78	13.92	0.09	0.00	0.00
PC-81	Shallow	7.3	121	54.9	725	27.4	324 J		971	703	3.7	0.019 B	0.02 U	1300	3960	6.04	4.51	31.54	0.70	5.31	0.00	20.22	19.80	0.19	0.00	0.00
PC-88	Shallow	7.1	263	109	1150	30.1	271 J		1320	1460	1.5	6.1	7.5 D	5700	6320	13.12	8.96	50.02	0.77	4.44	0.00	27.48	41.13	0.08	0.10	0.08
PC-94	Shallow	7.1	628	259	780 J	61.5	116 J		2700	1190	0.66	19.3	5.7 B D	3100	7790 J	31.34	21.30	33.93	1.57	1.90	0.00	56.21	33.52	0.03	0.31	0.06
POD2-R	Shallow	7.4	685	235	1080	27.7	103 J		2560	1570	0.92	20.7	7.9 D	5500	8870 J	34.18	19.33	46.98	0.71	1.69	0.00	53.30	44.23	0.05	0.33	0.08
POD-8	Shallow	6.9	370	225 J	539 J	32.5 J	197 J		1900	753	0.72	25.4	0.31 D	900	5270	18.46	18.50	23.44	0.83	3.23	0.00	39.56	21.21	0.04	0.41	0.00
POU-3	Shallow	7.4	806	378	1740	33.7	64.8 J		2460	2530	U	12.2	27 D	7600	11200 J	40.22	31.09	75.69	0.86	1.06	0.00	51.22	71.27	0.00	0.20	0.27
WMW5.58SD	Shallow	7.5	473	11600	21300 J	14800	304 J		67700	28000	U	U	0.083 B D	142000	112000 J	23.60	953.95	926.49	378.52	4.98	0.00	1409.54	788.73	0.00	0.00	0.00
WMW5.58SD (FD)	Shallow	7.5	424	9080	17000 J	11700	305 J		67600	28400	U	U	0.067 B D	138000	114000 J	21.16	746.71	739.45	299.23	5.00	0.00	1407.45	800.00	0.00	0.00	0.00
WMW5.58SI	Shallow	7.5	146	59.4 J	369 J	28.9 J	176 J		600	379	1.1	10.6	0.37 D	1100	133000	7.29	4.88	16.05	0.74	2.88	0.00	12.49	10.68	0.06	0.17	0.00
WMW5.58SS	Shallow	7.5	117	52.3 J	252 J	28 J	153 J		503	307	0.86	13.9	0.012 D	1000	2220	5.84	4.30	10.96	0.72	2.51	0.00	10.47	8.65	0.05	0.22	0.00

Well	Cation-Anion Balance Tests					TDS Checks			Lab TDS and EC		Qualifier
	Sum Cations (meq/l)	Sum Anions (meq/l)	(Cat-An)/ (Cat+An) (%)	Acceptable Variance <5%?		TDS Sum (mg/l)	Lab/Sum Ratio -	Acceptable Ratio 1.0 - 1.2	Lab TDS / EC Ratio -	Acceptable Range 0.55 - 0.70	
AA-01	51.20	56.18	4.64	PASS		3413.01	1.11	PASS	0.83	FAIL	J-TDS
AA-07	31.31	28.84	4.11	PASS		1898.98	1.32	FAIL	0.89	FAIL	J-TDS
AA-08	69.18	68.23	0.69	PASS		4255.50	0.82	FAIL	0.60	PASS	J-TDS
AA-09	91.95	91.91	0.02	PASS		5807.84	1.14	PASS	0.89	FAIL	J-TDS
AA-10	65.07	69.13	3.03	PASS		4204.70	0.98	FAIL	0.70	PASS	J-TDS
AA-13	42.04	47.66	6.27	FAIL		2967.06	0.61	FAIL	0.50	FAIL	R-CAB&TDS
AA-18	17.41	15.98	4.29	PASS		1017.59	0.34	FAIL	0.20	FAIL	J-TDS
AA-20	87.26	85.45	1.05	PASS		5440.22	1.18	PASS	0.84	FAIL	J-TDS
AA-21	83.59	89.60	3.47	PASS		5530.75	1.01	PASS	0.79	FAIL	J-TDS
AA-23R	64.11	67.24	2.38	PASS		4155.92	0.58	FAIL	0.40	FAIL	J-TDS
AA-26	36.66	34.29	3.35	PASS		2252.94	0.27	FAIL	0.18	FAIL	J-TDS
AA-27	64.88	62.56	1.82	PASS		4080.91	0.81	FAIL	0.66	PASS	J-TDS
AA-30	96.59	102.88	3.16	PASS		6248.21	0.80	FAIL	0.58	PASS	J-TDS
AA-UW-1	60.58	58.08	2.11	PASS		3747.38	0.83	FAIL	0.66	PASS	J-TDS
AA-UW-2	54.82	57.62	2.49	PASS		3603.08	1.17	PASS	0.89	FAIL	J-TDS
AA-UW-3	78.04	77.34	0.45	PASS		5159.67	0.68	FAIL	0.35	FAIL	J-TDS
AA-UW-4	76.35	70.88	3.71	PASS		4814.29	0.89	FAIL	0.75	FAIL	J-TDS
AA-UW-4(FD)	75.60	71.20	3.00	PASS		4815.30	0.77	FAIL	0.65	PASS	J-TDS
AA-UW-5	13.64	11.28	9.48	FAIL		729.24	0.96	FAIL	0.50	FAIL	R-CAB&TDS
AA-UW-5(FD)	13.98	11.55	9.52	FAIL		746.00	0.80	FAIL	0.43	FAIL	R-CAB&TDS
AA-UW-6	48.05	53.55	5.42	FAIL		3429.42	1.08	PASS	0.86	FAIL	R-CAB&TDS
BEC-6	82.30	95.77	7.56	FAIL		5648.70	1.29	FAIL	1.22	FAIL	R-CAB&TDS
BEC-9	82.62	79.20	2.11	PASS		4893.89	1.08	PASS	0.80	FAIL	J-TDS
COH-1	1674.54	1628.82	1.38	PASS	1	103220.00	1.13	PASS	0.75	FAIL	J-TDS
COH-2	1499.48	1431.55	2.32	PASS	1	89847.00	1.00	PASS	1.06	FAIL	J-TDS
COH-2A	83.92	86.79	1.68	PASS		5322.16	0.62	FAIL	0.44	FAIL	J-TDS
DBMW-1	85.95	92.99	3.94	PASS		5749.11	1.50	FAIL	1.15	FAIL	J-TDS
DBMW-10	31.92	31.69	0.36	PASS		2035.95	1.62	FAIL	1.18	FAIL	J-TDS
DBMW-11	121.19	117.49	1.55	PASS		7318.44	0.74	FAIL	0.52	FAIL	J-TDS
DBMW-12	113.48	108.47	2.26	PASS		6878.02	0.96	FAIL	0.82	FAIL	J-TDS
DBMW-12(FD)	101.38	104.76	1.64	PASS		6488.20	0.89	FAIL	0.72	FAIL	J-TDS
DBMW-13	85.08	82.75	1.39	PASS		5352.40	1.38	FAIL	1.11	FAIL	J-TDS
DBMW-14	81.63	78.89	1.71	PASS		5107.44	1.39	FAIL	1.09	FAIL	J-TDS
DBMW-15	69.22	64.70	3.38	PASS		4339.16	0.85	FAIL	0.74	FAIL	J-TDS
DBMW-16	14.43	17.22	8.82	FAIL		1060.65	1.01	PASS	1.05	FAIL	R-CAB&TDS
DBMW-17	30.77	32.94	3.41	PASS		2094.57	0.33	FAIL	0.64	PASS	J-TDS
DBMW-19	87.94	89.49	0.88	PASS		5585.52	0.77	FAIL	0.61	PASS	J-TDS
DBMW-2	96.67	103.72	3.52	PASS		6438.06	0.99	FAIL	0.84	FAIL	J-TDS
DBMW-20	77.52	73.53	2.64	PASS		4704.02	0.87	FAIL	0.68	PASS	J-TDS
DBMW-22	54.31	58.20	3.46	PASS		3778.96	1.32	FAIL	1.25	FAIL	J-TDS
DBMW-22(FD)	54.03	57.91	3.47	PASS		3761.40	1.36	FAIL	1.28	FAIL	J-TDS
DBMW-3	103.08	108.23	2.44	PASS		6700.08	0.99	FAIL	0.79	FAIL	J-TDS
DBMW-4	82.77	83.14	0.22	PASS		5282.17	0.83	FAIL	0.67	PASS	J-TDS
DBMW-7	85.27	92.25	3.93	PASS		5560.72	1.24	FAIL	0.92	FAIL	J-TDS
DBMW-7 (FD)	90.45	93.79	1.81	PASS		5724.80	1.41	FAIL	1.08	FAIL	J-TDS
DBMW-9	54.27	54.66	0.36	PASS		3542.36	1.89	FAIL	1.54	FAIL	J-TDS
DM-1	67.41	62.67	3.64	PASS		4161.74	0.58	FAIL	0.48	FAIL	J-TDS
HMW-09	92.19	95.22	1.62	PASS		5940.78	1.31	FAIL	1.53	FAIL	J-TDS
HMWWT-6	20.88	21.21	0.78	PASS		1269.69	1.26	FAIL	0.71	FAIL	J-TDS
MCF-01A	55.21	56.67	1.31	PASS		3749.14	1.04	PASS	0.92	FAIL	J-TDS
MCF-01B	28.07	28.30	0.39	PASS		1816.05	1.10	PASS	0.73	FAIL	J-TDS
MCF-02A	9.07	8.54	3.00	PASS		555.80	1.98	FAIL	1.13	FAIL	J-TDS
MCF-02B	10.61	9.92	3.39	PASS		658.40	3.34	FAIL	2.02	FAIL	J-TDS
MCF-03A	10.76	9.83	4.49	PASS		648.15	1.08	PASS	0.60	PASS	
MCF-03B	38.21	36.60	2.15	PASS		2407.37	0.79	FAIL	0.57	PASS	J-TDS
MCF-04	69.12	71.33	1.57	PASS		4707.94	13.74	FAIL	11.62	FAIL	J-TDS
MCF-05	2470.03	2556.87	1.73	PASS	1	160446.20	1.12	PASS	1.71	FAIL	J-TDS
MCF-06A-R	3232.23	3219.96	0.19	PASS	1	197404.24	0.90	FAIL	1.30	FAIL	J-TDS
MCF-06B	610.84	635.92	2.01	PASS		39909.60	0.29	FAIL	0.29	FAIL	J-TDS

Well	Cation-Anion Balance Tests					TDS Checks			Lab TDS and EC		Qualifier
	Sum Cations (meq/l)	Sum Anions (meq/l)	(Cat-An)/ (Cat+An) (%)	Acceptable Variance <5%?		TDS Sum (mg/l)	Lab/Sum Ratio -	Acceptable Ratio 1.0 - 1.2	Lab TDS / EC Ratio -	Acceptable Range 0.55 - 0.70	
MCF-06C	97.92	102.38	2.23	PASS		6235.70	0.99	FAIL	0.71	FAIL	J-TDS
MCF-07	2859.17	2905.59	0.81	PASS	1	181916.29	0.91	FAIL	1.31	FAIL	J-TDS
MCF-08A	1711.59	1989.36	7.51	FAIL	1	112927.04	0.88	FAIL	0.86	FAIL	R-CAB&TDS
MCF-08B-R	454.08	459.06	0.55	PASS		28298.00	0.88	FAIL	0.79	FAIL	J-TDS
MCF-08B-R (FD)	435.89	443.96	0.92	PASS		27275.70	1.13	PASS	0.93	FAIL	J-TDS
MCF-09A	420.90	476.31	6.18	FAIL		29256.60	0.76	FAIL	0.82	FAIL	R-CAB&TDS
MCF-09B	50.91	50.16	0.74	PASS		3356.34	0.89	FAIL	0.77	FAIL	J-TDS
MCF-09B(FD)	49.23	49.44	0.22	PASS		3289.59	0.67	FAIL	0.56	PASS	J-TDS
MCF-10A	107.59	127.85	8.60	FAIL		7820.80	0.54	FAIL	0.45	FAIL	R-CAB&TDS
MCF-10B	32.32	30.37	3.11	PASS		2006.98	1.10	PASS	0.81	FAIL	J-TDS
MCF-11	53.41	52.31	1.03	PASS		3445.80	0.78	FAIL	0.64	PASS	J-TDS
MCF-12A	98.04	99.13	0.55	PASS		6577.52	1.11	PASS	0.93	FAIL	J-TDS
MCF-12B	42.53	42.53	0.00	PASS		2768.92	1.05	PASS	0.80	FAIL	J-TDS
MCF-12C	28.11	30.08	3.39	PASS		1963.00	0.51	FAIL	0.40	FAIL	J-TDS
MCF-16B	1085.19	962.52	5.99	FAIL	1	71560.61	0.90	FAIL	1.15	FAIL	R-CAB&TDS
MCF-16C	113.39	162.29	17.73	FAIL		9526.89	1.21	FAIL	1.03	FAIL	R-CAB&TDS
MCF-18A	3096.94	3286.47	2.97	PASS	1	188946.81	0.86	FAIL	0.83	FAIL	J-TDS
MCF-18A (FD)	3156.50	3228.25	1.12	PASS	1	188246.57	0.92	FAIL	0.89	FAIL	J-TDS
MCF-19A	1805.02	2074.76	6.95	FAIL	1	123576.60	0.93	FAIL	1.15	FAIL	R-CAB&TDS
MCF-19A FD	2035.24	2143.22	2.58	PASS	1	131046.60	0.91	FAIL	1.18	FAIL	J-TDS
MCF-20A	2548.22	3187.74	11.15	FAIL	1	183016.00	0.95	FAIL	45.31	FAIL	R-CAB&TDS
MCF-21A	2051.08	1889.64	4.10	PASS	1	126055.00	0.94	FAIL	1.37	FAIL	J-TDS
MCF-22A	49.66	56.12	6.10	FAIL		3649.20	1.21	FAIL	1.16	FAIL	R-CAB&TDS
MCF-23A	1366.09	1231.35	5.19	FAIL	1	79781.44	0.97	FAIL	1.13	FAIL	R-CAB&TDS
MCF-24A	1765.95	1864.51	2.71	PASS	1	121746.60	0.04	FAIL	0.07	FAIL	J-TDS
MCF-24B	408.83	405.61	0.40	PASS		28004.99	0.98	FAIL	1.08	FAIL	J-TDS
MCF-25A	86.61	94.37	4.29	PASS		6155.25	24.04	FAIL	16.05	FAIL	J-TDS
MCF-27	15.80	13.63	7.37	FAIL		948.50	0.63	FAIL	0.39	FAIL	R-CAB&TDS
MCF-28B	830.57	895.00	3.73	PASS	1	54233.24	0.84	FAIL	0.83	FAIL	J-TDS
MCF-29B	2214.66	2098.27	2.70	PASS	1	135117.60	0.88	FAIL	1.11	FAIL	J-TDS
MCF-30A	2758.29	3381.92	10.16	FAIL	1	186310.40	0.94	FAIL	0.97	FAIL	R-CAB&TDS
MCF-30B	2593.88	3049.28	8.07	FAIL	1	178843.60	0.94	FAIL	1.23	FAIL	R-CAB&TDS
MCF-31B	1784.67	1731.27	1.52	PASS	1	105880.60	0.85	FAIL	0.91	FAIL	J-TDS
MCF-32B	64.45	77.09	8.93	FAIL		4887.94	0.59	FAIL	0.90	FAIL	R-CAB&TDS
MW-13	69.36	71.16	1.28	PASS		4459.41	0.83	FAIL	0.63	PASS	J-TDS
MW-15	68.32	66.91	1.04	PASS		4392.43	0.98	FAIL	0.83	FAIL	J-TDS
MW-3	74.12	76.75	1.75	PASS		4734.90	0.65	FAIL	0.45	FAIL	J-TDS
MW-4	219.70	283.02	12.60	FAIL		16294.96	0.88	FAIL	0.84	FAIL	R-CAB&TDS
PC-108	49.37	46.48	3.02	PASS		2879.40	0.59	FAIL	0.38	FAIL	J-TDS
PC-2	92.26	95.15	1.54	PASS		5966.59	1.01	PASS	0.80	FAIL	J-TDS
PC-24	149.57	148.20	0.46	PASS		8826.90	1.11	PASS	0.73	FAIL	J-TDS
PC-28	99.76	100.82	0.53	PASS		6668.07	0.99	FAIL	0.78	FAIL	J-TDS
PC-4	110.44	112.74	1.03	PASS		7034.72	1.05	PASS	0.81	FAIL	J-TDS
PC-67	192.61	189.83	0.73	PASS		11632.00	0.95	FAIL	0.60	PASS	J-TDS
PC-76	69.12	70.59	1.06	PASS		4370.77	1.01	PASS	0.76	FAIL	J-TDS
PC-79	48.13	45.87	2.40	PASS		2897.44	1.52	FAIL	1.02	FAIL	J-TDS
PC-80	34.95	31.44	5.28	FAIL		2020.35	1.24	FAIL	0.78	FAIL	R-CAB&TDS
PC-81	42.79	45.52	3.10	PASS		2800.44	0.46	FAIL	0.33	FAIL	J-TDS
PC-88	72.88	73.30	0.29	PASS		4509.80	1.26	FAIL	0.90	FAIL	J-TDS
PC-94	88.14	92.04	2.17	PASS		5713.76	0.54	FAIL	0.40	FAIL	J-TDS
POD2-R	101.19	99.68	0.76	PASS		6249.02	0.88	FAIL	0.62	PASS	J-TDS
POD-8	61.24	64.45	2.55	PASS		3964.13	0.23	FAIL	0.17	FAIL	J-TDS
POU-3	147.85	124.02	8.77	FAIL		8025.78	0.95	FAIL	0.68	PASS	R-CAB&TDS
WMW5.58SD	2282.56	2203.25	1.77	PASS	1	144055.48	0.99	FAIL	1.27	FAIL	J-TDS
WMW5.58SD (FD)	1806.55	2212.45	10.10	FAIL	1	134387.07	1.03	PASS	1.21	FAIL	R-CAB&TDS
WMW5.58SI	28.96	26.29	4.84	PASS		1699.97	0.65	FAIL	0.01	FAIL	J-TDS
WMW5.58SS	21.82	21.90	0.19	PASS		1365.87	0.73	FAIL	0.45	FAIL	J-TDS

Total Samples:	116		116		116	
Passing:	93		23		18	
Failing:	23		93		98	
% Usable						80.17

Summary of Cation-Anion Balance and Related Calculations
2009 Groundwater Sampling Event - BMI Common Areas - Eastside
Large Anion Sum Cation-Anion Balance

Well	pH	Major Ion Chemistry Data Input											TDS and Temperature		Density	molality (mol/kg) Calculations									Cation-Anion Balance Tests			
		Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	Temperature Measured	TDS Measured	Density Calculated	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	Sum Cation (molality * valence)	Sum Anions (molality * valence)	Charge Balance Error	Acceptable Variance <5%?
																40.078	24.305	22.9898	39.0983	61.0168	60.089	96.0626	35.453	18.998	62.0049	99.4506				
		(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	˚C	(mg/L)	(kg/L)	(g/mol)	(g/mol)	(g/mol)	(g/mol)	(g/mol)	(g/mol)	(g/mol)	(g/mol)	(g/mol)	(g/mol)	(g/mol)	(meq/kg)	(meq/kg)	(%)	
COH-1	8.2	490 L	8190	18700	6380	100 J		44600 J	24800	U	U	U	23.0	117000	1.088	1.12E-02	3.10E-01	7.48E-01	1.50E-01	1.51E-03	0.00E+00	4.27E-01	6.43E-01	0.00E+00	0.00E+00	0.00E+00	1.54	1.50	1.37	PASS
COH-2	7.5	560	7400	17000 L	4830	95		35400	24600 J	U	U	U	26.6	89900	1.065	1.31E-02	2.86E-01	6.94E-01	1.16E-01	1.46E-03	0.00E+00	3.46E-01	6.51E-01	0.00E+00	0.00E+00	0.00E+00	1.41	1.34	2.30	PASS
MCF-05	7.7	470	15300	19500	13300	127		80900 J	30900	U	U	U	28.53	180000	1.138	1.03E-02	5.53E-01	7.46E-01	2.99E-01	1.83E-03	0.00E+00	7.40E-01	7.66E-01	0.00E+00	0.00E+00	0.00E+00	2.17	2.25	1.73	PASS
MCF-06A-R	6.6	250	15800	37800 J	10800	90.4 J		70700	62000	U	U	U	(2)	178000	1.138	5.48E-03	5.71E-01	1.44E+00	2.43E-01	1.30E-03	0.00E+00	6.46E-01	1.54E+00	0.00E+00	0.00E+00	0.00E+00	2.84	2.83	0.17	PASS
MCF-07	7.0	434	15200	29500 J	11900	137 J		83300	41500	U	U	0.093 D	25.4	166000	1.127	9.61E-03	5.55E-01	1.14E+00	2.70E-01	1.99E-03	0.00E+00	7.69E-01	1.04E+00	0.00E+00	0.00E+00	8.30E-07	2.54	2.58	0.82	PASS
MCF-08A	7.3	608	5650	26200	3010	98.4 J		26200	51200 J	U	U	U	29.2	99800	1.072	1.42E-02	2.17E-01	1.06E+00	7.18E-02	1.50E-03	0.00E+00	2.54E-01	1.35E+00	0.00E+00	0.00E+00	0.00E+00	1.60	1.86	7.54	FAIL
MCF-16B	7.8	543	6020	3360	16300	146 J		42800	2450	U	U	0.0055 J B D	29.33	64300	1.044	1.30E-02	2.37E-01	1.40E-01	3.99E-01	2.29E-03	0.00E+00	4.27E-01	6.62E-02	0.00E+00	0.00E+00	5.30E-08	1.04	0.92	6.00	FAIL
MCF-18A	6.4	2670	2680	58900 J	7090	28 J		3590	114000	U	U	0.0061 J D	23.7	163000	1.126	5.92E-02	9.80E-02	2.28E+00	1.61E-01	4.08E-04	0.00E+00	3.32E-02	2.86E+00	0.00E+00	0.00E+00	5.45E-08	2.75	2.92	3.03	PASS
MCF-18A (FD)	6.1	2660	2760	60000 J	7310 J	27.6 J		3500	112000	U	U	0.0092 J D	23.7	173000	1.134	5.85E-02	1.00E-01	2.30E+00	1.65E-01	3.99E-04	0.00E+00	3.21E-02	2.79E+00	0.00E+00	0.00E+00	8.16E-08	2.78	2.85	1.19	PASS
MCF-19A	7.6	417	9270 J	20600 J	4920 J	116 J		56400	31900	U	U	U	28.51	115000	1.084	9.60E-03	3.52E-01	8.27E-01	1.16E-01	1.75E-03	0.00E+00	5.42E-01	8.30E-01	0.00E+00	0.00E+00	0.00E+00	1.67	1.91	6.97	FAIL
MCF-19A FD	7.6	467	10300 J	23600 J	5410 J	116 J		58200	33000	U	U	U	28.51	119000	1.087	1.07E-02	3.90E-01	9.44E-01	1.27E-01	1.75E-03	0.00E+00	5.57E-01	8.56E-01	0.00E+00	0.00E+00	0.00E+00	1.87	1.97	2.60	PASS
MCF-20A	6.8	392	12200 J	29500 J	9470 J	90 J		70100	61300	U	U	U	(2)	174000	1.135	8.62E-03	4.42E-01	1.13E+00	2.13E-01	1.30E-03	0.00E+00	6.43E-01	1.52E+00	0.00E+00	0.00E+00	0.00E+00	2.25	2.81	11.17	FAIL
MCF-21A	7.2	574	12700	14900	12900	135		68600	16300	U	U	U	28.33	119000	1.087	1.32E-02	4.81E-01	5.96E-01	3.03E-01	2.03E-03	0.00E+00	6.57E-01	4.23E-01	0.00E+00	0.00E+00	0.00E+00	1.89	1.74	4.10	PASS
MCF-23A	6.0	512 J	7400	14700 J	3620	82.4 J		37700 J	15800	U	U	U	25.5	77300	1.056	1.21E-02	2.88E-01	6.06E-01	8.77E-02	1.28E-03	0.00E+00	3.72E-01	4.22E-01	0.00E+00	0.00E+00	0.00E+00	1.29	1.17	5.18	FAIL
MCF-24A	6.2	512	12200	7950	15300	141		75100 J	10600	U	U	U	28.67	5300	1.000	1.28E-02	5.02E-01	3.46E-01	3.91E-01	2.31E-03	0.00E+00	7.82E-01	2.99E-01	0.00E+00	0.00E+00	0.00E+00	1.77	1.86	2.71	PASS
MCF-28B	7.4	565	3850	9880	2190	80.4 J		22900 J	14800	U	U	U	24.8	45300	1.031	1.37E-02	1.54E-01	4.17E-01	5.43E-02	1.28E-03	0.00E+00	2.31E-01	4.05E-01	0.00E+00	0.00E+00	0.00E+00	0.81	0.87	3.75	PASS
MCF-29B	7.5	538 J	9910 J	24800 J	11500 J	116 J		53200 J	35100	U	U	U	26.3	119000	1.090	1.23E-02	3.74E-01	9.90E-01	2.70E-01	1.74E-03	0.00E+00	5.08E-01	9.09E-01	0.00E+00	0.00E+00	0.00E+00	2.03	1.93	2.68	PASS
MCF-30A	8.6	571 J	8700	41200 J	8690	147 J	102 J	27400 J	99600	U	U	U	26.35	175000	1.134	1.26E-02	3.16E-01	1.58E+00	1.96E-01	2.12E-03	1.50E-03	2.51E-01	2.48E+00	0.00E+00	0.00E+00	0.00E+00	2.43	2.98	10.20	FAIL
MCF-30B	8.8	470 J	11700	31100 J	9990	186 J	120 J	66700 J	58700	U	U	U	27.0	168000	1.128	1.04E-02	4.27E-01	1.20E+00	2.26E-01	2.70E-03	1.77E-03	6.15E-01	1.47E+00	0.00E+00	0.00E+00	0.00E+00	2.30	2.70	8.09	FAIL
MCF-31B	7.4	615 J	7160 J	24300 J	4230 J	126 J		31100 J	38400	U	U	U	27.44	89700	1.066	1.44E-02	2.76E-01	9.91E-01	1.01E-01	1.94E-03	0.00E+00	3.04E-01	1.02E+00	0.00E+00	0.00E+00	0.00E+00	1.67	1.63	1.49	PASS
WMW5.58SD	7.5	473	11600	21300 J	14800	304 J		67700	28000	U	U	0.083 B D	25.7	142000	1.107	1.07E-02	4.31E-01	8.37E-01	3.42E-01	4.50E-03	0.00E+00	6.37E-01	7.13E-01	0.00E+00	0.00E+00	7.54E-07	2.06	1.99	1.76	PASS
WMW5.58SD (FD)	7.5	424	9080	17000 J	11700	305 J		67600	28400	U	U	0.067 B D	25.7	138000	1.104	9.58E-03	3.38E-01	6.70E-01	2.71E-01	4.53E-03	0.00E+00	6.37E-01	7.26E-01	0.00E+00	0.00E+00	6.10E-07	1.64	2.01	10.11	FAIL

Total Samples:	22
Passing:	14
Failing:	8

2009 Groundwater Sampling Event - BMI Common Areas - Eastside
Comparison of Filtered and Unfiltered Samples

Well	Filtered	pH	Major Ion Chemistry Data Input											TDS and EC Input		meq/l Calculations										Cation-Anion Balance Tests			
			Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	TDS Measured	EC Measured	Ca 20.04	Mg 12.16	Na 22.99	K 39.10	HCO_3 61.02	CO_3 30.01	SO_4 48.03	Cl 35.50	F 19.00	NO_3 61.91	ClO_4 99.50	Sum Cations	Sum Anions	(Cat-An)/ (Cat+An)	Acceptable Variance <5%?
			(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/L)	(umhos/cm)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(meq/l)	(meq/l)	(%)	
AA-01		6.9	471	142	364	7.21	93		1640	719	1.2	10.9	1.9 D	3800	4560	23.50	11.68	15.83	0.18	1.52	0.00	34.15	20.25	0.06	0.18	0.02	51.20	56.18	4.64	PASS-UF
AA-01 (FILTERED)	X		486	148	376	7.38	87		1720	759	1.2	9.9	1.9 D			24.25	12.17	16.35	0.19	1.43	0.00	35.81	21.38	0.06	0.16	0.02	52.97	58.86	5.27	FAIL-F
AA-07		7	266	87.8 J	224 J	42.1	84		956	261	0.68	10.6	0.4 D	2500	2800	13.27	7.22	9.74	1.08	1.38	0.00	19.90	7.35	0.04	0.17	0.00	31.31	28.84	4.11	PASS-UF
AA-07(FILTERED)	X		266	86.9 J	226 J	42.3	80		1050	277	0.66	10.5	0.46 D			13.27	7.15	9.83	1.08	1.31	0.00	21.86	7.80	0.03	0.17	0.00	31.33	31.18	0.24	PASS-F
AA-08		7.2	454	208	657	32.9	163		1820	975	1.3	6.2	3.3 B D	3500	5840	22.65	17.11	28.58	0.84	2.67	0.00	37.89	27.46	0.07	0.10	0.03	69.18	68.23	0.69	PASS-UF
AA-08 (FILTERED)	X		437	199	633	31.6	155		1840	1000	1.3	6.3	3.2 B D			21.81	16.37	27.53	0.81	2.54	0.00	38.31	28.17	0.07	0.10	0.03	66.51	69.22	1.99	PASS-F
AA-09		7.5	538	294	923 J	30.5	69		2870	1090	0.54 B	14.4	6 D	6600	7390	26.85	24.18	40.15	0.78	1.13	0.00	59.75	30.70	0.03	0.23	0.06	91.95	91.91	0.02	PASS-UF
AA-09 (FILTERED)	X		539	280	851 J	25.9	61		2870	1080	0.51 B	14.1	7.2 B D			26.90	23.03	37.02	0.66	1.00	0.00	59.75	30.42	0.03	0.23	0.07	87.60	91.50	2.18	PASS-F
AA-10		7.2	404	200	633 J	36.2	148		1800	1030	1	7.4	4.3 D	4110	5890	20.16	16.45	27.53	0.93	2.43	0.00	37.48	29.01	0.05	0.12	0.04	65.07	69.13	3.03	PASS-UF
AA-10(FILTERED)	X		398	196	623 J	35	146		1810	1030	1	7.8	5.1 D			19.86	16.12	27.10	0.90	2.39	0.00	37.68	29.01	0.05	0.13	0.05	63.97	69.32	4.01	PASS-F
AA-13		7.1	260	114	439	23.2	199		1590	371 J	0.76	49.6	0.097 B D	1800	3630	12.97	9.38	19.10	0.59	3.26	0.00	33.10	10.45	0.04	0.80	0.00	42.04	47.66	6.27	FAIL-UF
AA-13 (FILTERED)	X		268	120	447 L	27.2	198		1310	299 J	0.8	20.9	0.092 B D			13.37	9.87	19.44	0.70	3.24	0.00	27.27	8.42	0.04	0.34	0.00	43.38	39.32	4.91	PASS-F
AA-18		7.5	110	57.2	156 J	16.8	95		401	208	0.68	10.8	0.11 D	350 U	1720	5.49	4.70	6.79	0.43	1.56	0.00	8.35	5.86	0.04	0.17	0.00	17.41	15.98	4.29	PASS-UF
AA-18(FILTERED)	X		108	56.2	154 J	16.7	95		420	212	0.71	10.8	0.11 D			5.39	4.62	6.70	0.43	1.56	0.00	8.74	5.97	0.04	0.17	0.00	17.14	16.49	1.93	PASS-F
AA-20		6.9	556	235	898 J	44.2	78 J		2540	1100	0.22	14.7	5.3 D	6400	7640 J	27.74	19.33	39.06	1.13	1.28	0.00	52.88	30.99	0.01	0.24	0.05	87.26	85.45	1.05	PASS-UF
AA-20 (FILTER)	X		552	231	879 J	42.7	79 J		2510	1100	0.28	15.2	5.4 D			27.54	19.00	38.23	1.09	1.29	0.00	52.26	30.99	0.01	0.25	0.05	85.87	84.85	0.59	PASS-F
AA-21		7.2	512	299	720 J	83.3	189		2800	994	1.6 B	7.4	0.052 B D	5600	7100	25.55	24.59	31.32	2.13	3.10	0.00	58.30	28.00	0.08	0.12	0.00	83.59	89.60	3.47	PASS-UF
AA-21 (FILTERED)	X		520	300	740 J	84.6	180		2770	1000	1.6 B	7.5	0.057 B D			25.95	24.67	32.19	2.16	2.95	0.00	57.67	28.17	0.08	0.12	0.00	84.97	89.00	2.31	PASS-F
AA-23R		7.4	635	159	408 J	62.7	90.4 J		1880	928	0.48	26.6	1.9 B D	2400	6010 J	31.69	13.08	17.75	1.60	1.48	0.00	39.14	26.14	0.03	0.43	0.02	64.11	67.24	2.38	PASS-UF
AA-23R (FILTER)	X		656	161	426 J	62.6	89.8 J		1860	948	0.35	28.9	0.054 B D			32.73	13.24	18.53	1.60	1.47	0.00	38.73	26.70	0.02	0.47	0.00	66.11	67.39	0.96	PASS-F
AA-26		7.5	252	90.9	356 J	44.1	70 J		1100	355	0.79	12.1	0.049 B D	600	3420 J	12.57	7.48	15.48	1.13	1.15	0.00	22.90	10.00	0.04	0.20	0.00	36.66	34.29	3.35	PASS-UF
AA-26 (FILTER)	X		247	89.3	351 J	43.3	85.8 J		1140	380	0.79	12	0.048 B D			12.33	7.34	15.27	1.11	1.41	0.00	23.74	10.70	0.04	0.19	0.00	36.04	36.08	0.05	PASS-F
AA-27		7.6	513	192	535	8.58	126		2320	422	2	12.5	0.23 D	3300	4980	25.60	15.79	23.27	0.22	2.06	0.00	48.30	11.89	0.11	0.20	0.00	64.88	62.56	1.82	PASS-UF
AA-27(FILTER)	X		516	201	538	8.56	130		2290	417	2	12.2	0.23 D			25.75	16.53	23.40	0.22	2.13	0.00	47.68	11.75	0.11	0.20	0.00	65.90	61.86	3.16	PASS-F
AA-30		7.1	643	347	721 J	180	115 J		2630	1620	0.11	35.6	2.5 B D	5000	8610 J	32.09	28.54	31.36	4.60	1.88	0.00	54.76	45.63	0.01	0.58	0.03	96.59	102.88	3.16	PASS-UF
AA-30 (FILTER)	X		648	342	713 J	177	116 J		2570	1580	0.14	34.2	2.4 B D			32.34	28.13	31.01	4.53	1.90	0.00	53.51	44.51	0.01	0.55	0.02	96.00	100.50	2.29	PASS-F
AA-UW-1		5.8	541	219	353	8.55	90		2150	415 J	1.2	5	0.63 D	3100	4680	27.00	18.01	15.35	0.22	1.47	0.00	44.76	11.69	0.06	0.08	0.01	60.58	58.08	2.11	PASS-UF
AA-UW-1 (FILTERED)	X		522	227	367	7.87	88		2160	412 J	1.1	5	0.74 D			26.05	18.67	15.96	0.20	1.44	0.00	44.97	11.61	0.06	0.08	0.01	60.88	58.17	2.28	PASS-F
AA-UW-2		7.3	378	191	461 J	7.88	120		1970	512	0.9	10.2	0.099 D	4200	4740	18.86	15.71	20.05	0.20	1.97	0.00	41.02	14.42	0.05	0.16	0.00	54.82	57.62	2.49	PASS-UF
AA-UW-2(FILTERED)	X		371	188	455 J	7.78	115		1920	500	0.97	10.2	0.099 D			18.51	15.46	19.79	0.20	1.88	0.00	39.98	14.08	0.05	0.16	0.00	53.96	56.16	2.00	PASS-F
AA-UW-3		7.7	338	221	979	16.1	81		3280	267	1	8.9	0.065 D	3500	9870	16.87	18.17	42.58	0.41	1.33	0.00	68.29	7.52	0.05	0.14	0.00	78.04	77.34	0.45	PASS-UF
AA-UW-3 (FILTERED)	X		326	228	1010	15.2	85		3130	253	1	8.9	0.068 D			16.27	18.75	43.93	0.39	1.39	0.00	65.17	7.13	0.05	0.14	0.00	79.34	73.88	3.56	PASS-F
AA-UW-4		7.6	401	194	919	16	78		2920	304	0.81	12.6	0.077 D	4300	5700	20.01	15.95	39.97	0.41	1.28	0.00	60.80	8.56	0.04	0.20	0.00	76.35	70.88	3.71	PASS-UF
AA-UW-4(FILTER)	X		389	182	891	15.4	80		2970	307	0.86	12.6	0.081 D			19.41	14.97	38.76	0.39	1.31	0.00	61.84	8.65	0.05	0.20	0.00	73.53	72.04	1.02	PASS-F
AA-UW-4(FD)		7.6	397	190	914	16.1	81		2930	306	0.82	12.7	0.075 D	3700	5710	19.81	15.63	39.76	0.41	1.33	0.00	61.00	8.62	0.04	0.21	0.00	75.60	71.20	3.00	PASS-UF
AA-UW-4(FD)(FILTER)	X		395	197	904	16	86		2900	305	0.85	12.7	0.076 D			19.71	16.20	39.32	0.41	1.41	0.00	60.38	8.59	0.04	0.21	0.00	75.64	70.63	3.43	PASS-F
AA-UW-5		7.6	90.2	45.4	119	9.03	116 J		222	160	0.66	13.3	0.051 D	700	1400 J	4.50	3.73	5.18	0.23	1.90	0.00	4.62	4.51	0.03	0.21	0.00	13.64	11.28	9.48	FAIL-UF
AA-UW-5 (FILTER)	X		89.4	44.9	114	8.74	116 J		225	162	0.66	13.3	0.054 D			4.46	3.69	4.96	0.22	1.90	0.00	4.68	4.56	0.03	0.21	0.00	13.34	11.40	7.83	FAIL-F
AA-UW-5(FD)		7.5	91.8	46.9	122	9.08	116 J		227	166	0.66	12.9	0.056 D	600	1390 J	4.58	3.86	5.31	0.23	1.90	0.00	4.73	4.68	0.03	0.21	0.00	13.98	11.55	9.52	FAIL-UF
AA-UW-5(FD) (FILTER)	X		93.3	45.9	118	8.67	115 J		234	159	0.61	13.7	0.054 D			4.66	3.77	5.13	0.22	1.88	0.00	4.87	4.48	0.03	0.22	0.00	13.78	11.49	9.08	FAIL-F
AA-UW-6		7.6	384	151	342	62.4	66		2240	201	0.57	8.8	0.05 D	3700	4280	19.16	12.42	14.88	1.60	1.08	0.00	46.64	5.66	0.03	0.14	0.00	48.05	53.55	5.42	FAIL-UF
AA-UW-6 (FILTER)	X		421	184	441	80.1	64		2260	200	0.56	9.3	0.052 D			21.01	15.13	19.18	2.05	1.05	0.00	47.05	5.63	0.03	0.15	0.00	57.37	53.92	3.10	PASS-F
BEC-6		7	575 L	256	720	48.4	58 J		2400 J	1570	0.2 U	29.5	15 D	7300	5980 J	28.69	21.05	31.32	1.24	0.95	0.00	49.97	44.23	0.01	0.48	0.15	82.30	95.78	7.57	FAIL-UF
BEC-6 (FILTER)	X		592 L	253	660	41	58 J		2450 J	1530	0.2 U	29.4	15 D		5920 J	29.54	20.81	28.71	1.05	0.95	0.00	51.01	43.10	0.01	0.47	0.15	80.10	95.70	8.87	FAIL-F
BEC-9		7.1	716	283	514	49.2	134		1920	1290	0.62	40.4	0.27	5300	6650	35.73	23.27	22.36	1.26	2.20	0.00	39.98	36.34	0.03	0.65	0.00	82.62	79.20	2.11	PASS-UF
BEC-9(FILTERED)	X		728	290	512	49.7	135		1940	1280	0.61	38.8	0.27			36.33	23.85	22.27	1.27	2.21	0.00	40.39	36.06	0.03	0.63	0.00	83.72	79.32	2.70	PASS-F
COH-1		8.2	490 L	8190	18700	6380	100 J		44600 J	24800	1 U	0.5 U	2 U	117000	155000 J	24.45	673.52	813.40	163.17	1.64	0.00	928.59	698.59	0.05	0.01	0.02	1674.54	1628.90	1.38	PASS-UF
COH-1 (FILTER)	X		500 L	7750	17300	6160	99.6 J		42400 J	23900	1 U	0.5 U	0.011 J D		155000 J	24.95	637.34	752.50	157.54	1.63	0.00	882.78	673.24	0.05	0.01	0.00	1572.33	1557.71	0.47	PASS-F
COH-2		7.5	560	7400	17000 L	4830	95		35400	24600 J	1 U	0.5 U	0.2 U	89900	85000	27.94	608.55	739.45	123.53	1.56	0.00	737.04	692.96	0.05	0.01	0.00	1499.48	1431.62	2.32	PASS-UF
COH-2 (FILTERED)	X		569	7330	16000 L	4710	96		33900	22300 J	1 U	0.5 U	0.2 U			28.39	602.80	695.95	120.46	1.57	0.00	705.81	628.17	0.05	0.01	0.00	1447.60	1335.61	4.02	PASS-F
COH-2A		7.3	332	207	1130 J	45.9	350 J		1980	1410	0.76	1.1	5.4 D	3300	7510 J	16.57	17.02	49.15	1.17	5.74	0.00	41.22	39.72	0.04	0.02	0.05	83.92	86.79	1.68	PASS-UF
COH-2A (FILTER)	X		324	197	1120 J	38.6	302 J		1940	1450	0.69	1.1	4.8 D			16.17	16.20	48.72	0.99	4.95	0.00	40.39	40.85	0.04	0.02	0.05	82.07	86.29	2.50	PASS-F
DBMW-1		7.1	587	269	759	59.5	63 J		2930	1090 J	0.61	9.5	6.7 D	8600	7490	29.29	22.12	33.01	1.52	1.03	0.00	61.00	30.70	0.03	0.15	0.07	85.95	92.99	3.94	PASS-UF
DBMW-1(FILTER)	X		606	272	719	55.8	54 J		2960	1080 J	0.67	9.4	7.1 D			30.24	22.37	31.27	1.43	0.88	0.00	61.63	30.42	0.04	0.15	0.07	85.31	93.19	4.42	PASS-F
DBMW-10		5.3	223	88.7	273	63.6 J	89.6 J		985 J	338 J	0.59	9.8	0.5 D	3300	2800 J	11.13	7.29	11.87	1.63	1.47	0.00	20.51	9.52	0.03	0.16	0.01	31.92	31.69	0.36	PASS-UF
DBMW-10 (FILTER)	X		202	87.2	274	65.3 J	120 J		987	299 J	0.57	9.8	0.52 D		2790 J	10.08	7.17	11.92	1.67	1.97	0.00	20.55	8.42	0.03	0.16	0.01	30.84	31.13	0.47	PASS-F
DBMW-11		7.4	699	519	839	279	64.4 J		3040 J	1870	0.01 U	19.8	14 B D	5400	10400 J	34.88	42.68	36.49	7.14	1.06	0.00	63.29	52.68	0.00	0.32	0.14	121.19	117.49	1.55	PASS-UF
DBMW-11 (FILTER)	X		703	444	798	214	65.2 J		2800 J	1810	0.01 U	19.5	14 B D		10200 J	35.08	36.51	34.71	5.47	1.07	0.00	58.30	50.99	0.00	0.31	0.14	111.78	110.81	0.44	PASS-F
DBMW-12		6.1	573	581	668	315	67.6 J		3350 J	1320	0.36 B	18.1	12 D	6600	8070 J	28.59	47.78	29.06	8.06	1.11	0.00	69.75	37.18	0.02	0.29	0.12	113.48	108.47	2.26	PASS-UF
DBMW-12 (FILTER)	X		546	491	570	258	67.2 J		3300 J	1290	0.34 B	17	11 D		8100 J	27.25	40.38	24.79	6.60	1.10	0.00	68.71	36.34	0.02	0.27	0.11	99.02	106.55	3.66	PASS-F
DBMW-12(FD)		6.2	562	504	578	264	67.6 J		3240 J	1270	0.34 B	17.3	12 D	5800	8080 J	28.04	41.45	25.14	6.75	1.11	0.00	67.46	35.77	0.02	0.28	0.12	101.38	104.76	1.64	PASS-UF
DBMW-12(FD) (FILTER)	X		578	522	591	266	66.4 J		3280 J	1330	0.39 B	17.1	9.8 D		8100 J	28.84	42.93	25.71	6.80	1.09	0.00	68.29	37.46	0.02	0.28	0.10	104.28	107.24	1.40	PASS-F
DBMW-13		5.4	596	260	696	144 J	48 J		2700 J	901 J	0.01 U	16.9	9.7 D	7400	6660 J	29.74	21.38	30.27	3.68	0.79	0.00	56.21	25.38	0.00	0.27	0.10	85.08	82.75	1.39	PASS-UF
DBMW-13 (FILTER)	X		613	264	700	143 J	54.4 J		2750 J	906 J	0.01 U	16.5	9.8 D		6700 J	30.59	21.71	30.45	3.66	0.89	0.00	57.26	25.52	0.00	0.27	0.10	86.40	84.03	1.39	PASS-F
DBMW-14		5.5	626	228	644	142 J	58 J		2490 J	912 J	0.04 B	16.6	14 D	7100	6540 J	31.24	18.75	28.01	3.63	0.95	0.00	51.84	25.69	0.00	0.27	0.14	81.63	78.89	1.71	PASS-UF
DBMW-14 (FILTER)	X		610	221	638	140 J	54 J		2450 J	910 J	0.05 B	16.7	14 D		6510 J	30.44	18.17	27.75	3.58	0.88	0.00	51.01	25.63	0.00	0.27	0.14	79.95	77.94	1.27	PASS-F
DBMW-15		7.5	559	204	501	108	53.6 J		2550	375	0.3	8.4	1.3 B D	3700	5020 J	27.89	16.78	21.79	2.76	0.88	0.00	53.09	10.56	0.02	0.14	0.01	69.22	64.70	3.38	PASS-UF
DBMW-15 (FILTER)	X		562	206	508	98.1	53.6 J		2530	390	0.3	8.5	1.4 B D		5000 J	28.04	16.94	22.10	2.51	0.88	0.00	52.68	10.99	0.02	0.14	0.01	69.59	64.71	3.64	PASS-F
DBMW-16		5.6	79.6	31.1	170	19.7	74 J		565 J	148 J	0.73	2.1	0.015 B D	1070	1020 J	3.97	2.56	7.39	0.50	1.21	0.00	11.76	4.17	0.04	0.03	0.00	14.43	17.22	8.82	FAIL-UF
DBMW-16 (FILTER)	X		82.1	31.6	176	20.2	70 J		550 J	161 J	0.71	2	0.016 B D		1020 J	4.10	2.60	7.66	0.52	1.15	0.00	11.45	4.54	0.04	0.03	0.00	14.87	17.20	7.28	FAIL-F
DBMW-17		6.4	267	65.6	261	27.3	496 J		1130 J	43.6 J	0.56	1.9	0.012 B D	700	1100 J	13.32	5.39	11.35	0.70	8.13	0.00	23.53	1.23	0.03	0.03	0.00	30.77	32.94	3.41	PASS-UF
DBMW-17 (FILTER)	X		263	64.8	259	27.3	496 J		1140 J	43.1 J	0.56	1.8	0.02 U		1060 J	13.12	5.33	11.27	0.70	8.13	0.00	23.74	1.21	0.03	0.03	0.00	30.42	33.14	4.28	PASS-F

2009 Groundwater Sampling Event - BMI Common Areas - Eastside
Comparison of Filtered and Unfiltered Samples

Well	Filtered	pH	Major Ion Chemistry Data Input											TDS and EC Input		meq/l Calculations										Cation-Anion Balance Tests			
			Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	TDS Measured	EC Measured	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	Sum Cations	Sum Anions	(Cat-An)/ (Cat+An)	Acceptable Variance <5%?
																20.04	12.16	22.99	39.10	61.02	30.01	48.03	35.50	19.00	61.91	99.50				
			(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/L)	(umhos/cm)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(meq/l)	(meq/l)	(%)	
DBMW-19		5.5	593	307	705	95.1	166 J		2660 J	1100	0.62 B	19.4	5.8 D	4300	7010 J	29.59	25.25	30.67	2.43	2.72	0.00	55.38	30.99	0.03	0.31	0.06	87.94	89.49	0.88	PASS-UF
DBMW-19 (FILTER)	X		584	300	724	96.5	124 J		2680 J	1100	0.44 B	19.5	6.5 D		7100 J	29.14	24.67	31.49	2.47	2.03	0.00	55.80	30.99	0.02	0.31	0.07	87.77	89.22	0.82	PASS-F
DBMW-2		7.5	548	302 J	981 J	71.1 J	68.2 J		3240	1240	0.54	7	7.5 D	6400	7590	27.35	24.84	42.67	1.82	1.12	0.00	67.46	34.93	0.03	0.11	0.08	96.67	103.72	3.52	PASS-UF
DBMW-2 (FILTER)	X		545	298 J	974 J	67.2 J	68 J		3170	1240	0.65	5.9	6.8 D			27.20	24.51	42.37	1.72	1.11	0.00	66.00	34.93	0.03	0.10	0.07	95.79	102.24	3.26	PASS-F
DBMW-20		6.9	580	244	585	120	122 J		2120	961	0.22	17.4	3.2 B D	4100	6060 J	28.94	20.07	25.45	3.07	2.00	0.00	44.14	27.07	0.01	0.28	0.03	77.52	73.53	2.64	PASS-UF
DBMW-20 (FILTER)	X		567	237	568	117	121 J		2070	943	0.23	17.7	2.7 B D		6050 J	28.29	19.49	24.71	2.99	1.98	0.00	43.10	26.56	0.01	0.29	0.03	75.48	71.97	2.38	PASS-F
DBMW-22		6.9	484 L	171	283	148	34 J		2400 J	271	0.33	1.1	0.13 D	5000	4010 J	24.15	14.06	12.31	3.79	0.56	0.00	49.97	7.63	0.02	0.02	0.00	54.31	58.20	3.46	PASS-UF
DBMW-22 (FILTER)	X		519 L	177	277	140	32.4 J		2360 J	271	0.31	1.1	0.13 D		4000 J	25.90	14.56	12.05	3.58	0.53	0.00	49.14	7.63	0.02	0.02	0.00	56.08	57.34	1.10	PASS-F
DBMW-22(FD)		6.8	478 L	170	286	147	33.2 J		2390 J	269	0.25	1.1	0.13 D	5100	3990 J	23.85	13.98	12.44	3.76	0.54	0.00	49.76	7.58	0.01	0.02	0.00	54.03	57.91	3.47	PASS-UF
DBMW-22(FD) (FILTER)	X		515 L	176	275	139	31.6 J		2360 J	273	0.31	1.1	0.14 D		4020 J	25.70	14.47	11.96	3.55	0.52	0.00	49.14	7.69	0.02	0.02	0.00	55.69	57.38	1.50	PASS-F
DBMW-3		7.6	562	367 J	970 J	104 J	56.4 J		3230	1410	0.24	15.4	7.6 D	6600	8350	28.04	30.18	42.19	2.66	0.92	0.00	67.25	39.72	0.01	0.25	0.08	103.08	108.23	2.44	PASS-UF
DBMW-3 (FILTER)	X		572	377 J	1000 J	107 J	58 J		3300	1480	0.21	15.9	7.6 D			28.54	31.00	43.50	2.74	0.95	0.00	68.71	41.69	0.01	0.26	0.08	105.78	111.69	2.72	PASS-F
DBMW-4		7.5	631	237	681	84.8	90.8 J		2610	952	0.092 B	27.7	4.1 D	4400	6590 J	31.49	19.49	29.62	2.17	1.49	0.00	54.34	26.82	0.00	0.45	0.04	82.77	83.14	0.22	PASS-UF
DBMW-4(FILTER)	X		627	235	672	84	91.2 J		2570	938	0.13	26.4	4.3 D			31.29	19.33	29.23	2.15	1.49	0.00	53.51	26.42	0.01	0.43	0.04	81.99	81.90	0.05	PASS-F
DBMW-7		5.3	658	289	617	71.8	65.2 J		2410	1430	0.01 U	42.7	3.1 D	6900	7510 J	32.83	23.77	26.84	1.84	1.07	0.00	50.18	40.28	0.00	0.69	0.03	85.27	92.25	3.93	PASS-UF
DBMW-7 (FILTER)	X		700	295	650	78.9	146 J		2340	1420	0.01 U	41.8	3.2 D		7530 J	34.93	24.26	28.27	2.02	2.39	0.00	48.72	40.00	0.00	0.68	0.03	89.48	91.82	1.29	PASS-F
DBMW-7 (FD)		5.4	698	301	662	81.1	131 J		2420	1440	0.01 U	40.8	3.3 D	8100	7520 J	34.83	24.75	28.80	2.07	2.15	0.00	50.39	40.56	0.00	0.66	0.03	90.45	93.79	1.81	PASS-UF
DBMW-7 (FD) (FILTER)	X		685	289	634	77	143 J		2370	1430	0.01 U	39.9	3.2 D		7540 J	34.18	23.77	27.58	1.97	2.34	0.00	49.34	40.28	0.00	0.64	0.03	87.49	92.65	2.86	PASS-F
DBMW-9		7.4	560	138	307	63.6	78.8 J		2010 J	398 J	0.58	16.6	1.3 D	6700	4360 J	27.94	11.35	13.35	1.63	1.29	0.00	41.85	11.21	0.03	0.27	0.01	54.27	54.66	0.36	PASS-UF
DBMW-9 (FILTER)	X		534	131	291	57.9	78.8 J		2100 J	394 J	0.57	16.1	2.7 D		4340 J	26.65	10.77	12.66	1.48	1.29	0.00	43.72	11.10	0.03	0.26	0.03	51.56	56.43	4.51	PASS-F
DM-1		5.8	570	168	570	13.8	273 J		2310 J	346	0.77	19.1	0.27 B D	2400	5020 J	28.44	13.82	24.79	0.35	4.47	0.00	48.09	9.75	0.04	0.31	0.00	67.41	62.67	3.64	PASS-UF
DM-1 (FILTER)	X		574	169	576	13.5	263 J		2290 J	340	0.81	19	0.28 B D		5100 J	28.64	13.90	25.05	0.35	4.31	0.00	47.68	9.58	0.04	0.31	0.00	67.94	61.92	4.64	PASS-F
HMW-09		8.2	639 L	247	872	80.5	132 J		2720 J	1280	0.68 B	18.3	4.1 D	7800	5100 J	31.89	20.31	37.93	2.06	2.16	0.00	56.63	36.06	0.04	0.30	0.04	92.19	95.22	1.62	PASS-UF
HMW-09 (FILTER)	X		659 L	246	809	71	130 J		2660 J	1250	0.65 B	18.4	6.2 D		5210 J	32.88	20.23	35.19	1.82	2.13	0.00	55.38	35.21	0.03	0.30	0.06	90.12	93.12	1.64	PASS-F
HMWWT-6		7.7	134	75.3 J	180 J	6.6 J	79.6 J		435	375	0.66	15.3	0.069 D	1600	2240	6.69	6.19	7.83	0.17	1.30	0.00	9.06	10.56	0.03	0.25	0.00	20.88	21.21	0.78	PASS-UF
HMWWT-6 (FILTER)	X		132	74.9 J	179 J	6.25 J	79 J		432	384	0.69	15.4	0.071 D			6.59	6.16	7.79	0.16	1.29	0.00	8.99	10.82	0.04	0.25	0.00	20.69	21.39	1.66	PASS-F
MCF-01A		6.9	490	146 J	417 J	23.9	35		2530	121	0.24	0.005 U	0.00017 J	3900	4240	24.45	12.01	18.14	0.61	0.57	0.00	52.68	3.41	0.01	0.00	0.00	55.21	56.67	1.31	PASS-UF
MCF-01A (FILTERED)	X		493	146 J	423 J	23.9	34		2550	108	0.25	0.005 U	0.02 U			24.60	12.01	18.40	0.61	0.56	0.00	53.09	3.04	0.01	0.00	0.00	55.62	56.70	0.97	PASS-F
MCF-01B		7.2	111	63.9	391	10.7	127		889	271	0.65	1.9	0.7 D	1990	2740	5.54	5.25	17.01	0.27	2.08	0.00	18.51	7.63	0.03	0.03	0.01	28.07	28.30	0.39	PASS-UF
MCF-01B (FILTERED)	X		108	62.2	381	10.3	125		950	293	0.64	1.5	0.7 D			5.39	5.12	16.57	0.26	2.05	0.00	19.78	8.25	0.03	0.02	0.01	27.34	30.15	4.88	PASS-F
MCF-02A		7.6	21.2	6.49	166 J	10.1	72		183	124	0.81	1	0.00051	1100	974	1.06	0.53	7.22	0.26	1.18	0.00	3.81	3.49	0.04	0.02	0.00	9.07	8.54	3.00	PASS-UF
MCF-02A (FILTERED)	X		21.2	6.48	167 J	10	76		181	120	0.84	1.1	0.00022 J			1.06	0.53	7.26	0.26	1.25	0.00	3.77	3.38	0.04	0.02	0.00	9.11	8.46	3.72	PASS-F
MCF-02B		7.6	23.9	9.01	194 J	9.49	98		263	97.5	1.3	1.4	0.00013 J	2200	1090	1.19	0.74	8.44	0.24	1.61	0.00	5.48	2.75	0.07	0.02	0.00	10.61	9.92	3.39	PASS-UF
MCF-02B (FILTERED)	X		23	8.73	192 J	9.29	96		264	97.6	1.3	1.5	0.00022 J			1.15	0.72	8.35	0.24	1.57	0.00	5.50	2.75	0.07	0.02	0.00	10.45	9.91	2.67	PASS-F
MCF-03A		7.8	26.8	11.1	188 L	13	67		225	141 J	0.85	2.2	0.0011 B D	700	1170	1.34	0.91	8.18	0.33	1.10	0.00	4.68	3.97	0.04	0.04	0.00	10.76	9.83	4.49	PASS-UF
MCF-03A (FILTERED)	X		25.5	10.4	192 L	12.7	66		223	136 J	0.84	2.2	0.001 B D			1.27	0.86	8.35	0.32	1.08	0.00	4.64	3.83	0.04	0.04	0.00	10.80	9.64	5.72	FAIL-F
MCF-03B		7.8	150	88.2	532	12.9	130		1220	314	0.79	11.4	0.084 B D	1900	3360	7.49	7.25	23.14	0.33	2.13	0.00	25.40	8.85	0.04	0.18	0.00	38.21	36.60	2.15	PASS-UF
MCF-03B(FILTERED)	X		154	89	541	12.9	131		1190	309	0.8	11.3	0.083			7.68	7.32	23.53	0.33	2.15	0.00	24.78	8.70	0.04	0.18	0.00	38.87	35.85	4.03	PASS-F
MCF-04		7.3	496	131	719	90.9	41		2830 J	416	0.44	0.005 U	0.2 U	64700	5570	24.75	10.77	31.27	2.32	0.67	0.00	58.92	11.72	0.02	0.00	0.00	69.12	71.34	1.58	PASS-UF
MCF-04(FILTER)	X		476	127	720	90.8	40		3180 J	529	0.41	0.005 U	0.2 U			23.75	10.44	31.32	2.32	0.66	0.00	66.21	14.90	0.02	0.00	0.00	67.84	81.79	9.32	FAIL-F
MCF-05		7.7	470	15300	19500	13300	127		80900 J	30900	1 U	0.5 U	0.4 U	180000	105000	23.45	1258.22	848.19	340.15	2.08	0.00	1684.36	870.42	0.05	0.01	0.00	2470.03	2556.93	1.73	PASS-UF
MCF-05(FILTER)	X		468	15000	19800	12900	136		76200 J	30400	1 U	0.5 U	0.4 U			23.35	1233.55	861.24	329.92	2.23	0.00	1586.51	856.34	0.05	0.01	0.00	2448.07	2445.14	0.06	PASS-F
MCF-06A-R		6.6	250	15800	37800 J	10800	90.4 J		70700	62000	1 U	0.5 U	1 U	178000	137000 J	12.48	1299.34	1644.19	276.21	1.48	0.00	1472.00	1746.48	0.05	0.01	0.01	3232.23	3220.03	0.19	PASS-UF
MCF-06A-R (FILTER)	X		324	16500	37800 J	11400	90.8 J		70100	62900	1 U	0.5 U	0.0038 J D			16.17	1356.91	1644.19	291.56	1.49	0.00	1459.50	1771.83	0.05	0.01	0.00	3308.83	3232.88	1.16	PASS-F
MCF-06B		8.2	475	3760	4120	3860	94		19600 J	8030	1 U	3.9	4.3 D	11500	39600	23.70	309.21	179.21	98.72	1.54	0.00	408.08	226.20	0.05	0.06	0.04	610.84	635.97	2.02	PASS-UF
MCF-06B(FILTER)	X		482	3820	4230	4110	87		19800 J	8100	1 U	3.6	4.6 D			24.05	314.14	183.99	105.12	1.43	0.00	412.24	228.17	0.05	0.06	0.05	627.30	641.99	1.16	PASS-F
MCF-06C		7.3	663	357	688 J	217	66 J		2500	1720	0.01 U	47	4.1 B D	6200	8740 J	33.08	29.36	29.93	5.55	1.08	0.00	52.05	48.45	0.00	0.76	0.04	97.92	102.38	2.23	PASS-UF
MCF-06C (FILTER)	X		654	355	676 J	213	69.8 J		2530	1760	0.01 U	45.8	4.3 B D			32.63	29.19	29.40	5.45	1.14	0.00	52.68	49.58	0.00	0.74	0.04	96.68	104.18	3.73	PASS-F
MCF-07		7	434	15200	29500 J	11900	137 J		83300	41500	1 U	0.5 U	0.093 D	166000	127000 J	21.66	1250.00	1283.17	304.35	2.25	0.00	1734.33	1169.01	0.05	0.01	0.00	2859.17	2905.65	0.81	PASS-UF
MCF-07 (FILTER)	X		450	15600	30400 J	12000	152 J		80700	41900	1 U	0.5 U	0.1 D			22.46	1282.89	1322.31	306.91	2.49	0.00	1680.20	1180.28	0.05	0.01	0.00	2934.57	2863.03	1.23	PASS-F
MCF-08A		7.3	608	5650	26200	3010	98.4 J		26200	51200 J	1 U	0.5 U	0.2 U	99800	116000	30.34	464.64	1139.63	76.98	1.61	0.00	545.49	1442.25	0.05	0.01	0.00	1711.59	1989.42	7.51	FAIL-UF
MCF-08A(FILTER)	X		667	6740	30600	3500	98.2 J		26600	51900 J	1 U	0.5 U	0.2 U			33.28	554.28	1331.01	89.51	1.61	0.00	553.82	1461.97	0.05	0.01	0.00	2008.09	2017.46	0.23	PASS-F
MCF-08B-R		7.2	509	1890	5790 J	837	70		11400	7830	0.1 U	0.05 U	0.00013 J	24800	31400	25.40	155.43	251.85	21.41	1.15	0.00	237.35	220.56	0.01	0.00	0.00	454.08	459.07	0.55	PASS-UF
MCF-08B-R (FILTERED)	X		496	1720	5310 J	756	69		10500	7230	0.1 U	0.05 U	0.00017 J			24.75	141.45	230.97	19.34	1.13	0.00	218.61	203.66	0.01	0.00	0.00	416.50	423.41	0.82	PASS-F
MCF-08B-R (FD)		7.4	507	1800	5570 J	793	76		10900	7660	0.1 U	0.098 B	0.00024 J	30700	32900	25.30	148.03	242.28	20.28	1.25	0.00	226.94	215.77	0.01	0.00	0.00	435.89	443.97	0.92	PASS-UF
MCF-08B-R (FD)(FILTERED)	X		511	1780	5520 J	782	69		10500	7390	0.1 U	0.05 U	0.0014			25.50	146.38	240.10	20.00	1.13	0.00	218.61	208.17	0.01	0.00	0.00	431.98	427.92	0.47	PASS-F
MCF-09A		7.4	488	1880	5180	650	81		15900	5110	0.1 U	0.05 U	0.1 U	22100	27100	24.35	154.61	225.32	16.62	1.33	0.00	331.04	143.94	0.01	0.00	0.00	420.90	476.32	6.18	FAIL-UF
MCF-09A(FILTERED)	X		500	1930	5270	658	75		19700	6490	0.1 U	0.05 U	0.1 U			24.95	158.72	229.23	16.83	1.23	0.00	410.16	182.82	0.01	0.00	0.00	429.73	594.21	16.06	FAIL-F
MCF-09B		7.3	445	123	401	45	71		2150	149	0.72	0.023	0.1 U	3000	3910	22.21	10.12	17.44	1.15	1.16	0.00	44.76	4.20	0.04	0.00	0.00	50.91	50.16	0.74	PASS-UF
MCF-09B(FD)(FILTERED)	X		445	123	399	44.1	69		2100	148	0.79	0.005 U	0.1 U			22.21	10.12	17.36	1.13	1.13	0.00	43.72	4.17	0.04	0.00	0.00	50.80	49.07	1.74	PASS-F
MCF-09B(FD)		7.3	431	118	389	42.8	70		2120	146	0.79	0.005 U	0.1 U	2200	3920	21.51	9.70	16.92	1.09	1.15	0.00	44.14	4.11	0.04	0.00	0.00	49.23	49.44	0.22	PASS-UF
MCF-09B(FILTERED)	X		438	121	394	43.7	69		2120	149	0.74	0.005 U	0.1 U			21.86	9.95	17.14	1.12	1.13	0.00	44.14	4.20	0.04	0.00	0.00	50.06	49.51	0.56	PASS-F
MCF-10A		7.8	528	235	1320	176	36 J		3920	1620 J	0.2	0.005 U	3.1E-05 J	4200	9430	26.35	19.33	57.42	4.50	0.59	0.00	81.62	45.63	0.01	0.00	0.00	107.59	127.85	8.60	FAIL-UF
MCF-10A(FILTER)	X		535	241	1360	182	38 J		3900	1350 J	0.16	0.005 U	0.02 U			26.70	19.82	59.16	4.65	0.62	0.00	81.20	38.03	0.01	0.00	0.00	110.33	119.86	4.14	PASS-F
MCF-10B		7.5	253	102	237	38.9	51		1140	205	0.39	0.093	0.00032 J	2200	2700	12.62	8.39	10.31	0.99	0.84	0.00	23.74	5.77	0.02	0.00	0.00	32.32	30.37	3.11	PASS-UF
MCF-10B(FILTERED)	X		254	104	234	38.8	52		1120	205	0.39	0.097	0.00035 J			12.67	8.55	10.18	0.99	0.85	0.00	23.32	5.77	0.02	0.00	0.00	32.40	29.97	3.90	PASS-F
MCF-11		7.4	425	129	459	63.5	100		1960	348	1.2	0.005 U	0.1 U	2700	4190	21.21	10.61	19.97	1.62	1.64	0.00	40.81	9.80	0.06	0.00	0.00	53.41	52.31	1.03	PASS-UF
MCF-11(FILTERED)	X		411	124	453	62.9	99		1920	344	1.2	0.005 U	0.00022 J			20.51	10.20	19.70	1.61	1.62	0.00	39.98	9.69	0.06	0.00	0.00	52.02	51.35	0.65	PASS-F
MCF-12A		7.4	518	204	1040	398	77		3440	931	0.32	0.005 U	4.9E-05 J	7300	7820	25.85	16.78	45.24	10.18	1.26	0.00	71.62	26.23	0.02	0.00	0.00	98.04	99.13	0.55	PASS-UF
MCF-12A (FILTER)	X		500	198	1000	382	48		3260	921	0.33	0.005 U	0.02 U			24.95	16.28	43.50	9.77	0.79	0.00	67.87	25.94	0.02	0.00	0.00	94.50	94.62	0.06	PASS-F
MCF-12B		7.4	302	136	326 J	82	58		1560	317	0.52	6.6	4 D	2900	3640	15.07	11.18	14.18	2.10	0.95	0.00	32.48	8.93	0.03	0.11	0.04	42.53	42.53	0.00	PASS-UF
MCF-12B (FILTERED)	X		293	131	319 J	79.6	60		1550	317	0.55	6.6	18 D			14.62	10.77	13.88	2.04	0.98	0.00	32.27	8.93	0.03	0.11	0.18	41.31	42.50	1.43	PASS-F
MCF-12C		7.2	209	82.5	207 J	73.9	72		1230	115	0.47	1.5	0.43 D	1000	2520	10.43	6.78	9.00	1.89	1.18	0.00	25.61	3.24	0.02	0.02	0.00	28.11	30.08	3.39	PASS-UF
MCF-12C (FILTERED)	X		212	83.7	210 J	74.9	71		1210	116	0.46	1.5	0.47 D			10.58	6.88	9.13	1.92	1.16	0.00	25.19	3.27	0.02	0.02	0.00	28.51	29.68	2.00	PASS-F

2009 Groundwater Sampling Event - BMI Common Areas - Eastside
Comparison of Filtered and Unfiltered Samples

Well	Filtered	pH	Major Ion Chemistry Data Input											TDS and EC Input		meq/l Calculations										Cation-Anion Balance Tests			
			Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	TDS Measured	EC Measured	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	Sum Cations	Sum Anions	(Cat-An)/ (Cat+An)	Acceptable Variance
																20.04	12.16	22.99	39.10	61.02	30.01	48.03	35.50	19.00	61.91	99.50				<5%?
			(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/L)	(umhos/cm)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(meq/l)	(meq/l)	(%)	
MCF-16B		7.8	543	6020	3360	16300	146 J		42800	2450	1 U	0.5 U	0.0055 J B D	64300	55700 J	27.10	495.07	146.15	416.88	2.39	0.00	891.11	69.01	0.05	0.01	0.00	1085.19	962.58	5.99	FAIL-UF
MCF-16B (FILTER)	X		528	5900	3350	15600	146 J		42400	2420	1 U	0.5 U	2 U		55100 J	26.35	485.20	145.72	398.98	2.39	0.00	882.78	68.17	0.05	0.01	0.02	1056.24	953.42	5.12	FAIL-F
MCF-16C		7.4	601	600	602	308	83.6 J		6290	1050	0.43 B	16.6	8.7 B D	11500	11200 J	29.99	49.34	26.19	7.88	1.37	0.00	130.96	29.58	0.02	0.27	0.09	113.39	162.29	17.73	FAIL-UF
MCF-16C (FILTER)	X		625	493	575	213	74.4 J		3050	1050	0.52 B	21	11 B D		11300 J	31.19	40.54	25.01	5.45	1.22	0.00	63.50	29.58	0.03	0.34	0.11	102.19	94.78	3.76	PASS-F
MCF-18A		6.4	2670	2680	58900 J	7090	28 J		3590	114000	1 U	0.5 U	0.0061 J D	163000	196000 J	133.23	220.39	2561.98	181.33	0.46	0.00	74.74	3211.27	0.05	0.01	0.00	3096.94	3286.53	2.97	PASS-UF
MCF-18A (FILTER)	X		2570	2580	57500 J	6870	28 J		3630	106000	1 U	0.5 U	0.0075 J D			128.24	212.17	2501.09	175.70	0.46	0.00	75.58	2985.92	0.05	0.01	0.00	3017.21	3062.01	0.74	PASS-F
MCF-18A (FD)		6.1	2660	2760	60000 J	7310	27.6 J		3500	112000	1 U	0.5 U	0.0092 J D	173000	195000 J	132.73	226.97	2609.83	186.96	0.45	0.00	72.87	3154.93	0.05	0.01	0.00	3156.50	3228.31	1.12	PASS-UF
MCF-18A (FD)(FILTER)	X		2560	2640	53400 J	6910	28.4 J		3680	105000	1 U	0.5 U	0.0071 J D			127.74	217.11	2322.75	176.73	0.47	0.00	76.62	2957.75	0.05	0.01	0.00	2844.33	3034.89	3.24	PASS-F
MCF-19A		7.6	417	9270 J	20600 J	4920 J	116 J		56400	31900	1 U	0.5 U	2 U	115000	100000	20.81	762.34	896.04	125.83	1.90	0.00	1174.27	898.59	0.05	0.01	0.02	1805.02	2074.84	6.95	FAIL-UF
MCF-19A (FILTER)	X		459	10200 J	22900 J	5310 J	128 J		57300	31600	1 U	0.5 U	2 U			22.90	838.82	996.09	135.81	2.10	0.00	1193.00	890.14	0.05	0.01	0.02	1993.61	2085.32	2.25	PASS-F
MCF-19A (FD) (FILTER)	X		453	9990 J	22600 J	5300 J	123 J		58000	32000	1 U	0.5 U	2 U			22.60	821.55	983.04	135.55	2.02	0.00	1207.58	901.41	0.05	0.01	0.02	1962.74	2111.08	3.64	PASS-F
MCF-19A FD		7.6	467	10300 J	23600 J	5410 J	116 J		58200	33000	1 U	0.5 U	2 U	119000	101000	23.30	847.04	1026.53	138.36	1.90	0.00	1211.74	929.58	0.05	0.01	0.02	2035.24	2143.30	2.59	PASS-UF
MCF-20A		6.8	392	12200 J	29500 J	9470 J	90 J		70100	61300	1 U	0.5 U	2 U	174000	3840	19.56	1003.29	1283.17	242.20	1.47	0.00	1459.50	1726.76	0.05	0.01	0.02	2548.22	3187.82	11.15	FAIL-UF
MCF-20A (FILTER)	X		393	12300 J	30000 J	8930 J	89.6 J		69200	57300	1 U	0.5 U	2 U			19.61	1011.51	1304.92	228.39	1.47	0.00	1440.77	1614.08	0.05	0.01	0.02	2564.43	3056.40	8.75	FAIL-F
MCF-21A		7.2	574	12700	14900	12900	135		68600	16300	1 U	0.5 U	0.2 U	119000	86900	28.64	1044.41	648.11	329.92	2.21	0.00	1428.27	459.15	0.05	0.01	0.00	2051.08	1889.70	4.10	PASS-UF
MCF-21A (FILTERED)	X		548	12100	14500	12400	125		68800	16300	1 U	0.5 U	0.2 U			27.35	995.07	630.71	317.14	2.05	0.00	1432.44	459.15	0.05	0.01	0.00	1970.26	1893.70	1.98	PASS-F
MCF-22A		6.8	521 J	109 J	268 J	119 J	79.2 J		2450 J	134	0.68	0.005 U	0.02 U	4400	3800 J	26.00	8.96	11.66	3.04	1.30	0.00	51.01	3.77	0.04	0.00	0.00	49.66	56.12	6.10	FAIL-UF
MCF-22A(FILTER)	X		536 J	112 J	274 J	111 J	76.8 J		2300 J	124	0.71	0.005 U	0.02 U		3840 J	26.75	9.21	11.92	2.84	1.26	0.00	47.89	3.49	0.04	0.00	0.00	50.71	52.68	1.90	PASS-F
MCF-23A		6	512 J	7400	14700 J	3620	82.4 J		37700 J	15800	1 U	0.5 U	0.2 U	77300	68500 J	25.55	608.55	639.41	92.58	1.35	0.00	784.93	445.07	0.05	0.01	0.00	1366.09	1231.41	5.19	FAIL-UF
MCF-23A(FILTER)	X		488 J	7160	14300 J	3600	78.4 J		38200 J	16200	1 U	0.5 U	2 U		68200 J	24.35	588.82	622.01	92.07	1.28	0.00	795.34	456.34	0.05	0.01	0.02	1327.25	1253.04	2.88	PASS-F
MCF-24A		6.2	512	12200	7950	15300	141		75100 J	10600	1 U	0.5 U	0.4 U	5300	77400	25.55	1003.29	345.80	391.30	2.31	0.00	1563.61	298.59	0.05	0.01	0.00	1765.95	1864.57	2.72	PASS-UF
MCF-24A(FILTER)	X		505	12300	7980	15500	162		89900 J	15800	1 U	0.5 U	0.4 U			25.20	1011.51	347.11	396.42	2.65	0.00	1871.75	445.07	0.05	0.01	0.00	1780.24	2319.54	13.15	FAIL-F
MCF-24B		6.3	324 J	2520	1470 J	4750	134 J		17400 J	1460	0.1 U	0.59	0.0045 J D	27500	25500 J	16.17	207.24	63.94	121.48	2.20	0.00	362.27	41.13	0.01	0.01	0.00	408.83	405.61	0.40	PASS-UF
MCF-24B(FILTER)	X		350 J	1900	1280 J	3900	346 J		13900 J	1200	0.14 B	0.05 U	0.011 D		21800 J	17.47	156.25	55.68	99.74	5.67	0.00	289.40	33.80	0.01	0.00	0.00	329.14	328.88	0.04	PASS-F
MCF-25A		6.3	470	157	1060	162	75		3660 J	601	0.25	0.005 U	0.2 U	148000	9220	23.45	12.91	46.11	4.14	1.23	0.00	76.20	16.93	0.01	0.00	0.00	86.61	94.38	4.29	PASS-UF
MCF-25A(FILTER)	X		470	160	1060	167	70		3540 J	623	0.26	0.005 U	2.5E-05 J			23.45	13.16	46.11	4.27	1.15	0.00	73.70	17.55	0.01	0.00	0.00	86.99	92.41	3.02	PASS-F
MCF-27		7.8	69.2	21.7	235	13.3	68 J		477	89.8	0.75	0.95	0.00079	600	1530 J	3.45	1.78	10.22	0.34	1.11	0.00	9.93	2.53	0.04	0.02	0.00	15.80	13.63	7.37	FAIL-UF
MCF-27 (FILTER)	X		68.4	21.3	231	12.6	64.4 J		484	90.5	0.74	0.92	0.00076			3.41	1.75	10.05	0.32	1.06	0.00	10.08	2.55	0.04	0.01	0.00	15.53	13.74	6.15	FAIL-F
MCF-28B		7.4	565	3850	9880	2190	80.4 J		22900 J	14800	0.2 U	0.1 U	2 U	45300	54900 J	28.19	316.61	429.75	56.01	1.32	0.00	476.79	416.90	0.01	0.00	0.02	830.57	895.04	3.74	PASS-UF
MCF-28B (FILTER)	X		561	4160	11000	2370	80 J		22600 J	14900	0.2 U	0.1 U	1 U		54700 J	27.99	342.11	478.47	60.61	1.31	0.00	470.54	419.72	0.01	0.00	0.01	909.18	891.59	0.98	PASS-F
MCF-29B		7.5	538 J	9910 J	24800 J	11500 J	116 J		53200 J	35100	1 U	0.5 U	0.4 U	119000	107000 J	26.85	814.97	1078.73	294.12	1.90	0.00	1107.64	988.73	0.05	0.01	0.00	2214.66	2098.34	2.70	PASS-UF
MCF-29B(FILTER)	X		540 J	9880 J	24400 J	11500 J	118 J		53400 J	34100	1 U	0.5 U	0.4 U		107000 J	26.95	812.50	1061.33	294.12	1.93	0.00	1111.81	960.56	0.05	0.01	0.00	2194.89	2074.37	2.82	PASS-F
MCF-30A		8.6	571 J	8700	41200 J	8690	147 J	102 J	27400 J	99600	1 U	0.5 U	0.2 U	175000	180000 J	28.49	715.46	1792.08	222.25	2.41	3.40	570.48	2805.63	0.05	0.01	0.00	2758.29	3381.98	10.16	FAIL-UF
MCF-30A(FILTER)	X		560 J	8640	45700 J	8850	121 J	84.8 J	27200 J	100000	1 U	0.5 U	0.2 U		177000 J	27.94	710.53	1987.82	226.34	1.98	2.83	566.31	2816.90	0.05	0.01	0.00	2952.63	3388.09	6.87	FAIL-F
MCF-30B		8.8	470 J	11700	31100 J	9990	186 J	120 J	66700 J	58700	1 U	0.5 U	2 U	168000	137000 J	23.45	962.17	1352.76	255.50	3.05	4.00	1388.72	1653.52	0.05	0.01	0.02	2593.88	3049.36	8.07	FAIL-UF
MCF-30B(FILTER)	X		415 J	14900	37200 J	11300	130 J	119 J	69000 J	58700	1 U	0.5 U	2 U		136000 J	20.71	1225.33	1618.09	289.00	2.13	3.97	1436.60	1653.52	0.05	0.01	0.02	3153.13	3096.30	0.91	PASS-F
MCF-31B		7.4	615 J	7160 J	24300 J	4230 J	126 J		31100 J	38400	1 U	0.5 U	0.4 U	89700	98400 J	30.69	588.82	1056.98	108.18	2.06	0.00	647.51	1081.69	0.05	0.01	0.00	1784.67	1731.33	1.52	PASS-UF
MCF-31B(FILTER)	X		582 J	6990 J	23900 J	4230 J	136 J		31600 J	38500	1 U	0.5 U	0.4 U		99600 J	29.04	574.84	1039.58	108.18	2.23	0.00	657.92	1084.51	0.05	0.01	0.00	1751.64	1744.72	0.20	PASS-F
MCF-32B		6	518	164	494	142	62.8 J		3190 J	342 J	0.23	0.0092 B	0.019 B D	2900	3210 J	25.85	13.49	21.49	3.63	1.03	0.00	66.42	9.63	0.01	0.00	0.00	64.45	77.09	8.93	FAIL-UF
MCF-32B (FILTER)	X		517	165	496	142	63.6 J		3360 J	366 J	0.23	0.005 U	0.00016 J B D		3210 J	25.80	13.57	21.57	3.63	1.04	0.00	69.96	10.31	0.01	0.00	0.00	64.57	81.32	11.48	FAIL-F
MW-13		7	526	207	531 J	117	128 J		2070	908 J	0.51	21	2.1 D	3700	5840 J	26.25	17.02	23.10	2.99	2.10	0.00	43.10	25.58	0.03	0.34	0.02	69.36	71.16	1.28	PASS-UF
MW-13 (FILTER)	X		536	212	540 J	120	126 J		2090	908 J	0.57	20.9	2.2 D			26.75	17.43	23.49	3.07	2.06	0.00	43.51	25.58	0.03	0.34	0.02	70.74	71.55	0.57	PASS-F
MW-15		7.3	409	184	710 J	74.3	151 J		2450	472 J	2.5	0.026	8.4E-05 J	4300	5170 J	20.41	15.13	30.88	1.90	2.47	0.00	51.01	13.30	0.13	0.00	0.00	68.32	66.91	1.04	PASS-UF
MW-15 (FILTER)	X		397	150	661 J	62.6	148 J		2400	453 J	2.5	0.027	0.00028 J			19.81	12.34	28.75	1.60	2.43	0.00	49.97	12.76	0.13	0.00	0.00	62.50	65.29	2.18	PASS-F
MW-3		7.4	443	202	769 J	76.3	89 J		1990	1200	1.1	0.005 U	0.1 B D	3100	6840 J	22.11	16.61	33.45	1.95	1.46	0.00	41.43	33.80	0.06	0.00	0.00	74.12	76.75	1.75	PASS-UF
MW-3 (FILTER)	X		434	198	766 J	76.1	97 J		1960	1200	1	0.071	7 D			21.66	16.28	33.32	1.95	1.59	0.00	40.81	33.80	0.05	0.00	0.07	73.20	76.32	2.09	PASS-F
MW-4		7.4	518	974	2140	808	69 J		6880	4910	0.36 B	13.8	9.4 D	14400	17200 J	25.85	80.10	93.08	20.66	1.13	0.00	143.24	138.31	0.02	0.22	0.09	219.70	283.02	12.60	FAIL-UF
MW-4 (FILTER)	X		512	962	2120	799	70 J		5790	3590	0.36 B	13.2	8.7 D			25.55	79.11	92.21	20.43	1.15	0.00	120.55	101.13	0.02	0.21	0.09	217.31	223.14	1.32	PASS-F
PC-108		6.2	263	95.6	641	19.7	420 J		780	827	1.1	0.005 U	0.00064	1700	4430 J	13.12	7.86	27.88	0.50	6.88	0.00	16.24	23.30	0.06	0.00	0.00	49.37	46.48	3.02	PASS-UF
PC-108 (FILTER)	X		255	91	624	18.4	407 J		781	810	1.1	0.005 U	0.02 U			12.72	7.48	27.14	0.47	6.67	0.00	16.26	22.82	0.06	0.00	0.00	47.82	45.81	2.15	PASS-F
PC-2		7.4	453	305	989 J	60.6	87		2960	1130	0.59	11.4	4.8 D	6000	7460	22.60	25.08	43.02	1.55	1.43	0.00	61.63	31.83	0.03	0.18	0.05	92.26	95.15	1.54	PASS-UF
PC-2 (FILTERED)	X		444	299	987 J	60.1	84		2850	1110	0.62	11.1	4.5 D			22.16	24.59	42.93	1.54	1.38	0.00	59.34	31.27	0.03	0.18	0.05	91.21	92.24	0.56	PASS-F
PC-24		7.1	835	379	1750 J	24.1	83		2100	3630 J	0.8 B	39.2	19 D	9800	13400	41.67	31.17	76.12	0.62	1.36	0.00	43.72	102.25	0.04	0.63	0.19	149.57	148.20	0.46	PASS-UF
PC-24 (FILTERED)	X		805	368	1690 J	23.5	79		2150	3580 J	0.77 B	40.3	22 D			40.17	30.26	73.51	0.60	1.29	0.00	44.76	100.85	0.04	0.65	0.22	144.54	147.82	1.12	PASS-F
PC-28		7.4	628	231	1130 J	10.6	93		2870	1200 J	0.77 B	41.9	500 D	6600	8440	31.34	19.00	49.15	0.27	1.52	0.00	59.75	33.80	0.04	0.68	5.03	99.76	100.82	0.53	PASS-UF
PC-28 (FILTERED)	X		632	222	1110 J	9.4	92		2850	1170 J	0.72 B	41	530 D			31.54	18.26	48.28	0.24	1.51	0.00	59.34	32.96	0.04	0.66	5.33	98.32	99.83	0.76	PASS-F
PC-4		7	574	341	1160 J	129	95		3110	1630	0.42	25.8	7.5 D	7400	9140	28.64	28.04	50.46	3.30	1.56	0.00	64.75	45.92	0.02	0.42	0.08	110.44	112.74	1.03	PASS-UF
PC-4 (FILTERED)	X		550	330	1120 J	130	89		3130	1660	0.42	25.2	7.3 D			27.45	27.14	48.72	3.32	1.46	0.00	65.17	46.76	0.02	0.41	0.07	106.62	113.89	3.29	PASS-F
PC-67		5.6	709	349	2940 J	25.2	144 J		3120	4300	1.4	48	53 B D	11000	18400 J	35.38	28.70	127.88	0.64	2.36	0.00	64.96	121.13	0.07	0.78	0.53	192.61	189.83	0.73	PASS-UF
PC-67 (FILTER)	X		728	352	3040 J	25.4	132 J		3070	4240	1.4	48.8	59 B D			36.33	28.95	132.23	0.65	2.16	0.00	63.92	119.44	0.07	0.79	0.59	198.16	186.97	2.90	PASS-F
PC-76		7.4	418	232	649 J	37.1	187 J		2010	908	0.93	2.7	0.84 D	4400	5820 J	20.86	19.08	28.23	0.95	3.06	0.00	41.85	25.58	0.05	0.04	0.01	69.12	70.59	1.06	PASS-UF
PC-76 (FILTER)	X		407	230	645 J	38.7	185 J		1970	919	0.95	2.8	0.77 D			20.31	18.91	28.06	0.99	3.03	0.00	41.02	25.89	0.05	0.05	0.01	68.27	70.04	1.28	PASS-F
PC-79		7.3	282	112	558	22.5	202		1110	687	1.1	0.64	3 D	4400	4330	14.07	9.21	24.27	0.58	3.31	0.00	23.11	19.35	0.06	0.01	0.03	48.13	45.87	2.40	PASS-UF
PC-79 (FILTER)	X		286	115	568	23.1	209		1100	687	1.2	0.62	2.9 D			14.27	9.46	24.71	0.59	3.43	0.00	22.90	19.35	0.06	0.01	0.03	49.03	45.78	3.42	PASS-F
PC-80		7.3	191	48.9	480	20.3	284		614	494	1.7	0.012	0.038 D	2500	3210	9.53	4.02	20.88	0.52	4.65	0.00	12.78	13.92	0.09	0.00	0.00	34.95	31.44	5.28	FAIL-UF
PC-80 (FILTER)	X		187	52.9	478	20.1	287		612	501	1.7	0.005 U	0.044 D			9.33	4.35	20.79	0.51	4.70	0.00	12.74	14.11	0.09	0.00	0.00	34.99	31.65	5.01	FAIL-F
PC-81		7.3	121	54.9	725	27.4	324 J		971	703	3.7	0.019 B	0.02 U	1300	3960	6.04	4.51	31.54	0.70	5.31	0.00	20.22	19.80	0.19	0.00	0.00	42.79	45.52	3.10	PASS-UF
PC-81 (FILTER)	X		121	57	712	26.5	325 J		1000	715	3.7	0.018 B	0.02 U			6.04	4.69	30.97	0.68	5.33	0.00	20.82	20.14	0.19	0.00	0.00	42.37	46.48	4.62	PASS-F
PC-88		7.1	263	109	1150	30.1	271 J		1320	1460	1.5	6.1	7.5 D	5700	6320	13.12	8.96	50.02	0.77	4.44	0.00	27.48	41.13	0.08	0.10	0.08	72.88	73.30	0.29	PASS-UF
PC-88 (FILTER)	X		261	111	1090	28.2	266 J		1390	1550	1.5	6.3	6.9 D			13.02	9.13	47.41	0.72	4.36	0.00	28.94	43.66	0.08	0.10	0.07	70.29	77.21	4.70	PASS-F
PC-90			224	92.3	872 J	21.9	234 J		1160	1070	1.4	7.6	6.3 B D	2100		11.18	7.59	37.93	0.56	3.83	0.00	24.15	30.14	0.07	0.12	0.06	57.26	58.39	0.98	PASS-UF
PC-90 (FILTER)	X		229	94.2	876 J	21.4	239 J		1150	1070	1.4	8.1	6.6 B D			11.43	7.75	38.10	0.55	3.92	0.00	23.94	30.14	0.07	0.13	0.07	57.82	58.27	0.39	PASS-F
PC-94		7.1	628	259	780 J	61.5	116 J		2700	1190	0.66	19.3	5.7 B D	3100	7790 J	31.34	21.30	33.93	1.57	1.90	0.00	56.21	33.52	0.03	0.31	0.06	88.14	92.04	2.17	PASS-UF
PC-94 (FILTER)	X		641	262	794 J	60.4	115 J		2690	1190	0.59	19.3	5.3 B D			31.99	21.55	34.54	1.54	1.88	0.00	56.01	33.52	0.03	0.31	0.05	89.61	91.81	1.21	PASS-F

2009 Groundwater Sampling Event - BMI Common Areas - Eastside
Comparison of Filtered and Unfiltered Samples

Well	Filtered	pH	Major Ion Chemistry Data Input											TDS and EC Input		meq/l Calculations										Cation-Anion Balance Tests			
			Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	TDS Measured	EC Measured	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	Cl	F	NO_3	ClO_4	Sum Cations	Sum Anions	(Cat-An)/ (Cat+An)	Acceptable Variance
			20.04	12.16	22.99	39.10	61.02	30.01	48.03	35.50	19.00	61.91	99.50																<5%?
			(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)	(mg/meq)																	
			(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/L)	(umhos/cm)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(%)	
POD2-R		7.4	685	235	1080	27.7	103 J		2560	1570	0.92	20.7	7.9 D	5500	8870 J	34.18	19.33	46.98	0.71	1.69	0.00	53.30	44.23	0.05	0.33	0.08	101.19	99.68	0.76	PASS-UF
POD2-R (FILTER)	X		688	233	1080	28	102 J		2600	1570	0.89	22	7.5 D			34.33	19.16	46.98	0.72	1.67	0.00	54.13	44.23	0.05	0.36	0.08	101.19	100.51	0.34	PASS-F
POD-8		6.9	370	225 J	539 J	32.5 J	197 J		1900	753	0.72	25.4	0.31 D	900	5270	18.46	18.50	23.44	0.83	3.23	0.00	39.56	21.21	0.04	0.41	0.00	61.24	64.45	2.55	PASS-UF
POD-8 (FILTER)	X		366	223 J	533 J	32.3 J	191 J		1860	726	0.71	25.2	0.31 D			18.26	18.34	23.18	0.83	3.13	0.00	38.73	20.45	0.04	0.41	0.00	60.61	62.75	1.74	PASS-F
POU-3		7.4	806	378	1740	33.7	64.8 J		2460	2530	0.2 U	12.2	27 D	7600	11200 J	40.22	31.09	75.69	0.86	1.06	0.00	51.22	71.27	0.01	0.20	0.27	147.85	124.03	8.76	FAIL-UF
POU-3(FILTER)	X		665	305	1440	27	64 J		2400	2470	0.2 U	11.8	20 D			33.18	25.08	62.64	0.69	1.05	0.00	49.97	69.58	0.01	0.19	0.20	121.59	121.00	0.25	PASS-F
WMW5.58SD		7.5	473	11600	21300 J	14800	304 J		67700	28000	1 U	0.5 U	0.083 B D	142000	112000 J	23.60	953.95	926.49	378.52	4.98	0.00	1409.54	788.73	0.05	0.01	0.00	2282.56	2203.31	1.77	PASS-UF
WMW5.58SD (FILTER)	X		488	12000	21900 J	15000	307 J		67800	28100	1 U	0.5 U	0.062 B D			24.35	986.84	952.59	383.63	5.03	0.00	1411.62	791.55	0.05	0.01	0.00	2347.41	2208.26	3.05	PASS-F
WMW5.58SD (FD)		7.5	424	9080	17000 J	11700	305 J		67600	28400	1 U	0.5 U	0.067 B D	138000	114000 J	21.16	746.71	739.45	299.23	5.00	0.00	1407.45	800.00	0.05	0.01	0.00	1806.55	2212.51	10.10	FAIL-UF
WMW5.58SD (FD)(FILTER)	X		462	11200	21100 J	14100	301 J		67200	28000	1 U	0.5 U	0.065 B D			23.05	921.05	917.79	360.61	4.93	0.00	1399.13	788.73	0.05	0.01	0.00	2222.51	2192.85	0.67	PASS-F
WMW5.58SI		7.5	146	59.4 J	369 J	28.9 J	176 J		600	379	1.1	10.6	0.37 D	1100	133000	7.29	4.88	16.05	0.74	2.88	0.00	12.49	10.68	0.06	0.17	0.00	28.96	26.29	4.84	PASS-UF
WMW5.58SI (FILTER)	X		132	56.8 J	361 J	28.1 J	171 J		615	380	1.1	10.8	0.39 D			6.59	4.67	15.70	0.72	2.80	0.00	12.80	10.70	0.06	0.17	0.00	27.68	26.55	2.09	PASS-F
WMW5.58SS		7.5	117	52.3 J	252 J	28 J	153 J		503	307	0.86	13.9	0.012 D	1000	2220	5.84	4.30	10.96	0.72	2.51	0.00	10.47	8.65	0.05	0.22	0.00	21.82	21.90	0.19	PASS-UF
WMW5.58SS (FILTER)	X		122	54.2 J	261 J	28.2 J	152 J		476	291	0.94	13.8	0.018 D			6.09	4.46	11.35	0.72	2.49	0.00	9.91	8.20	0.05	0.22	0.00	22.62	20.87	4.02	PASS-F

Total Samples:	234
Passing:	196
Failing:	38
Total Unfiltered:	117
Passing Unfiltered:	94
Failing Unfiltered:	23
% Passing:	80.3
Total Filtered:	117
Passing Unfiltered:	102
Failing Unfiltered:	15
% Passing:	87.2

Summary of Cation-Anion Balance and Related Calculations
2009 Groundwater Sampling Event - BMI Common Areas - Eastside
Comparison of Field and Laboratory Measured Alkalinity

Well	Zone	pH	Major Ion Chemistry Data Input										TDS and EC Input		meq/l Calculations										Cation-Anion Balance Tests				TDS Checks		
			Ca	Mg	Na	K	HCO_3	SO_4	Cl	F	NO_3	ClO_4	TDS Measured	EC Measured	Ca	Mg	Na	K	HCO_3	SO_4	Cl	F	NO_3	ClO_4	Sum Cations	Sum Anions	(Cat-An)/ (Cat+An)	Acceptable Variance <5%?	TDS Sum	Lab/Sum Ratio	Acceptable Ratio 1.0 - 1.2
															20.04	12.16	22.99	39.10	61.02	48.03	35.50	19.00	61.91	99.50							
			(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/L)	(umhos/cm)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(meq/l)	(%)		(mg/l)	-	
AA-08	Shallow	7.2	454	208	657	32.9	163 Lab	1820	975	1.3	6.2	3.3 B D	3500	5840	22.65	17.11	28.58	0.84	2.67	37.89	27.46	0.07	0.10	0.03	69.18	68.23	0.69	PASS-LA	4255.50	0.82	FAIL-LA
AA-08 (FA)	Shallow	7.2	454	208	657	32.9	152 Field	1820	975	1.3	6.2	3.3 B D	3500	5840	22.65	17.11	28.58	0.84	2.49	37.89	27.46	0.07	0.10	0.03	69.18	68.05	0.82	PASS-FA	4248.90	0.82	FAIL-FA
AA-20	Shallow	6.9	556	235	898 J	44.2	78 J Lab	2540	1100	0.22	14.7	5.3 D	6400	7640 J	27.74	19.33	39.06	1.13	1.28	52.88	30.99	0.01	0.24	0.05	87.26	85.45	1.05	PASS-LA	5440.22	1.18	PASS-LA
AA-20 (FA)	Shallow	6.9	556	235	898 J	44.2	79 Field	2540	1100	0.22	14.7	5.3 D	6400	7640 J	27.74	19.33	39.06	1.13	1.29	52.88	30.99	0.01	0.24	0.05	87.26	85.47	1.04	PASS-FA	5440.82	1.18	PASS-FA
AA-27	Shallow Upgradient	7.6	513	192	535	8.58	126 Lab	2320	422	2	12.5	0.23 D	3300	4980	25.60	15.79	23.27	0.22	2.06	48.30	11.89	0.11	0.20	0.00	64.88	62.56	1.82	PASS-LA	4080.91	0.81	FAIL-LA
AA-27 (FA)	Shallow Upgradient	7.6	513	192	535	8.58	122 Field	2320	422	2	12.5	0.23 D	3300	4980	25.60	15.79	23.27	0.22	2.00	48.30	11.89	0.11	0.20	0.00	64.88	62.50	1.87	PASS-FA	4078.51	0.81	FAIL-FA
AA-UW-4	Shallow Upgradient	7.6	401	194	919	16	78 Lab	2920	304	0.81	12.6	0.077 D	4300	5700	20.01	15.95	39.97	0.41	1.28	60.80	8.56	0.04	0.20	0.00	76.35	70.88	3.71	PASS-LA	4814.29	0.89	FAIL-LA
AA-UW-4 (FA)	Shallow Upgradient	7.6	401	194	919	16	71 Field	2920	304	0.81	12.6	0.077 D	4300	5700	20.01	15.95	39.97	0.41	1.16	60.80	8.56	0.04	0.20	0.00	76.35	70.77	3.79	PASS-FA	4810.09	0.89	FAIL-FA
AA-UW-6	Shallow Upgradient	7.6	384	151	342	62.4	66 Lab	2240	201	0.57	8.8	0.05 D	3700	4280	19.16	12.42	14.88	1.60	1.08	46.64	5.66	0.03	0.14	0.00	48.05	53.55	5.42	FAIL-LA	3429.42	1.08	PASS-LA
AA-UW-6 (FA)	Shallow Upgradient	7.6	384	151	342	62.4	75 Field	2240	201	0.57	8.8	0.05 D	3700	4280	19.16	12.42	14.88	1.60	1.23	46.64	5.66	0.03	0.14	0.00	48.05	53.70	5.55	FAIL-FA	3434.82	1.08	PASS-FA
DBMW-3	Shallow	7.6	562	367 J	970 J	104 J	56.4 J Lab	3230	1410	0.24	15.4	7.6 D	6600	8350	28.04	30.18	42.19	2.66	0.92	67.25	39.72	0.01	0.25	0.08	103.08	108.23	2.44	PASS-LA	6700.08	0.99	FAIL-LA
DBMW-3 (FA)	Shallow	7.6	562	367 J	970 J	104 J	60 Field	3230	1410	0.24	15.4	7.6 D	6600	8350	28.04	30.18	42.19	2.66	0.98	67.25	39.72	0.01	0.25	0.08	103.08	108.29	2.47	PASS-FA	6702.24	0.98	FAIL-FA
DBMW-4	Shallow	7.5	631	237	681	84.8	90.8 J Lab	2610	952	0.092 B	27.7	4.1 D	4400	6590 J	31.49	19.49	29.62	2.17	1.49	54.34	26.82	0.00	0.45	0.04	82.77	83.14	0.22	PASS-LA	5282.17	0.83	FAIL-LA
DBMW-4 (FA)	Shallow	7.5	631	237	681	84.8	84 Field	2610	952	0.092 B	27.7	4.1 D	4400	6590 J	31.49	19.49	29.62	2.17	1.38	54.34	26.82	0.00	0.45	0.04	82.77	83.03	0.16	PASS-FA	5278.09	0.83	FAIL-FA
DBMW-7	Shallow	5.3	658	289	617	71.8	65.2 J Lab	2410	1430	U	42.7	3.1 D	6900	7510 J	32.83	23.77	26.84	1.84	1.07	50.18	40.28	0.00	0.69	0.03	85.27	92.25	3.93	PASS-LA	5560.72	1.24	FAIL-LA
DBMW-7 (FA)	Shallow	5.3	658	289	617	71.8	157 Field	2410	1430	U	42.7	3.1 D	6900	7510 J	32.83	23.77	26.84	1.84	2.57	50.18	40.28	0.00	0.69	0.03	85.27	93.75	4.74	PASS-FA	5615.80	1.23	FAIL-FA
MCF-05	Middle	7.7	470	15300	19500	13300	127 Lab	80900 J	30900	U	U	U	180000	105000	23.45	1258.22	848.19	340.15	2.08	1684.36	870.42	0.00	0.00	0.00	2470.03	2556.87	1.73	PASS-LA	160446.20	1.12	PASS-LA
MCF-05 (FA)	Middle	7.7	470	15300	19500	13300	127 Field	80900 J	30900	U	U	U	180000	105000	23.45	1258.22	848.19	340.15	2.08	1684.36	870.42	0.00	0.00	0.00	2470.03	2556.87	1.73	PASS-FA	160446.20	1.12	PASS-FA
MCF-06A-R	Deep	6.6	250	15800	37800 J	10800	90.4 J Lab	70700	62000	U	U	U	178000	137000 J	12.48	1299.34	1644.19	276.21	1.48	1472.00	1746.48	0.00	0.00	0.00	3232.23	3219.96	0.19	PASS-LA	197404.24	0.90	FAIL-LA
MCF-06A-R (FA)	Deep	6.6	250	15800	37800 J	10800	88 Field	70700	62000	U	U	U	178000	137000 J	12.48	1299.34	1644.19	276.21	1.44	1472.00	1746.48	0.00	0.00	0.00	3232.23	3219.92	0.19	PASS-FA	197402.80	0.90	FAIL-FA
MCF-16C	Shallow	7.4	601	600	602	308	83.6 J Lab	6290	1050	0.43 B	16.6	8.7 B D	11500	11200 J	29.99	49.34	26.19	7.88	1.37	130.96	29.58	0.02	0.27	0.09	113.39	162.29	17.73	FAIL-LA	9526.89	1.21	FAIL-LA
MCF-16C (FA)	Shallow	7.4	601	600	602	308	83 Field	6290	1050	0.43 B	16.6	8.7 B D	11500	11200 J	29.99	49.34	26.19	7.88	1.36	130.96	29.58	0.02	0.27	0.09	113.39	162.28	17.73	FAIL-FA	9526.53	1.21	FAIL-FA
MCF-18A	Deep	6.4	2670	2680	58900 J	7090	28 J Lab	3590	114000	U	U	0.0061 J D	163000	196000 J	133.23	220.39	2561.98	181.33	0.46	74.74	3211.27	0.00	0.00	0.00	3096.94	3286.47	2.97	PASS-LA	188946.81	0.86	FAIL-LA
MCF-18A (FA)	Deep	6.4	2670	2680	58900 J	7090	34 Field	3590	114000	U	U	0.0061 J D	163000	196000 J	133.23	220.39	2561.98	181.33	0.56	74.74	3211.27	0.00	0.00	0.00	3096.94	3286.57	2.97	PASS-FA	188950.41	0.86	FAIL-FA
MCF-20A	Deep	6.8	392	12200 J	29500 J	9470 J	90 J Lab	70100	61300	U	U	U	174000	3840	19.56	1003.29	1283.17	242.20	1.47	1459.50	1726.76	0.00	0.00	0.00	2548.22	3187.74	11.15	FAIL-LA	183016.00	0.95	FAIL-LA
MCF-20A (FA)	Deep	6.8	392	12200 J	29500 J	9470 J	69 Field	70100	61300	U	U	U	174000	3840	19.56	1003.29	1283.17	242.20	1.13	1459.50	1726.76	0.00	0.00	0.00	2548.22	3187.40	11.14	FAIL-FA	183003.40	0.95	FAIL-FA
POD2-R	Shallow	7.4	685	235	1080	27.7	103 J Lab	2560	1570	0.92	20.7	7.9 D	5500	8870 J	34.18	19.33	46.98	0.71	1.69	53.30	44.23	0.05	0.33	0.08	101.19	99.68	0.76	PASS-LA	6249.02	0.88	FAIL-LA
POD2-R (FA)	Shallow	7.4	685	235	1080	27.7	98 Field	2560	1570	0.92	20.7	7.9 D	5500	8870 J	34.18	19.33	46.98	0.71	1.61	53.30	44.23	0.05	0.33	0.08	101.19	99.59	0.80	PASS-FA	6246.02	0.88	FAIL-FA

Total Samples:	28		28
Passing:	22		6
Failing:	6		22
Total Lab Alkalinity:	14		14
Passing Lab Alkalinity	11		3
Failing Lab Alkalinity	3		11
% Passing:	78.6		21.4
Total Field Alkalinity:	14		14
Passing Field Alkalinity	11		3
Failing Field Alkalinity:	3		11
% Passing:	78.6		21.4

Summary of Cation-Anion Balance and Related Calculations
2009 Groundwater Sampling Event - BMI Common Areas - Eastside

Notes:
NR - not reported
mg/L - Milligrams per Liter
(1) For samples with anion sum > 800 meq/L, see Table 1b for Cation-Anion Balance Results
(2) No temperature values available for MCF-06A-R and MCF-20A due to equipment malfunction. A value of 26.6˚ C used in density calculation, taken from average of other wells in table
Density calculated from http://www.earthwardconsulting.com/density_calculator.htm
Well PC-90 was removed since no value for EC was reported.

Qualifiers:
J-TDS: TDS measured/sum and/or TDS:EC ratio checks do not pass; Cation-anion balance check does pass
R-CAB&TDS: Cation-anion balance check does not pass; TDS measured/sum and/or TDS:EC ratio check do not pass